July 8, 1969 W. J. S. JOHNSON ET AL 3,454,131

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Filed Jan. 26, 1968 Sheet 1 of 4

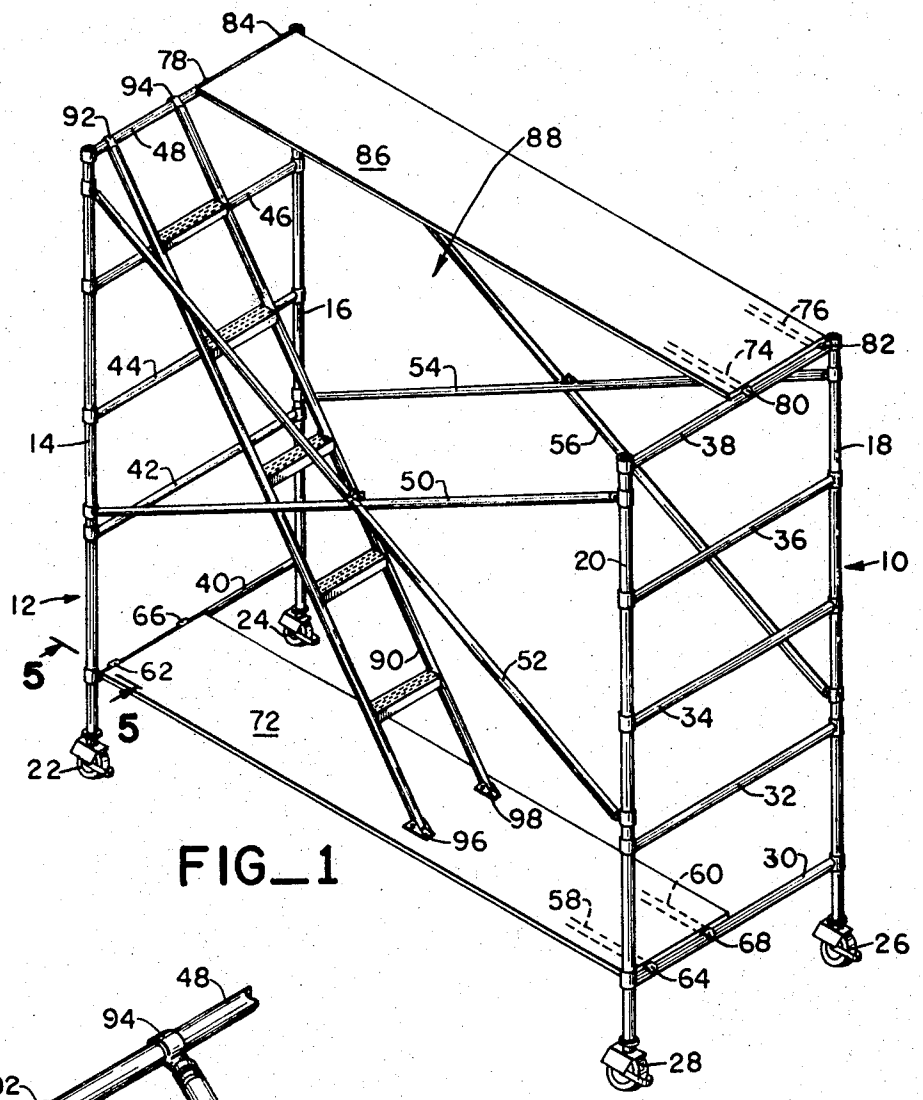


FIG_1

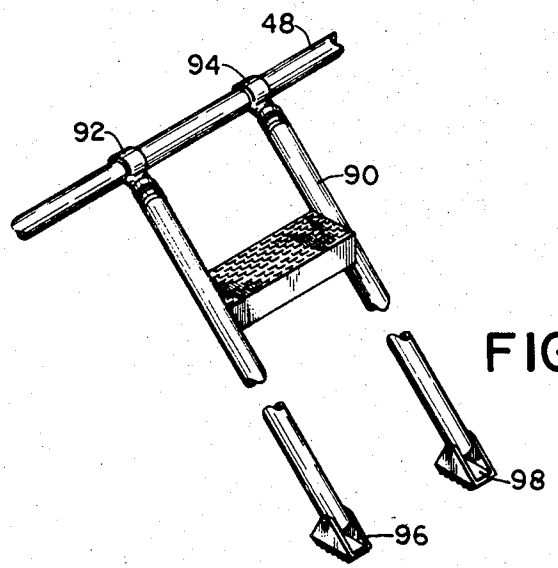


FIG_2

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Filed Jan. 26, 1968 Sheet 2 of 4

