Nov. 3, 1931. C. A. DAHLBERG 1,830,017

SCAFFOLDING

Filed Aug. 2, 1928 2 Sheets-Sheet 1

Fig. 1.

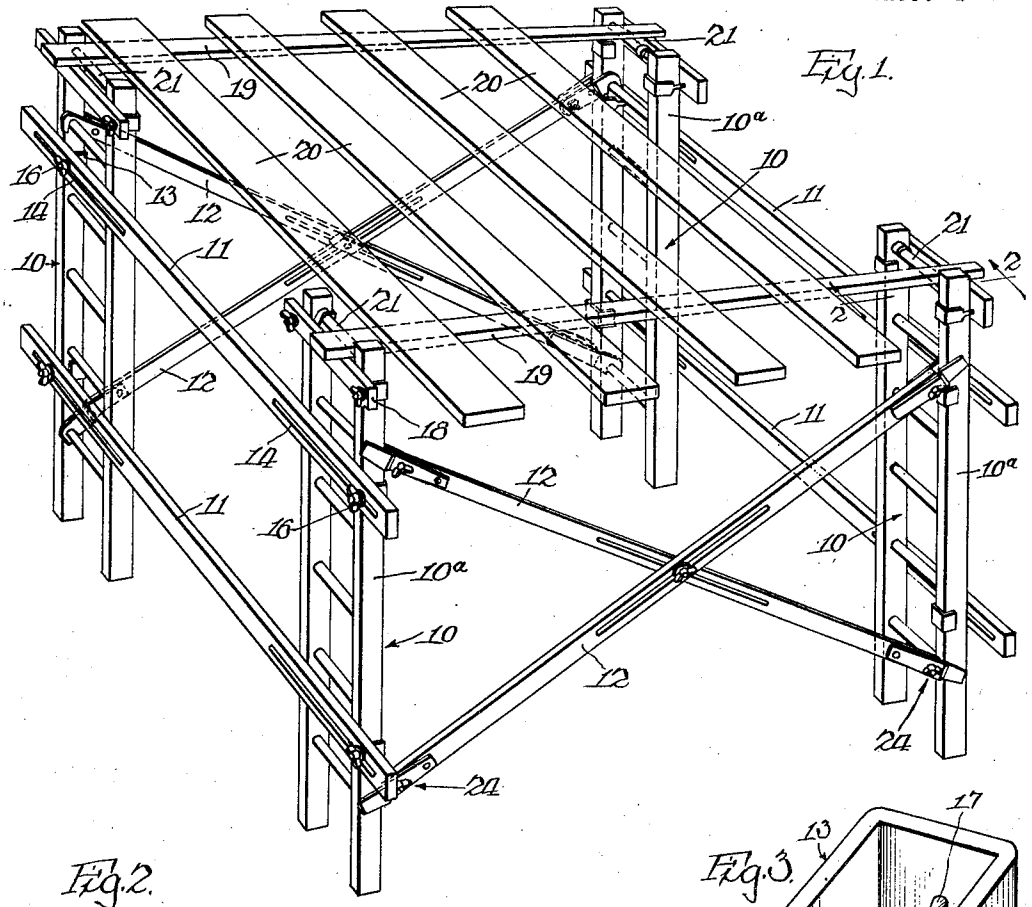


Fig. 2.

