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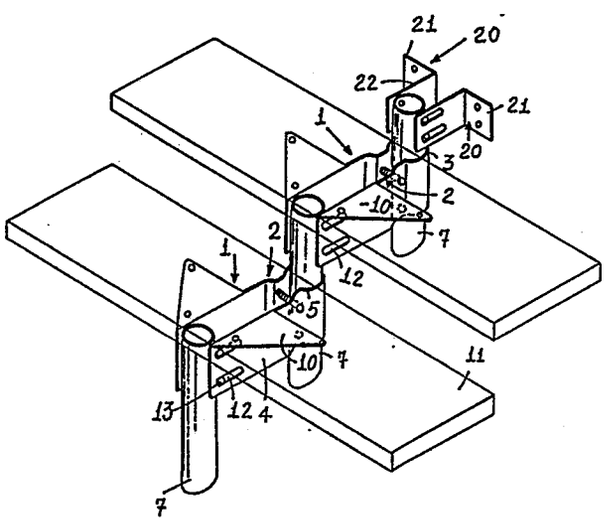
(54) Modular composable element for making stepladders.

(57) A modular composable element for making ladders in general comprises an elongated body (1) supporting a plate-like element (11) and provided with a central portion to be coupled, at one end whereof, with a portion engageable with an adjoining modular lower element and defining, at the other end, a sleeve element (3) to be engaged with the upright portion of an adjoining modular upper element. There are further included means for locating the upright portion (7) with respect to the central portion (2), which means maxy be displaced perpendicularly to the upright portion (7) and movably locked for changing the width of the step.



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The present invention relates to a modular composable element for making stepladders in general.

As it is known, composable modular elements are presently commercially available which are specifically designed for making stepladders and which, in a conventional embodiment, comprise a shelf-shaped central portion defining the supporting zone for a plate-like element forming practically a step.

The mentioned shelf-shaped central portion is provided, at one end whereof, with an upright portion or pin to be coupled to a sleeve portion provided at the other end of the shelf shaped central portion of a lower modular element.

With that structure the possibility is obtained of changing, by changing the coupling of the upright portion and the sleeve, the step pitch, within a broad range, as well as the mutual slanting of the steps, in the case therein winding staircases are to be made.

On the other hand, the above mentioned structure does not afford the possibility of varying the width of the step, with consequent great limitations during the stepladder making work.

Another drawback of the above known structure is that the presently available modular composable elements are very complex and of a comparatively high cost.

Accordingly, the task of the present invention is that of overcoming the above mentioned drawbacks by providing such a modular composable element, for

making stepladders in general, which affords the possibility of changing, depending on the contingent requirements, the pitch, mutual slanting of the steps, as well as the useful width of said steps.

Within the scope of the above task, it is a main object of the present invention to provide such a modular composable element which is of very simple structure and may be made starting from a bent sheet metal element, thereby providing comparatively light and strong stepladders.

Another object of the present invention is to provide such a modular composable element for making stepladders in general which, owing to its constructional features, is able of providing a great reliability and safety of use.

Yet another object of the present invention is to provide such a modular composable element for making stepladders in general which may be easily made starting from easily available elements and materials and which, moreover, is of a comparatively reduced cost.

According to one aspect of the present invention the above task and objects, as well as yet other objects which will become more apparent thereinafter, are achieved by a modular composable element, for making stepladders in general, comprising an elongated body, supporting a plate-like element and provided with a central portion to be coupled, at one end whereof, with an upright portion, engageable with an adjoining lower modular element and defining, at the other end

whereof, a sleeve element to be engaged with the upright portion of an adjoining upper modular element, characterized in that it comprises moreover means for locating said upright portion, with respect to the central portion, which may be displaced perpendicularly to the upright portion and may be movably locked in position, in order to vary the width of the step.

Further characteristics of the modular composable element for making stepladders in general according to the present invention will become more apparent thereinafter from the following detailed description of a preferred embodiment whereof, being illustrated, by way of example and not of limitation, in the accompanying drawings, where:

fig.1 is a schematic perspective view illustrating some modular composable elements according to the present invention as mutually coupled for making a stepladder portion;

fig.2 is an elevation view illustrating a stepladder portion;

fig.3 is a top view illustrating a modular element according to the invention;

and

fig.4 is a vertical cross-sectional view illustrating a modified embodiment for stabilizing the coupling between the upright and the central portion.

With reference to the figures of the accompanying drawings, the modular composable element for making stepladders in general according to the present invention, essentially comprises an elongated body, indicated overally by the reference number 1, which consists of a central portion 2 defining, at one end whereof, a sleeve element 3.

The mentioned elongated body 2 is practically made starting from a U-bent sheet metal portion, provided with an edge portion pair 4 defining said central portion 2 and a portion circumpherentially extending and defining the sleeve element 3.