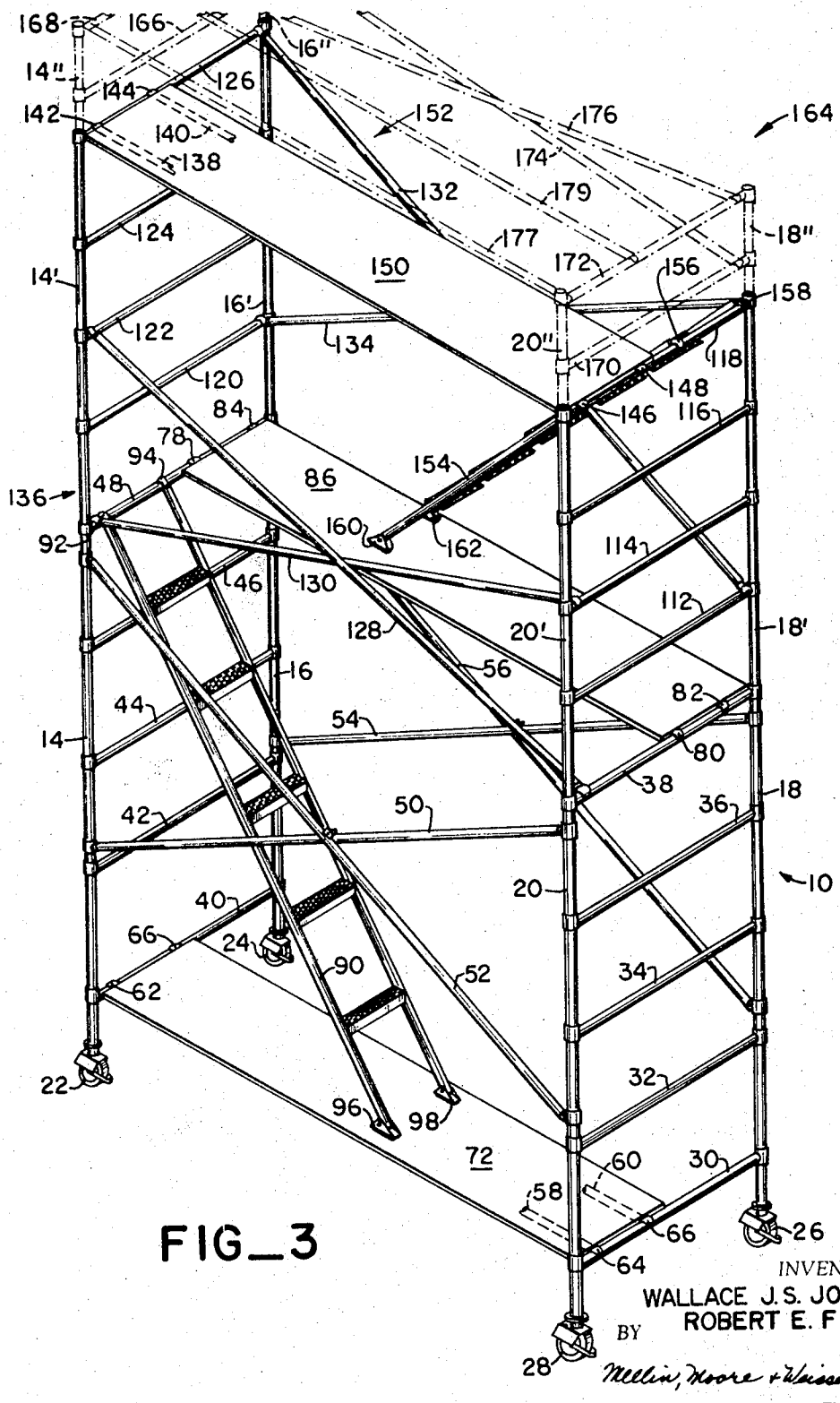


FIG_3

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Filed Jan. 26, 1968 Sheet 3 of 4