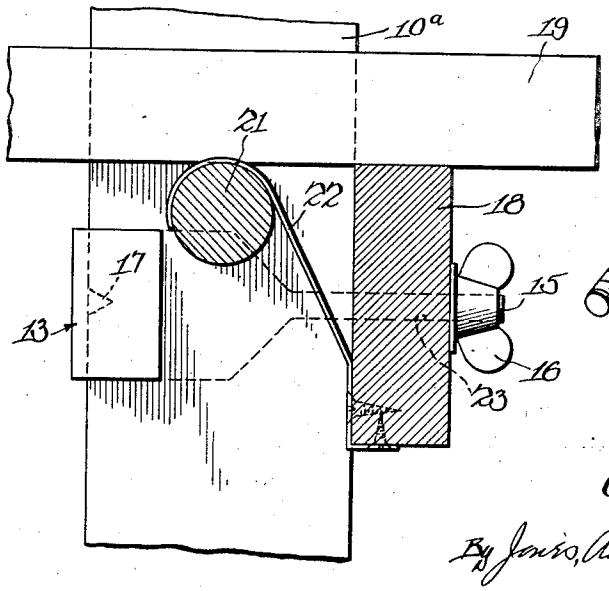
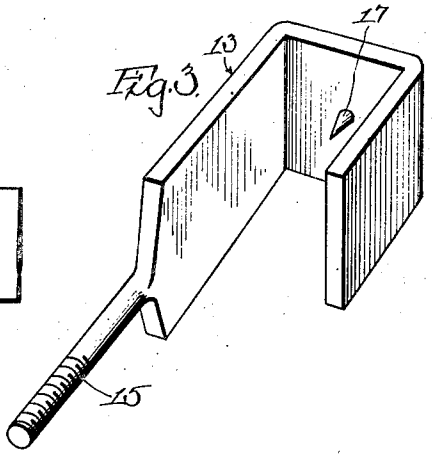


Fig. 3.



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Fig. 4.

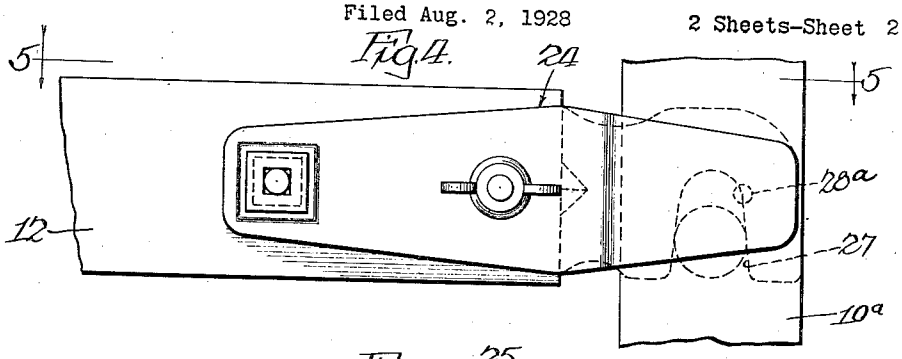


Fig. 5.

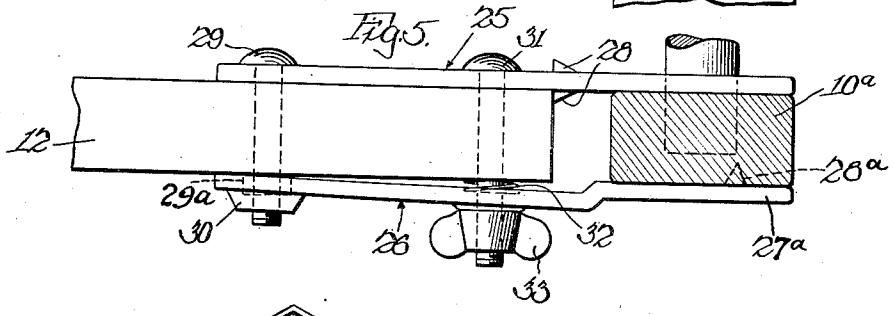


Fig. 7.

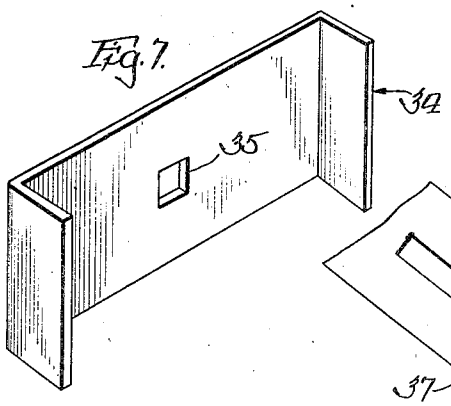
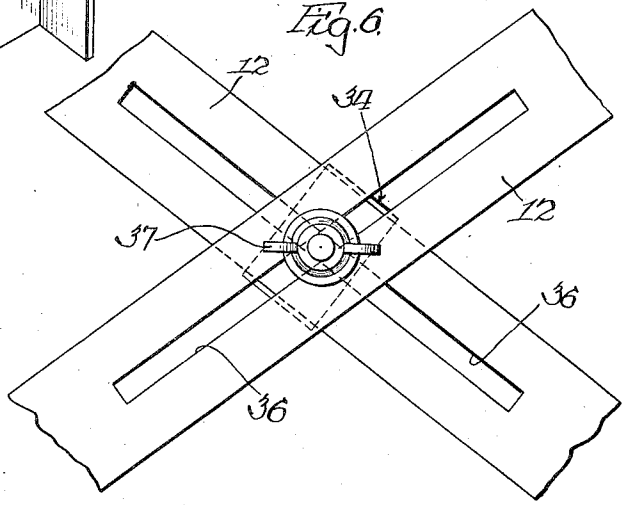