Between the central portion 2 and the sleeve element 3 there is defined a groove 5, therein there are engaged clapmping bolts 6, for coupling the upright portion 7 of an adjoining upper modular element.

At the other end, the mentioned central portion engages with an upright portion 7, downwardly extending.

The edge portions 4 of the central portion 2 are provided at the top with wings 10, advantageously of triangular shape, which lie in a substantially horizontal plane and which act as a supporting element for a plate-like element 11.

A main feature of the invention is that the mentioned central portion 2 is coupled with the upright portion 7, downwardly extending, with a possibility of being displaced along a substantially perpendicular direction to the upright portion 7 itself.

In order to obtain the mentioned coupling, there are provided locating means, advantageously consisting of a slot pair 12, longitudinally extending on the central portion 2.

With the mentioned slots clamping bolts 13 are coupled which diametrically extend with respect to the upright portion 7, owing to the provision of throughgoing holes 14 in such a way that, after having located the upright portion 7 and central portion 2 with respect to one another, it will be possible to lock it in position, thereby the great advantage will be obtained of changing at will the useful width of the step being made.

In order to improve the coupling stability between the central portion 2 and upright 7, which, under load, would be susceptible to rotate, it is possible to provide, at the top end of the upright 7, annular recesses 30 arranged at the holes 14. Correspondingly, the slots 12 will have their edges 12a inwardly bent with a shape fitting the shape of the annular recesses 30.

Thus a firm coupling between the central portion 2 and the upright 7 will be obtained, thereby any rotations about a substantially horizontal axis will be prevented from occurring in such a way as to improve the stability of the formed stepladder.

It should be moreover noted that, at the top step, there are applied fixing brackets, indicated at 20 which are provided with a fixing wing 21 and a coupl-

ing wing 22, engageable with the mentioned upright portion 7.

Accordingly the above disclosed modular composable element affords the possibility of changing, between a step and the other, both the mutual slanting and the pitch or elevation, as in the conventional steps, and moreover it affords the possibility of varying the useful width, since the upright portions can be fixed at different positions with respect to the central portion 2.

From the above disclosure it should be noted that the present invention fully achieves the intended objects.

In particular the fact is pointed out that a modular composable element for making stepladders in general is provided which is construction-wise very simple and, being of U-shape, it provides, by its edge portions 4, a clamping means engaging firmly with the upright elements, both at the bottom and at the top, thereby providing the stepladder with a great stability.

Moreover the sliding coupling, with a possibility of locking between the upright and central portion, affords the possibility of adjusting, in a quick and easy way, the width of the steps.

In practicing the invention the used materials, though the best results have been obtained by using metal materials, as well as the contingent shape and size, will be any depending on the needs.

C L A I M S

1- A modular composable element, for making stepladders in general, comprising an elongated body, supporting a plate-like element and provided with a central portion to be coupled, at one end whereof, with an upright portion, engageable with an adjoining lower modular element and defining, at the other end whereof, a sleeve element to be engaged with the upright portion of an adjoining upper modular element, characterized in that it comprises moreover means for locating said upright portion (7), with respect to said central portion (2), which may be displaced perpendicularly to the upright portion (7) and may be movably locked in position, in order to vary the width of the step.

2- A modular composable element for making stepladders in general, according to the preceding claim, characterized in that said elongated body (1) consists essentially of a U-bent sheet metal portion defining a pair of edge portions (4) facing one another and forming said central portion (2), said edge portions being coupled by a circumpherantially extending portion defining a sleeve element (3).

3- A modular composable element for making stepladders in general, according to claim 2, characterized in that it is provided, between said edge portions (4) and said sleeve element (3), with a groove (5) therein clamping bolts (6) are engaged for fixing said upright portion (7).

4- A modular composable element for making stepladders in general, according to claim 1, characterized in that it comprises substantially horizontally extending wings (10) extending from said edge portions (4) for supporting said plate-like element (11).

5- A modular composable element for making stepladders in general, according to claim 1, characterized in that said means for locating said upright portion (7) consist of an elongated slot pair (12) longitudinally extending on said edge portions (4), in said slots (12) there being engaged fixing bolts (13) radially passing through said upright portion (7).

6- A modular composable element for making stepladders in general, according to claim 1, characterized in that said upright portion (7) is provided, at the engaging region of said bolts (13), with annular recesses (30) therein there are movably engaged the inwardly bent edges (12a) of said elongated slots (12), said bent edges (12a) having a shape fitting the shape of said annular recesses (30).

7- A modular composable element for making stepladders in general, according to claim 1, characterized in that it comprises brackets (20) for fixing the top step of the ladder, provided with a fixing wing (21) and a coupling wing (22), provided with horizontally extending slots.

8- A modular cimposabke element for making stepladders in general, according to the preceding claims, all as broaderly described and illustrated, and for the specified purposes.