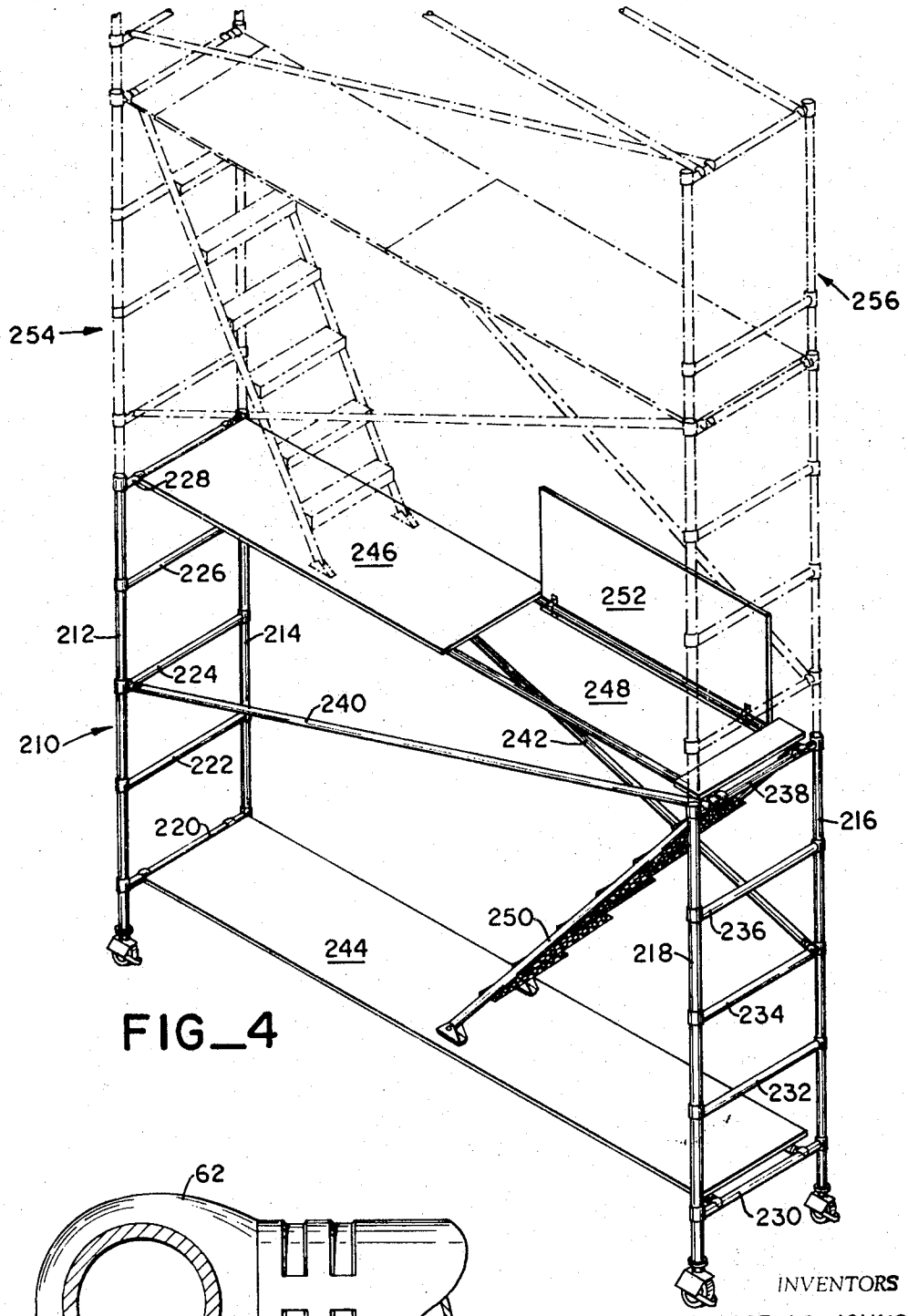


FIG_4

FIG_5

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Filed Jan. 26, 1968 Sheet 4 of 4