Fig. 6.



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UNITED STATES PATENT OFFICE

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SCAFFOLDING

Application filed August 2, 1928. Serial No. 296,926.

This invention relates to scaffolding and has special reference to scaffolding of the self-sustaining ladder type for the general use of painters, carpenters, plasterers and other workmen.

More particularly this invention relates to a scaffolding construction comprising a plurality of uprights in the form of ordinary ladders, including extension ladders, held in a self-sustaining relation by means of readily adjustable cross supports and having end supporting members disposed across reinforced rungs of cooperating ladders for carrying a platform in the nature of cross-planks or the like, capable of sustaining the weight of workmen and the necessary tools and materials.

One of the objects of this invention is to provide a scaffolding construction which may be readily assembled, which is rigid after it is assembled and which consists of a minimum number of simple connecting members.

Particular attention will be directed hereinafter to the connecting members for attachment between the ordinary ladders, which latter act as the uprights, and the cross supports, which latter provide the self-sustaining relation between the several uprights. In the embodiment illustrated, two forms of connecting members are shown and it is to be noted that the same idea is contemplated by each. The connecting members alone are provided with fittings, holes and the like, while the uprights or ladders are free therefrom, thereby permitting the use of the ordinary ladders and such other ordinary materials as are necessary to complete the construction of such a device.

In a great number of instances, it will merely be necessary for the workmen to provide the connecting members of this construction, the remaining members or elements thereof being obtained at the place of use, that is to say, the various planks for the platform and end supporting members, together with the ladders, are to be found at almost any building wherever the scaffolding of this invention may be employed.

Other objects and advantages will hereinafter be more fully described and for a more complete understanding of the nature, characteristics and scope of this invention, reference may now be had to the following description when taken together with the accompanying drawings, in which latter—

Figure 1 is a perspective of the complete scaffolding as contemplated by the present invention;

Fig. 2 is a cross sectional view taken on the line 2—2 of Figure 1, showing more particularly a connecting member and its relation with its associated parts;

Fig. 3 is a perspective view of the connecting member shown in Figure 2;

Fig. 4 is a side elevational view of a modified form of connecting member, showing its position between an upright and a cross member;

Fig. 5 is a plan view partially in section, taken on the line 5—5 of Figure 4;

Fig. 6 is a side elevational view of a connection between a pair of cross supports, and

Fig. 7 is a perspective view of one of the elements of the connection shown in Fig. 6.

Referring more particularly to the drawings, the scaffolding is comprised of a plurality of uprights 10, in the form of the ordinary ladders, connected together in a manner to provide a self-sustaining relation therebetween.

In the construction shown in the drawings, four ladders are shown, pairs of adjacent ladders being connected across the face sides thereof by means of cross supports 11 and opposite pairs of ladders being connected across their edges by means of members 12. Although but four such ladders are shown in the drawings, it is to be understood that any number thereof may be provided, as the connected members to be hereinafter described, will operate to provide the self-sustaining relation between a greater number of ladders in the same manner as shown in the present illustration. Further, extension ladders may be employed to accommodate any desired height.

The cross members 11 comprise preferably an ordinary wood 2 x 4 of any desirable length, having a slotted portion extending

for a comparatively great distance, adjacent to each end thereof. It is, of course, to be understood that a channel iron member or any other desirable member may be used in lieu of the 2 x 4. A portion of a connecting member 13 engages each of the slots 14 and provides a fixed connection to the upright 10 in a manner such as will now be described.