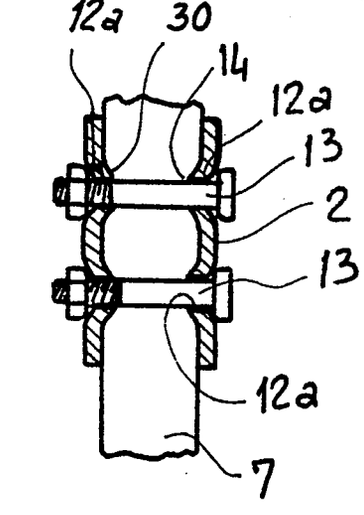

Fig. 4

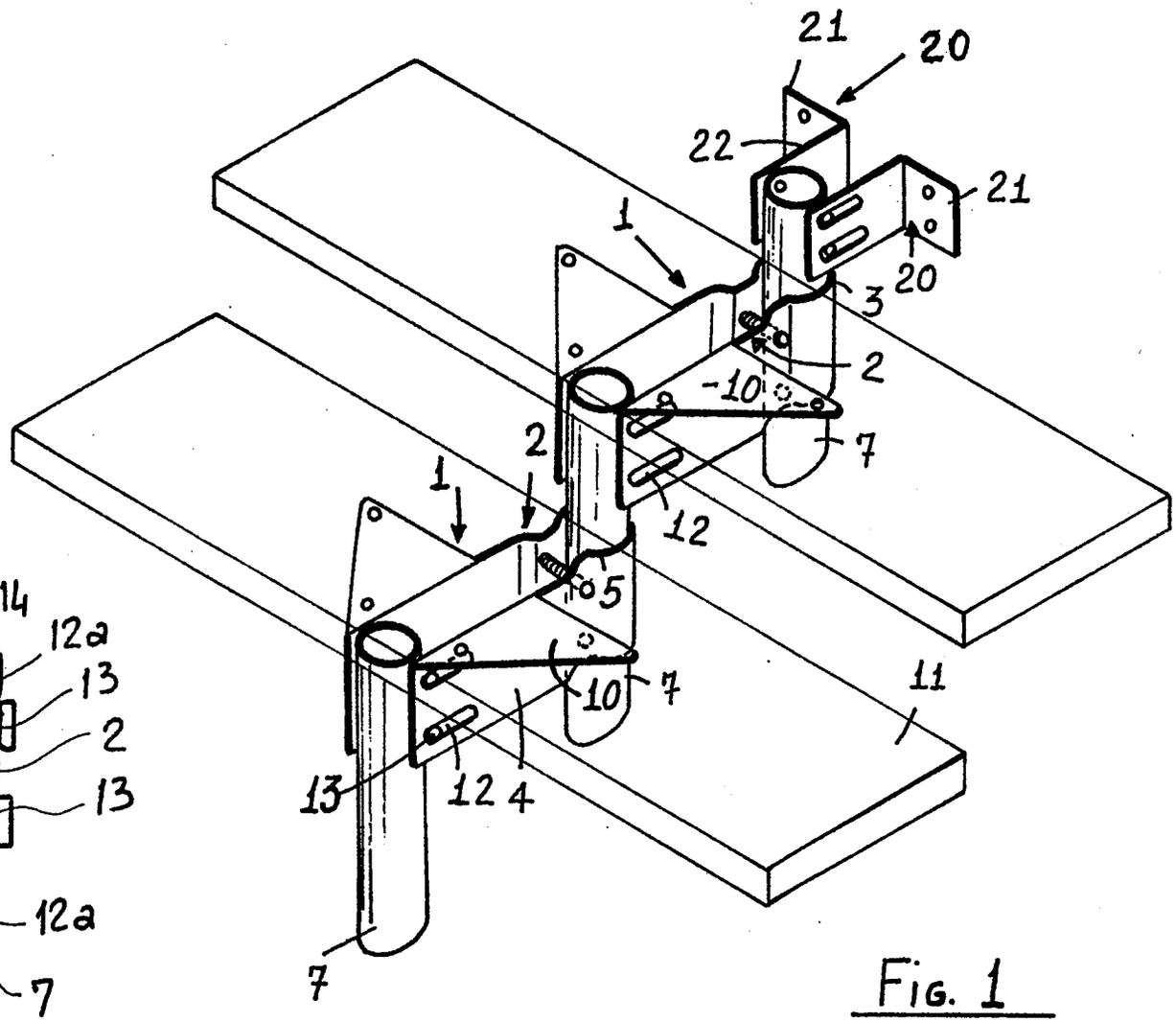

Fig. 1