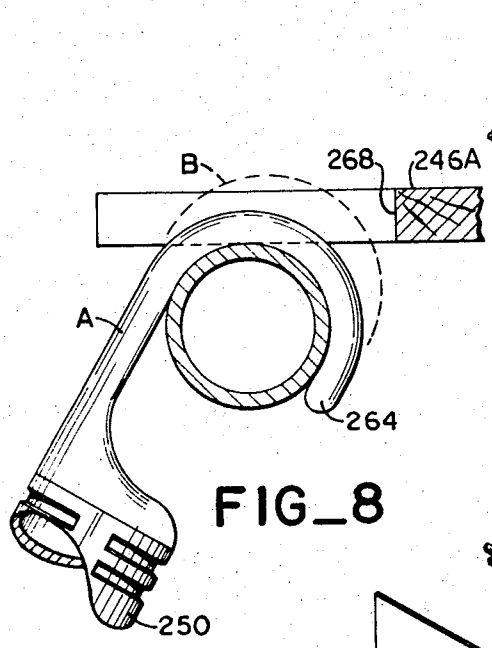


FIG_8

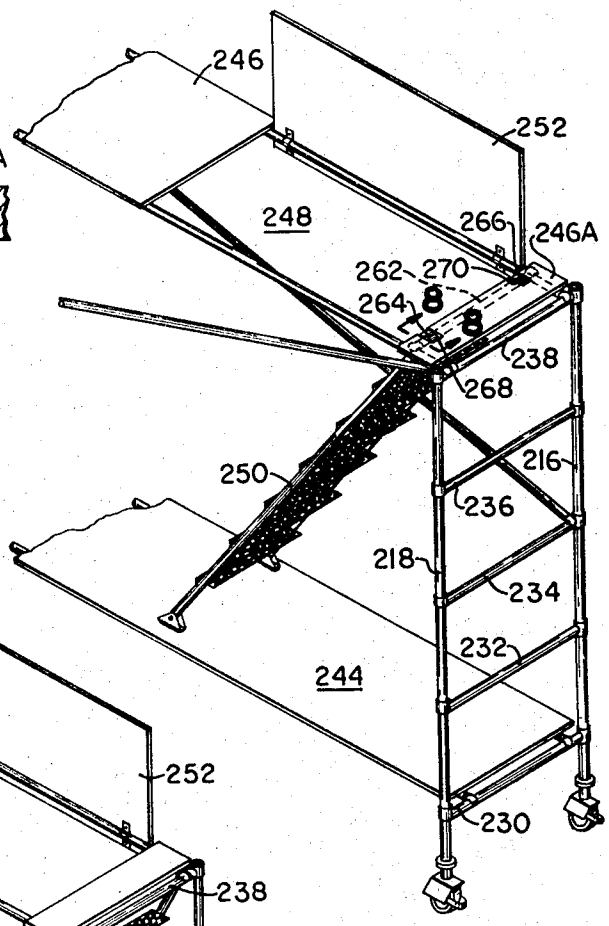


FIG_7

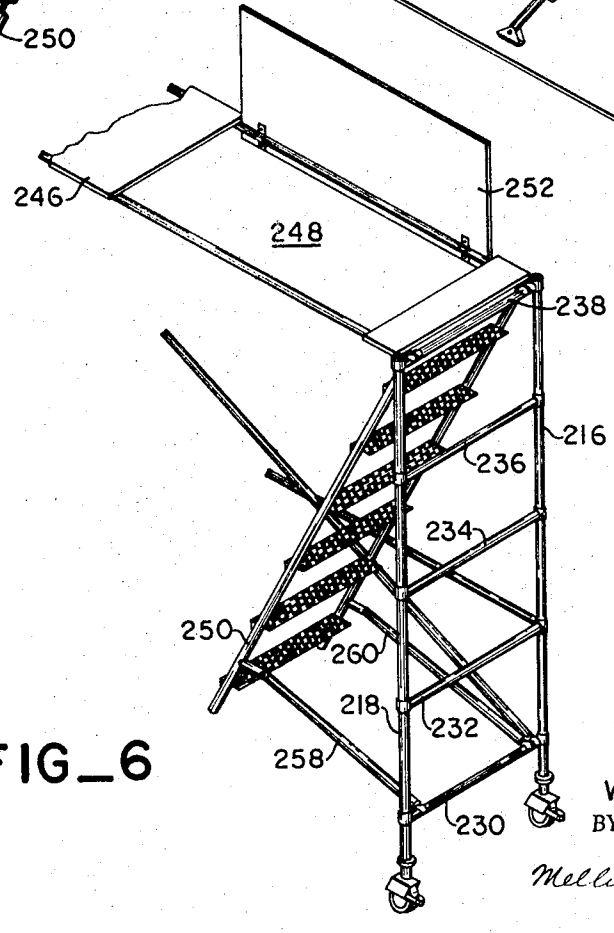


FIG_6

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United States Patent Office 3,454,131 Patented July 8, 1969