The connecting member 13 comprises a U-shaped strap formed preferably of malleable or wrought iron although a casting of suitably heavy material may be employed. One end of the U-shaped member is reduced and threaded as at 15 to be inserted through the slot 14 to receive a wing nut 16. The U-shaped portion of the connecting member 13 is of a sufficient width to embrace the upright of any ladder, although it may be preferable to have several sizes of connecting members 13, that is, of various widths, in order that a snug engagement may exist between the side walls of the U-shaped member and the upright of the ladder. However, this latter is merely suggestive of what may be done in this construction, and it is to be understood that a single casting may be effective on any size upright.

A spur 17 is provided on the inside side of the U-shaped bracket and comprises a conical-shaped or pointed portion which may be formed integrally with the bracket or may be riveted thereto in any well known manner. The spur 17 may be of a comparatively low height to facilitate the assembly of the structure. Hereinafter I will describe the position of this spur as being on the "facing surface" of the connecting member in the sense that that particular surface faces the surface of the upright which this spur 17 engages.

In the assembly of the connecting member and the upright 10*a* of the ladder 10, the U-shaped portion is positioned to embrace the upright and the threaded portion 15 is inserted through the slot 14. The wing nut 16 is then screwed on the threaded portion 15 to exert a pressure against the face of the cross member 11, the cross member 11 abutting against the front edge of the upright, whereafter, a continued tightening of the wing nut 16 pulls the strap portion of the connecting member 13 against the rear edge of the upright 10*a* of the ladder 10, whereby the spur 17 penetrates into the wood of the ladder a sufficient distance to hold the connecting member in a fixed vertical position. It will be noted that a secure anchorage is obtained to prevent a downward displacement of the cross member 11 at any desired height. This latter advantage will be of even greater benefit in its use to be hereinafter recited.

The cross member 11 is provided preferably with a pair of connecting members 13 at each end thereof to engage the elongated slot 14, one connecting member being provided to embrace each of the uprights 10*a* of the ladders 10. One cross member 11 is provided adjacent the top of the ladders and a similar cross brace 11 is provided adjacent the lower end of the ladders. However, should a plurality of extension ladders be employed it will be apparent that the upper and lower ends of the extensions should be similarly anchored.

A construction similar to the foregoing is employed at the upper end of each of the ladders as shown in the drawings for a different purpose. A member 18 formed preferably of the usual 2 x 4 is adapted to reinforce a run 21 of the ladder on which the end supporting member 19 for carrying the platform is mounted. These members 18 are shown as reinforcing the uppermost rungs 21 of the ladder, although it is apparent that they could be shifted to a position adjacent any rung. By referring now particularly to Fig. 2 of the drawings the assembly of the various aforementioned elements is illustrated more particularly. In order that the upper edge of the cross member 18 be in the same plane as the upper portion of the rung 21 so as to relieve the rung of a portion of the strain of carrying the end support 19, a strap 22 is fixedly secured to the cross member 18. One end of the strap 22 is secured to the lower end of the cross member 18, the upper end thereof being formed into a hook-shaped member to rest on the rung 21. The strap 22 merely predetermines the proper position for clamping the member 18 to the upright 10*a*.

In the assembly of this construction the cross member 18, having straps 22 fixedly secured thereto, is placed adjacent to the edge of the upright 10*a*. The hook portion of each of the straps 22 is disposed over the rung 21, one of the straps being provided at each end of the end supporting member 18. The strap 22 is sufficiently strong to hold the member 18 in position against the uprights 10*a* and the U-shaped portion of the connecting member 13 is then positioned to embrace the upright 10*a*, the threaded reduced portion 15 being inserted through an aperture 23 in the member 18. The wing nut 16 is then screwed on the threaded portion 15 against the member 18 whereafter the facing edge of the connecting member 13 is drawn against the rear edge of the upright 10*a* and the spur 17 penetrates into the material thereof. In this manner of construction a downward displacement of the member 18 is prevented and it is therefore held at a desired height predetermined by the strap 22 to relieve the rung 21 of a portion of the weight of the end supporting member 19 and the platform disposed thereon.

