July 2, 1963 H. G. LEONARD 3,096,064

SUSPENSION STRUCTURE FOR DEMOUNTABLE SCAFFOLDS

Filed March 23, 1961 2 Sheets-Sheet 1

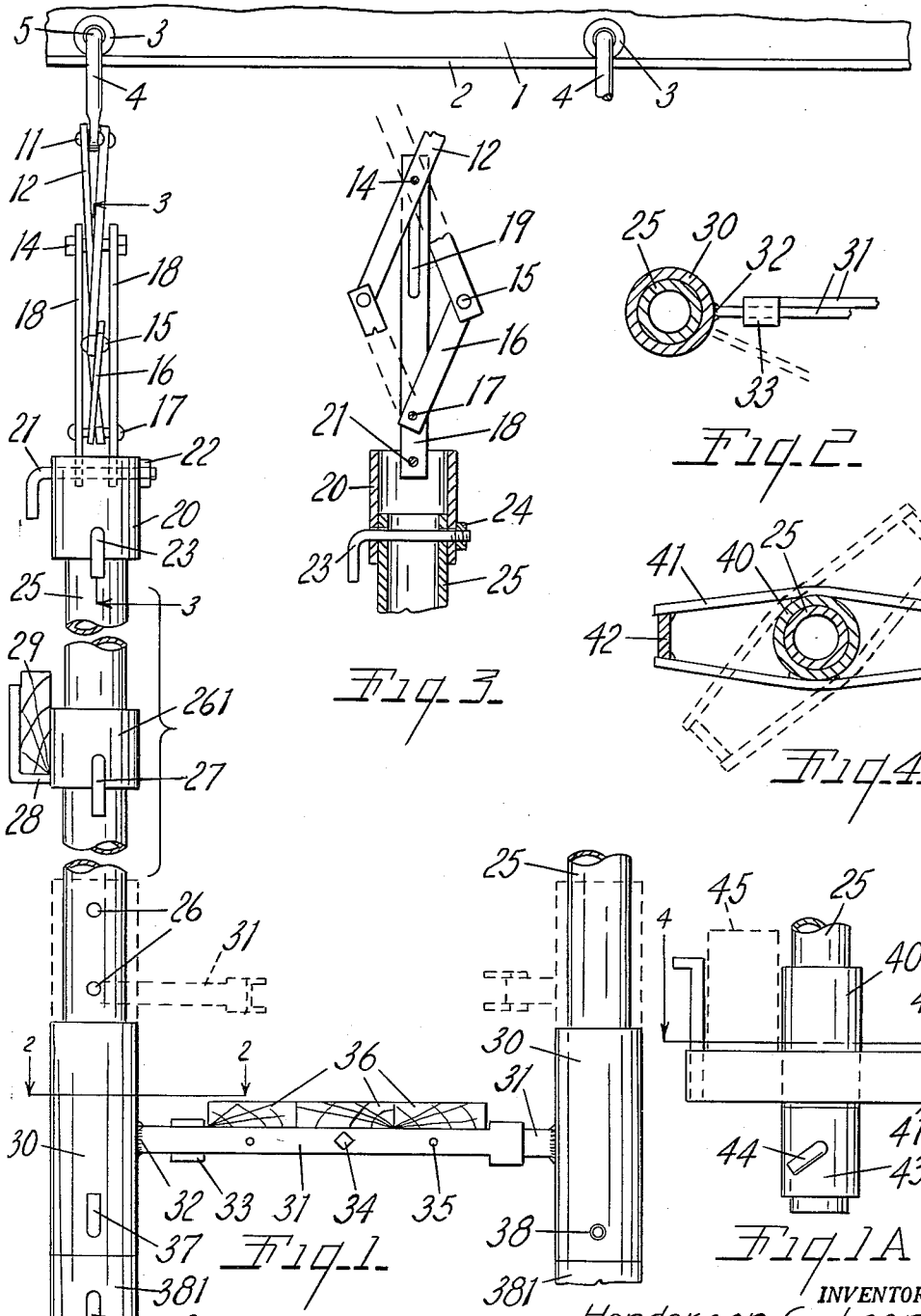

Fig. 1

Fig. 3

Fig. 2