3,454,131

SCAFFOLD

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Int. Cl. A64b 7/16, 1/50; E04g 7/00
U.S. Cl. 182—115 9 Claims

ABSTRACT OF THE DISCLOSURE

A scaffold having a framework made up of a plurality of vertical members and a plurality of brace members each running between a pair of vertical members, a pair of horizontal platforms one above the other, the upper one having an opening between it and the adjacent framework, and a pair of ladders, one of which runs from intermediate the ends of the lower platform to one side of the framework, or adjacent that side, and into the opening, the other of which runs from intermediate the ends of the upper platform upward to an opposite side of the framework.

Background of the invention

This invention relates to scaffolding, and more particularly to a scaffold which is capable of being easily erected and dismantled by a person moving only within the scaffold structure.

In the prior art, various scaffold structures having ladders within their frameworks are known (see, for example, the United States patent to Blomgren et al., No. 69,168, and German Patents 23,199 and 725,709). These devices allow the user of the scaffold to remain within the framework thereof while climbing up and down. This is obviously safer than the form of scaffold which the user must climb along the outside. However, it will be noted that none of these patents disclose a scaffold which, while being strong and compact, can be completely constructed by one climbing only within it to relatively great height. The device of Blomgren et al. obviously must be preconstructed to a great extent before the scaffold is actually set up at its site. The German Patents 23,199 and 725,709 disclose no simple manner of construction, and require a great deal of climbing about each structure as it goes up, a relatively unsafe manner of construction.

It is an object of this invention to provide a scaffold which can easily be constructed by one climbing only within the structure as it is constructed.

It is a further object of the invention to provide a scaffold which, while fulfilling the above object, can be built to any reasonable height.

It is a still further object of the invention to provide a scaffold which, while fulfilling the above objects, is extremely simple, compact and strong.

Summary of the invention

Broadly stated, the scaffold comprises a framework made up of a plurality of substantially vertical members and a plurality of brace members each interconnecting a pair of substantially vertical members, the framework defining a base and first and second substantially vertically extending sides. Included are platform means disposed in the framework extending from the first side to the second side thereof and defining with the framework an opening within the framework. Further included are first ladder means extending upward from adjacent the base and from intermediate the first and second sides toward the first side and into the opening defined by the platform means and the framework. Means are included which extend from the first ladder means intermediate

the first and second sides to the first side. Included are second ladder means extending upward from the platform means intermediate the first and second sides to the second side.

Brief description of the drawings

These and other objects of the invention will become apparent from a study of the following specification and drawings, in which:

FIG. 1 is a perspective view of a first embodiment of the scaffold;

FIG. 2 is a perspective view, with a portion removed, of a ladder used in the scaffold;

FIG. 3 is a view similar to FIG. 1 but with the scaffold built to a higher level;

FIG. 4 is a perspective view of a second embodiment of the invention;

FIG. 5 is a view taken along the line 5—5 of FIG. 1;

FIG. 6 is a fragmentary perspective view of the scaffold shown in FIG. 4, with certain variations thereto;

FIG. 7 is a view similar to FIG. 6 but with other variations thereto;

FIG. 8 is a view taken along the line 8—8 of FIG. 7.

Description of the preferred embodiment

Referring to FIG. 1, there is shown at **10** a scaffold. Part of the scaffold **10** is a framework **12**. The framework **12** includes vertical members **14, 16, 18, 20**, which may each be of one piece or of a series of pieces fixed together. The members **14, 16, 18** and **20** have locking casters **22, 24, 26, 28** fixed thereto respectively. Horizontal braces **30, 32, 34, 36, 38** each interconnect vertical members **18** and **20**, and horizontal braces **40, 42, 44, 46, 48** each interconnect vertical members **14** and **16**.