The cross members 12 are provided at their outer ends with a modified form of connecting member 24. This connecting mem-

ber comprises a pair of spaced gripping arms 25 and 26 disposed on opposite sides and at each end of the cross members 12. As will hereinafter be apparent, these gripping arms 25 and 26 are interchangeable and one set thereof may be employed on either end of the cross member 12. The gripping arm 25 is provided with a tapered slot 27 for engaging a rung of the ladder 10. The fork provided by this slot, which latter extends from the outer surface of the gripping arm to a central portion thereof, is adapted to accommodate any sized rung because of the tapered shape of the slot.

The cross member 12 engages a stop member 28 in order that it may not extend to the upright 10*a* of the ladder, one such stop member being provided on each side of the arm 25 in order to permit the same of being interchangeable. However, if two stop members should not be desirable, one thereof may be omitted with the provision of tapered slots 27 on each side of the arm.

The gripping arm 26 is disposed on the opposite side of the cross member 12 to that of gripping arm 25 and comprises a shank portion having an off-set head portion 27*a*, the off-set portion 27*a* having a spur 28*a* preferably formed integrally therewith or riveted thereto for engaging and penetrating into the upright 10*a*. The shank portion has a depressed portion at the outer end thereof which is preferably square in shape to receive the nut of a carriage bolt in snug engagement therewith.

The nut 29*a* is screwed on the end of the carriage bolt 29 which latter extends through the gripping arms 25 and 26 and the cross member 12 to afford a fixed relation therebetween, the head of the carriage bolt being disposed on the outside of the gripping arm 25. The shank portion of the bolt 29 is square, as is usual in carriage bolts, and engages a square hole in the gripping arm 25 to keep the bolt from turning when the nut is screwed in place. The end of the carriage bolt extends through the embossed portion 30 of the gripping arm 26, the carriage bolt 29 merely positioning the end of the gripping finger 26 although not preventing lateral displacement thereof.

A second carriage bolt 31 is disposed preferably adjacent the end of the member 12 and substantially midway between the ends of the gripping arms 25 and 26. The bolt extends through both gripping arms and the member 12, the head of the carriage bolt abutting against the outside side of the gripping arm 25 and the square portion thereof extending through a square hole in the gripping arm 25 to prevent the bolt from turning. A coil spring 32 is disposed between the gripping arm 26 and the member 12 on the bolt 31 to urge the gripping arm 26 away from the member 12. A wing nut 33 is disposed on the outer end of the carriage bolt 31 on the outside side of the gripping arm 26 and engages a boss on the shank portion of the gripping arm, the boss being for the purpose of providing enough stock so that the inner surface of the gripping finger may be recessed to accommodate the coil spring 32 and hold the same in the definite relation between the cooperating members 26 and 12.

When it is desired to assemble the cross members 12 in the scaffolding construction to provide for a self-sustaining relation between the ladders 10, the thumbscrew 33 is unscrewed to permit the coil spring 32 to urge the gripping arm 26 a substantial distance from the member 12, thereby providing a substantial distance between the off-set lead portion 27*a* and the outer end of the gripping arm 25. The distance between these latter described members is great enough to accommodate the upright of any ladder. These arms are then extended about the sides of the upright and the arm 25 engages one of the rungs.

The thumbscrew 33 is next tightened against the tension of the coil spring 32, whereafter the spur 28*a* engages the upright 10*a* and penerates thereinto perferably until the inner surface of the portion 27 engages the edge of the upright along the entire cooperating surfaces thereof. By reason of the spur penetrating into the material of the upright, a displacement of the member 12 will be prevented.

Pairs of members 12 are preferably crossed and secured together at the points of intersection by means of the following construction. The members 12 are slotted for a substantial distance on each side of a central point thereof and a U-shaped bracket 34 is disposed on the outer side of one of the members. The U-shaped portion is provided with a square aperture 35 in axial alignment with the slot of the member 12 at a central point longitudinally thereof. An ordinary carriage bolt is then extended through the U-shaped bracket 34, the head of the carriage bolt abutting against the outside side of the bracket and the square portion of the bolt snugly engaging the square hole 35. The carriage bolt extends through the slots 36 of the members 12 at the points of intersection thereof and a wing nut 37 is screwed on the outer end of the bolt and tightened as desired to provide a rigid construction. A pair of cross members 12 are provided for one set of uprights of each of opposite pairs of ladders which, together with the cross supports 11, provide for a rigid construction and one which consists of a minimum number of simple connecting members.