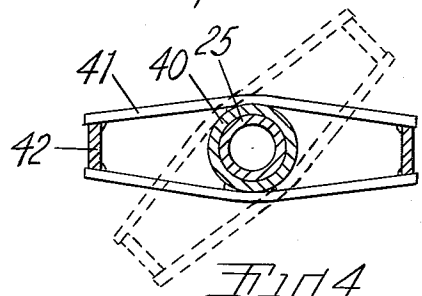

Fig. 4

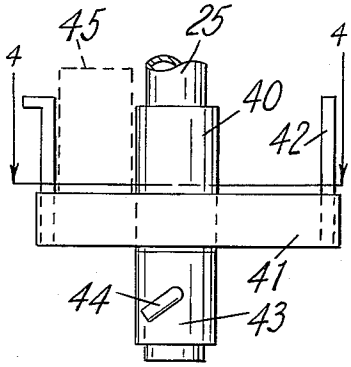

Fig. 1A

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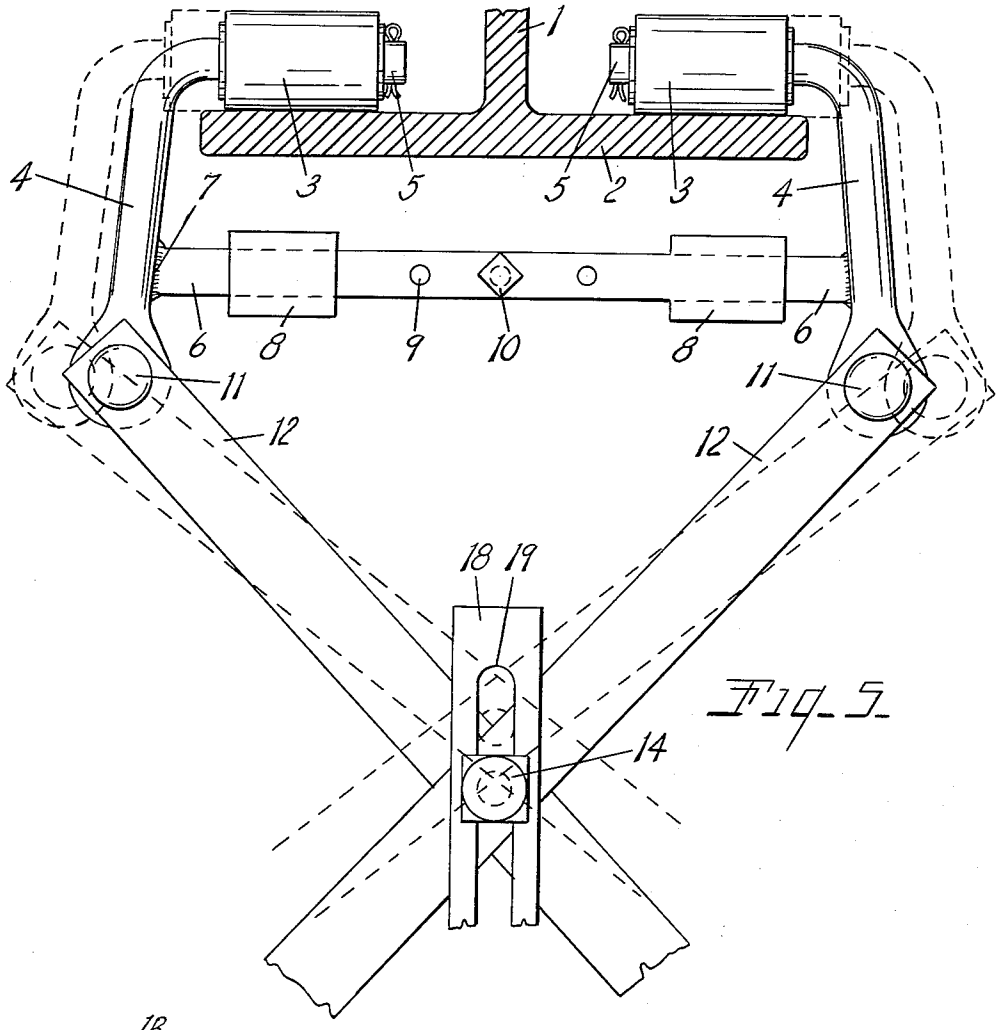

Fig. 5.