Diagonal cross braces **50, 52** each interconnect vertical members **14, 20** and diagonal cross braces **54, 56** each interconnect vertical members **16, 18**. These members and braces make up the framework **12** of the scaffold **10**.

A pair of longitudinal braces **58, 60** each extend between braces **30** and **40**. Longitudinal braces **58, 60** attach to braces **38, 40** by means of members **62, 64** fixed on the ends of longitudinal brace **58** and members **66, 68** fixed on the ends of longitudinal brace **60**. One of these members is shown in FIG. 5. As shown therein, member **62** is substantially U-shaped to mate with brace **40** and rest on it. An extendable member **70** allows the member **62** to be locked to the brace **40**. The other members **64, 66, 68** operate in a similar manner. If desired, members **62, 64, 66, 68** need not include extendable members so that no locking takes place, the U-shaped members **62, 64, 66, 68** merely resting on the respective braces.

Fixed to the longitudinal braces **58, 60** is a platform **72** horizontally disposed in the framework **12** and extending from brace **30** to brace **40**.

A second pair of longitudinal braces **74, 76** each extend between braces **38** and **48**. These longitudinal braces **74, 76** attach to braces **38, 48** by means of members **78, 80, 82, 84** which correspond to members **62, 64, 66, 68**. Fixed to the longitudinal braces **74, 76** is a platform **86** horizontally disposed in the framework **12** and extending from brace **38** to brace **48**. It will be seen that the platform **86** defines with the framework **12** an opening **88** adjacent the platform **86**.

Extending from the platform **58** intermediate braces **30, 40** and to the brace **48** is a ladder **90** which extends toward the opening **88**. The ladder **90** is hung on the brace **48** by means of members **92, 94** similar to members **62, 64, 66**, and **68** and rests on pivotal feet **96, 98** on the platform **58**.

The scaffold **10** is dimensioned so that its highest point may be reached by a person standing on the ground. The

scaffold **10** may thus be constructed in any reasonable order by a single person in complete safety.

FIG. 3 shows the scaffold **10** with another level **110** built thereon. The level **110** is made up of vertical members **14'**, **16'**, **18'**, **20'** which fix to and extend from vertical members **14**, **16**, **18**, **20** respectively. Horizontal braces **112**, **114**, **116**, **118** each interconnect vertical members **14'** and **16'**, and horizontal braces **120**, **122**, **124**, **126** each interconnect vertical members **18'** and **20'**. Diagonal cross braces **128**, **130** interconnect braces **38**, **122** and braces **48**, **118** respectively, and diagonal cross braces **132**, **134** interconnect braces **112**, **126** and braces **118**, **120** respectively. These members and braces add to framework **12** to make up a framework **126** of the complete scaffold of FIG. 3.

A pair of longitudinal braces **138**, **140** each extend between braces **126**, **118**. These longitudinal braces **138**, **140** attach thereto by means of members **142**, **144**, **146**, **148** similar to member **62**. Fixed to the longitudinal braces **138**, **140** is a platform **150** horizontally disposed in the framework **136** and extending from brace **126** to brace **118**. It will be seen that the platform **150** defines an opening **152** adjacent the platform **150**.

Extending from the platform **86** intermediate braces **38**, **48** is a ladder **154** which extends toward the opening **152**. The ladder **154** is hung on brace **118** by means of members **156**, **158** similar to members **62**, **64**, **66**, **68** and rests on pivotal feet **160**, **162** similar to pivotal feet **96**, **98** on the platform **86**.

FIG. 3 shows a guard rail structure **164** built on the second level **110**. This guard rail structure is made up of vertical members **14''**, **16''**, **18''**, **20''** which fix to and extend from the vertical members **14'**, **16'**, **18'**, **20'** respectively. Horizontal braces **166**, **168** each interconnect vertical members **14''** and **16''**, and horizontal braces **170**, **172** each interconnect vertical members **18''** and **20''**. Diagonal cross brace **174** interconnects horizontal braces **166** and **172**, and diagonal cross brace **176** interconnects horizontal braces **168**, **170**. Longitudinal braces **177**, **179** each interconnect horizontal braces **168**, **172**.