While but a single embodiment of this invention is herein shown and described, it is to be understood that various modifications will be apparent to those skilled in the art

without departing from the spirit and scope of this invention and therefore the same is to be limited only by the scope of the prior art and the appended claims.

I claim:

1. A connecting member for use between elements of a scaffold and comprising a portion for engaging one of said elements and having a spur on a facing surface and a second portion permanently engaging in a detachable relation a second of said elements, and means on said latter portion for causing said spur to penetrate into said element to cause a fixed relation between said elements.

2. A connecting member for use between elements of a scaffold and comprising a portion for engaging one of said elements and having a spur on a facing surface, a second portion permanently engaging in a detachable relation a second of said elements, and means on said latter portion for urging said first mentioned portion against said first mentioned element to cause said spur to penetrate into said element.

3. A connecting member for use between an upright and a cross support of a scaffolding and comprising a portion for engaging said upright and having a spur on a facing surface, a second portion permanently engaging in a detachable relation said cross support and means on said second portion for urging said second portion in a direction toward said upright to cause said spur to penetrate therein to prevent a displacement of said cross support.

4. A connecting member for use between elements of a scaffold and comprising arms for embracing opposite sides of one of said elements, said member being fixedly connected to another of said elements, and a spur for engaging said first mentioned element to cause a fixed relation between both of said elements.

5. A connecting member for use between an upright and a cross support of a scaffolding and comprising a pair of arms extending over and secured to said cross support on opposite sides thereof, said arms embracing opposite sides of said upright, a spur on a facing surface of one of said arms, said last mentioned arm being laterally adjustable to cause said spur to penetrate into said upright, thereby providing a fixed relation between said upright and said cross support.

6. A connecting member for use between an upright and a cross support of a scaffolding and comprising a pair of arms extending over and secured to said cross support on opposite sides thereof, said arms embracing opposite sides of said upright, a spur on a facing surface on one of said arms, said last mentioned arm being spring urged to extend apart a substantial distance from the other of said arms, and adjusting means for acting against said spring to cause said spur to penetrate into said upright, thereby providing a fixed relation between said upright and said cross support.

7. A supporting member adapted to be used with a ladder for supporting a platform member resting on a rung of said ladder and comprising a cross member, straps connected to said cross member, said straps being formed at one end to fit over a rung of said ladder, and means adjacent the ends of said cross member for tightly securing the same to the uprights of said ladder.

8. A supporting member adapted to be used with a ladder for supporting a platform member resting on a rung of said ladder and comprising a cross member, straps formed at one end to engage the side and bottom of said cross member and at the other end to fit over a rung of said ladder to hold the top of said cross member at the same height as the top of said rung, and adjustable means adjacent the ends of said cross members for tightly securing the same to the uprights of said ladder.

9. A connecting member for use with an upright of a ladder and a cross support of a scaffolding comprising a pair of arms extending over and secured to said cross support on opposite sides thereof, said arms embracing opposite sides of said upright, one of said arms being provided with a slot for engaging a rung of said ladder, a spur on a facing surface of the other of said arms, said last mentioned arm being laterally adjustable to cause said spur to penetrate into said upright, whereby to provide a fixed relation between said upright and said cross support.

10. Intersecting cross supports for connecting together the uprights of ladders in a scaffolding and having means adjacent their middle for adjustably securing said cross supports in a fixed relation at their points of intersection, said cross supports having a pair of arms at each end extending over and secured thereto on opposite sides thereof, said arms embracing opposite sides of said uprights, one of said arms being provided with a tapered slot for engaging a rung of one of said ladders, a spur on a facing surface of the other of said arms, said last mentioned arm being laterally adjustable to cause said spur to penetrate into said upright whereby to provide a fixed relation between said uprights and said cross supports.

In witness whereof, I have hereunto subscribed my name.

CARL A. DAHLBERG.