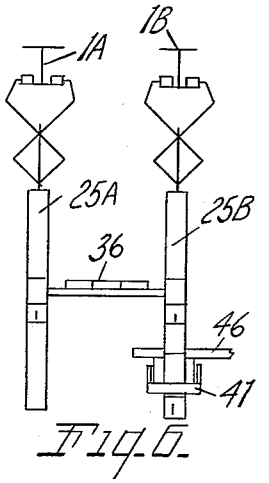

Fig. 6.

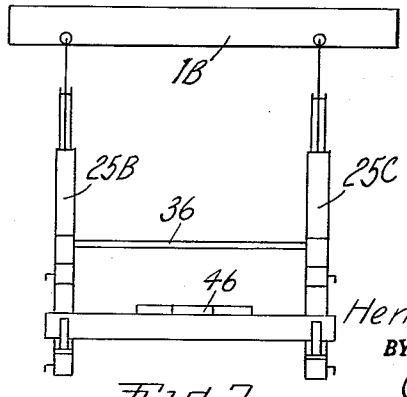

Fig. 7.

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SUSPENSION STRUCTURE FOR DEMOUNTABLE SCAFFOLDS

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This invention relates to improvements in suspension structure for demountable scaffolds. The principal objects of this invention are:

First, to provide an improved form of suspended hanger capable of supporting scaffolding in a plurality of positions.

Second, to provide hanger structure which can be raised from below and engaged with an overhead beam with a minimum of effort and thereafter have scaffold supporting and bracing elements selectively connected thereto for supporting scaffolds at various positions.

Third, to provide demountable scaffold supporting structure with means for effectively bracing adjacent portions of the supporting structure whereby similar hanger elements can be arranged in various positions and interconnected and braced to support a scaffold platform.

Fourth, to provide a demountable scaffold structure in which the several load supporting elements are easily separated for convenient handling and erection and in which the elements are easily and securingly connectable for safely supporting a scaffold and the load on the scaffold.

Other objects and advantages of the invention will be apparent from a consideration of the following description and claims. The drawings, of which there are two sheets, illustrate a highly practical form of the suspended scaffold supporting structure in various uniformly erected forms thereof.

FIG. 1 is a fragmentary elevational view of one end of a scaffold supported by two of the scaffold hanger elements embodying the invention.

FIG. 1A is a fragmentary elevational view of the lower end of one of the scaffold hanger assemblies appearing in FIG. 1.

FIG. 2 is a fragmentary transverse cross sectional view taken along the plane of the line 2—2 in FIG. 1.

FIG. 3 is a fragmentary vertical cross sectional view through the beam engaging hanger supporting elements taken along the plane of the line 3—3 in FIG. 1.

FIG. 4 is a fragmentary horizontal cross sectional view through the lower end of the hanger assembly taken along the plane of the line 4—4 in FIG. 1A.

FIG. 5 is a fragmentary enlarged side elevational view of the beam engaging and hanger supporting elements of the assembly, a portion of a supporting beam being shown in cross section.

FIG. 6 is a conventional illustration of one end of one possible element of the scaffold supporting mechanism of the invention.

FIG. 7 is a conventionally illustrated side elevational view of the scaffold and supporting structure shown in FIG. 6.

The scaffold supporting structure of the invention is designed primarily for use with overhead structural beams such as are found on bridges and in factory and warehouse buildings. The supporting structure is intended to be used in plural combinations and in different elements with respect to the beams from which they are supported to accomplish the objects of the invention set out above.