As now explained, the scaffold of FIG. 2, and higher levels thereon, may be easily and safely constructed. As stated previously, the scaffold **10** of FIG. 1 is dimensioned so that its highest point may be reached by a person standing on the ground. The scaffold **10** may thus be easily and safely constructed by connecting the vertical members **14**, **16**, **18**, **20** to the braces **30**, **32**, **34**, **36**, **38**, **40**, **42**, **44**, **46**, **48**, **50**, **52**, **54**, **56**. The longitudinal braces **58**, **60**, **74**, **76** and platforms **72**, **86** may then be mounted.

If the second level **110** of FIG. 3 is desired, it may be constructed in a quite simple manner. First, the vertical members **14'**, **16'**, **18'**, **20'** and braces **112**, **114**, **116**, **118**, **120**, **122**, **124**, **126**, **128**, **130**, **132**, **134** may be carried up to platform **86** by a person ascending ladder **90** and assembled. The person then descends ladder **90** and carries up ladder **154**, which he mounts on platform **86** and brace **118**. The person then descends ladder **90** and ascends it with longitudinal braces **138**, **140** and platform **150**, which he mounts between braces **118**, **126**.

It will be noted that, during this construction, the person so constructing moves only within the scaffold framework as it is being constructed. This is made possible because of the unique combination of the disposition of ladders and openings defined by the platforms and framework. The fact that each ladder extends from between the ends of a platform to a side of the framework, with each successive ladder leading to an opposite side of the framework, allows each platform to be used as a landing by one ascending or descending the ladders. This disposition of ladders, it should also be noted, allows a standard size ladder to be used no matter what the length of platforms used. This is so because the ladders merely rest on platforms and are connected to only one side of the frame. The horizontally disposed platforms, it has been found, add greatly to the stiffening of the scaffold.

It will be apparent that additional levels of scaffolding and/or guard rail structure such as **164** may be built in the same manner, with the person passing only within the scaffold previously built.

A second embodiment of the invention is shown in FIG. 4. This scaffold **210** is made up of vertical members **212**, **214**, **216**, **218**, braces **220**, **222**, **224**, **226**, **228** interconnecting vertical members **212** and **214**, braces **230**, **232**, **234**, **236**, **238** interconnecting vertical members **216** and **218**, and cross braces **240**, **242** similar to the previous embodiment. However, braces **220–238** are substantially the width of platform **244** and platform **246**, which is about one-half the width of the previously described scaffold. An opening **248** is defined by platform **246** and the framework. A ladder **250** leads into the opening **248** and is attached to brace **238** by members **251**, **253**, which are similar to member **62**, and which incorporate extendable members similar to member **70**. The opening **248** may be covered by a trapdoor after a person has ascended the ladder **250** and is on platform **246**. The person may then move within the scaffold **210** to build additional levels **254** and a guard rail structure **256** thereon similar to the previous embodiment.

A variation of the scaffold shown in FIG. 4 is shown in FIG. 6. This embodiment does away with the platform **244** and in its place provides a pair of support braces **258** and **260**, each of which extends from brace **230** to the ladder **250**. This results in an even simpler construction than in the previous embodiments.

FIG. 7 shows yet another variation of the scaffold shown in FIG. 4. Instead of ladder **250** locking the brace **238**, it attaches to a brace **262** on which rests a portion **246A** of platform **246**. This allows the person ascending the ladder **250** to step directly on the platform portion **246A** instead of having to pull his feet back as he would in the embodiments of FIGS. 4 and 6.

In this embodiment the ladder **250** attaches to a brace **262** which makes up part of the support structure of platform **246**. It will be noted that, if platform **246** is not locked to brace **238**, but merely rests thereon, as may sometimes be the case, locking the ladder **250** to the brace **262** means that upward movement of the ladder **250** results in upward movement of the platform **246**, obviously an undesirable result. This upward movement of the ladder **250** may occur if a person steps on platform **244**, bowing it to a certain extent, and then gets off the platform **244**. As this platform **244** moves back up to its original position, it will urge the ladder upward. This is no problem when the ladder **250** is locked to brace **238**, since that brace **238** is fixed and no lifting will occur.