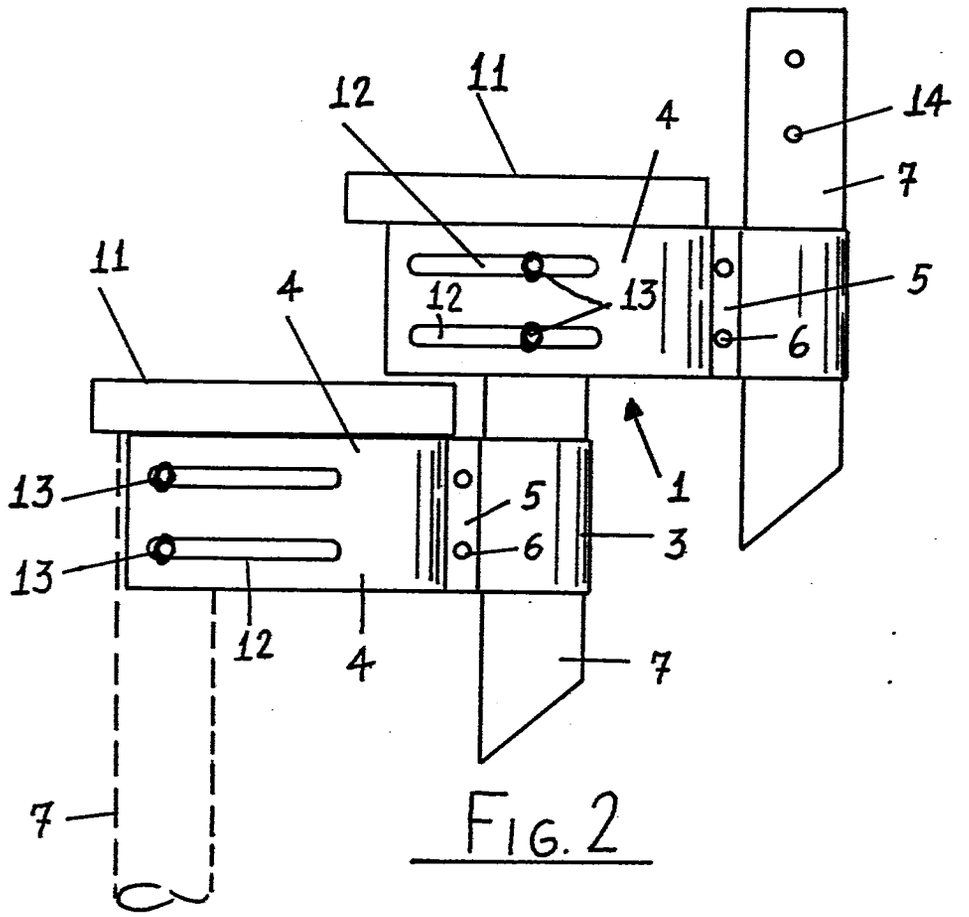

FIG. 2

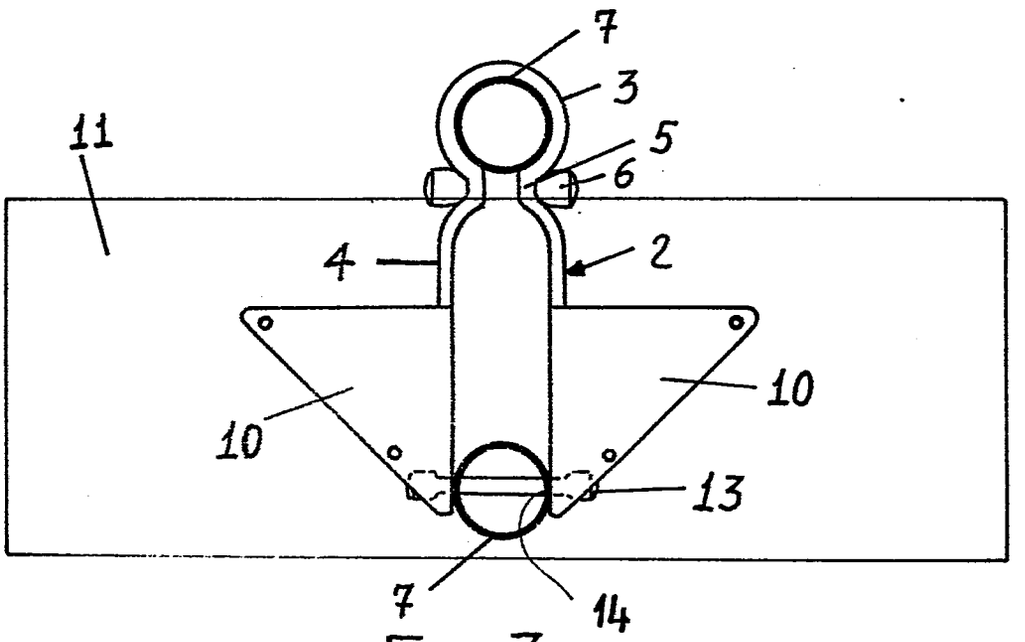

FIG. 3