FIGS. 1 and 1A illustrate the details of the scaffold supporting hanger assembly of the invention in one possible assembled relation to a supporting beam and a scaffold. Since the hanger assemblies are duplicates only one hanger is disclosed completely with enough of another hanger to show the assembled relationship between the two. An overhead supporting I beam is illustrated at 1 having the usual oppositely projecting lower flanges 2 with which the rollers 3 of the hanger assembly are supportingly engaged. The rollers 3 are rotatably mounted on opposed hook members 4 having oppositely inwardly projecting pintles or bearing portions 5 (see FIG. 5) rotatably received in the rollers. The hook members 4 extend substantially straight downwardly over the edges of the flanges 2 and are connected toward their lower ends by oppositely inwardly extending tie bars 6 welded to the hooks as at 7. The tie bars have retaining loops or bands 8 on their ends which slidably receive and laterally retain the tie bars together. A plurality of holes 9 are formed through the overlapped portions of the tie bars and after erection of the hanger a safety bolt 10 is passed through selected registering holes to fixedly connect the two tie bars and the books 4.

At their lower ends the hooks 4 are provided with pivot pins 11 engaged with the upper ends of a first pair of suspension links 12—12. The links 12—12 are arranged in crossing relation and pivotally connected intermediate of their ends by a pivot pin or bolt 14. At their lower divergent ends the links 12 are connected by pivot pins 15 to the upper ends of a second pair of links 16. The links 16 converge downwardly and are connected at their lower ends by a pivot pin 17 supported by a pair of spaced guide bars 18. The upper ends of the guide bars 18 define slots 19 which receive and vertically guide the movement of the central pivot 14 of the upper links. The lower ends of the guide bars 18 are connected to a tubular connector member or collar 20 by means of a cross bolt or pin 21 passed through the collar and the guide bars and secured in place by a nut 22. The foregoing assembly from the hook members 4 and rollers 3 to the connector collar 20 constitute an adjustable scissors hanger unit which can be easily engaged with the supporting beam 2 by opening the scissors links 12 and hook members 4 as shown in dotted lines in FIG. 5 and lifting the assembly to the beam 2. After the rollers are engaged over the flanges of the beam, a downward force applied to the connector member collapses the scissors links and draws the hook members and rollers together over the beam flanges so that they cannot be accidentally disengaged from the flange. The connector 20 and the scissors assembly is relatively light and can be manually raised and engaged with the beam with a separate lift rod or with the scaffold supporting pipe which will be described presently.

The connector sleeve or collar 20 has transversely aligned holes formed in its lower end arranged to receive the cross pin or bolt 23 in threaded engagement with a nut 24 welded to one side of the connector. The pin 23 removeably supports the upper end of a scaffold supporting pipe or tube 25. The pipe 25 is the main suspension element of the hanger assembly and is provided with a plurality of holes 26 along its length to receive connecting and supporting elements at selected elevations as will be described. These connecting elements are added subsequently to the erection of the pipe and scissors assembly to reduce the weight which must be lifted and engaged with the beam at one time.

When it is desired to provide a hand rail for the scaffold being erected, a first sleeve 261 is slid upwardly over the pipe 25 and secured in place by a cross pin or bolt 27. The sleeve 261 has a laterally projecting angle bracket 28 secured thereto and adapted to receive and support one end of a hand rail 29. It will be appreciated that the other end of the hand rail will be supported from a similar hanger structure engaged with an adjacent beam 2 or other suitable support. When two hanger tubes 25 are suspended in side by side relation from the same beam

as shown in FIG. 1, the two tubes can be interconnected and braced relative to each other by a second sleeve 30 slid upwardly over the lower ends of the tubes. The sleeves 30 carry laterally projecting brace and support arms 31 welded to the sleeves as at 32. At their outer ends the arms 31 carry laterally turned flanges 33 which swing into vertically overlapped relation with the adjacent brace arm when the sleeve and arms are leveled and rotated into engagement with each other. This swiveling and interlocking engagement between the brace arms is extremely useful in bringing together and cross bracing two previously individually suspended hanger pipes 25.

After the brace arms are engaged and overlapped with the desired spacing between the pipes a connecting bolt 34 is passed selectively through holes 35 in the brace arms to prevent accidental disengagement of the arms. The connected brace arms then become a support for one end of scaffold planks 36 if desired. As a further safety factor preventing rotation of the sleeves 30, a cross pin or bolt 37 is passed through the sleeve and the hanger pipes 25 and threadedly engaged with a tapped hole in the opposite side of the sleeve as appears at 38 in FIG. 1. The pin or bolt 37 performs the dual function of vertically supporting the sleeve 30 on the pipe while also preventing rotation between the sleeve and pipe. To further support the sleeve 30 and the brace arms 31 particularly when the scaffold planks are supported thereon, a third collar 381 is positioned around the pipe below the sleeve 30 and secured in place by the removable cross pin or bolt 39.