However, lifting of the platform **246** would occur in similar circumstances if the platform **246** was not locked to the braces on which it rests and the ladder **250** was locked to brace **262**. To overcome this problem, U-shaped members **264**, **266** (FIG. 8) are provided on the ladder **250** to hook over brace **262** to support the ladder **250** while allowing upward movement of the ladder **250** relative to brace **262** (and this platform **246**). Cut out portions **268**, **270** are provided in platform portion **246A** to allow such upward movement. Thus, if a person steps on platform **244** and then steps off, member **264** will be carried from position A to position B (FIG. 8), and platform **246** will remain in proper position. The ladder **250** may then, of course, be moved back to its proper position.

As pointed out previously, the forms of scaffold described lend themselves to easy and safe construction. This is so mainly because of the zigzag disposition of the ladders (i.e., successive ladders leading to opposite sides of the frame), which allows the platforms to support the ladders and to be used as landings for the ladders they support. Since the platforms of the scaffold are used as landings, no other landings need be provided, and consequently the platforms can be relatively of large width for a given scaffold (i.e., room need not be allowed for sepa-

rate landings, since the platforms also serve the purpose of landings). Also, since the ladders do not go from one side of the framework to the other, a standard ladder length may be used for any length scaffold, or various length ladders may be used in the same scaffold without problems. The platforms, as pointed out previously, further serve as cross braces to greatly stiffen the structure.

It will be seen that herein is provided a scaffold which can be easily constructed to any reasonable height by one moving only within the structure as it is being assembled. The scaffold provided is extremely simple, compact and strong, and can, of course, be constructed in an extremely safe manner. Obviously, the invention can be carried out in many different ways, and the embodiments shown and described herein are merely illustrative. Consequently, we do not desire to be limited by the embodiments shown and described, but only by the scope of the following claims.

We claim:

1. A scaffold comprising:
   (a) a framework made up of a plurality of substantially vertical members and a plurality of brace members each interconnecting a pair of substantially vertical members, said framework defining a base and first and second substantially vertical sides;
   (b) platform means disposed in the framework and extending from the first side to the second side thereof and defining with the framework an opening within the framework;
   (c) first ladder means extending upward from adjacent the base and from intermediate the first and second sides toward the first side and into the opening defined by the platform means and the framework;
   (d) means extending from the first ladder means intermediate the first and second sides to the first side; and
   (e) second ladder means extending upward from the platform means intermediate the first and second sides to the second side.

2. A scaffold according to claim 1, wherein the first ladder means extends to adjacent but spaced from the first side.

3. A scaffold according to claim 1, wherein the first ladder means extends to the first side.

4. A scaffold according to claim 1, wherein the means extending from the first ladder means intermediate the first and second sides to the first side comprises brace means and extending from the ladder means to the first side.

5. A scaffold according to claim 1, wherein the means extending from the first ladder means intermediate the first and second sides to the first side comprises another platform extending from the first side to the ladder means and further to the second side.

6. A scaffold according to claim 1, wherein are included means for selectively closing the opening defined by the second platform means and the framework and becoming part of the second platform when the opening is so closed.

7. A scaffold comprising:
   (a) a framework comprising first, second, third and fourth substantially vertical members, first, second, and third substantially horizontal braces each interconnecting the first and second vertical members, said second brace being above said first brace, said third brace being above said second brace, fourth and fifth sustantially horizontal braces each interconnecting the third and fourth substantially vertical members, said fifth brace being above said fourth brace, and a plurality of braces interconnecting the second and third, and fourth and first, substantially vertical members respectively;
   (b) a first substantially horizontal platform extending from the first brace to the fourth brace and being detachably secured thereto;
   (c) a second substantially horizontal platform extending from the second brace to the fifth brace and being detachably secured thereto, and defining with the framework an opening within the framework adjacent the second platform;
   (d) a first ladder extending from the first platform intermediate the first and fourth braces and toward the opening to the fifth brace, the first ladder being detachably secured to the fifth brace; and
   (e) a second ladder extending from the second platform intermediate the second and fifth braces and to the third brace, the second ladder being detachably secured to the third brace.

8. A scaffold according to claim 7, wherein are included means for selectively closing the opening defined by the second platform and the framework and becoming part of the second platform when the opening is so closed.

9. A scaffold according to claim 7, wherein the first substantially horizontal platform defines with the framework another opening substantially directly below the second substantially horizontal platform, the opening defined by the second substantially horizontal platform and the framework being substantially directly above the first substantially horizontal platform.

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U.S. Cl. X.R.

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