As appears in FIG. 1A the pipe 25 extends below the collar 381 and is adapted at its lower end to receive the rotatable sleeve 40 having transverse stirrup bars 41 welded to its sides and projecting laterally therefrom to the upright retainer bars 42. The sleeve 40 is selectively supported upon the pipe 25 by a collar 43 pinned in place by the pin or bolt 44. The sleeve 40 and stirrup bars 41 can be rotated to any desired position as indicated by the dotted lines in FIG. 4 and in all adjusted positions will support a scaffold cross beam as indicated by the dotted lines at 45. The cross beam 45 may extend to a similar hanger and stirrup bar 41 as appears in FIG. 7 or may extend to any other suitable support for supporting a second scaffold platform 46 as shown in FIG. 7.

FIGS. 6 and 7 show one possible method of utilizing four hanger assemblies to support either or both of the scaffold platforms 36 and 46. Without repeating the detailed description of each hanger assembly and identifying the assemblies as 25A, 25B and 25C, it will be apparent that the hangers 25A and B are supported from adjacent parallel I beams 1A and 1B. A similar pair of hangers of which only the hanger 25C is visible engage the I beams at points spaced along the I beams so that the platform 36 is supported below and parallel to the I beams while the platform 46 is supported below and transversely to the platform 36. Depending upon the type of work to be performed from the scaffolds either one or the other or both of scaffolds 36 and 46 can be supported from this set of hanger assemblies. Regardless of the combination of scaffold and scaffold supporting parts selected they are all easily attachable to the several hanger pipes 25 after the pipes have been suspended from the overhead beams.

What is claimed as new is:

1. Suspended demountable scaffold structure comprising a pair of hangers each including

opposed rigid hook members having beam engaging rollers on their upper ends,

laterally inwardly extending tie bars connected to said hook members adjacent the lower ends thereof,

means securing said bars in overlapping slidable relation,

removable pin means selectively connecting said tie bars,

first suspension links pivoted on the lower ends of said hook members and pivotally connected to each other in crossing relation at their mid-sections,

second suspension links pivotally connected to the lower ends of said first links,

upright guide means comprising spaced bars having slots formed in their upper ends slidably receiving and guiding the pivot connection at the mid-section of said first links and pivotally connected at their lower ends to the lower ends of said second links,

a tubular connector of circular cross section pinned to the lower end of said guide means,

a suspension pipe telescopically received in said connector and removably pinned thereto, a sleeve rotatably and axially adjustable on said pipe and having a laterally projecting brace and support arm arranged in lapped engagement with the similar brace on the suspension pipe of the other hanger,

bolt means connecting said bases of said pair of hangers,

a supporting collar sleeved around each of said pipes and removably pinned thereto below said sleeves to support said sleeves.

2. Suspended demountable scaffold structure comprising

opposed rigid hook members having beam engaging rollers on their upper ends,

laterally inwardly extending tie bars connected to said hook members adjacent the lower ends thereof,

means vertically securing said bars in overlapping slidable relation,

means selectively and transversely connecting said tie bars,

first suspension links pivoted on the lower ends of said hook members and pivotally connected to each other in crossing relation at their mid-sections,

second suspension links pivotally connected to the lower ends of said first links,

upright guide means having slots slidably receiving and guiding the pivot connection at the mid-section of said first links and pivotally connected at its lower end to the lower ends of said second links,

a connector of circular cross section removably pinned to the lower end of said guide means,

a suspension pipe telescopically engaged with said connector and removably pinned thereto,

a sleeve rotatably and axially adjustable on said pipe and having a laterally projecting brace and support arm swingable into lapped engagement with a similar brace on a similar pipe,

means on said brace transversely connectable with said similar brace,

and a supporting collar sleeved around said pipe and removably pinned thereto below said sleeve to support said sleeve.

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