Jan. 1, 1963 J. BECK, JR 3,071,205

ADJUSTABLE SCAFFOLDING

Filed May 22, 1961 2 Sheets-Sheet 1

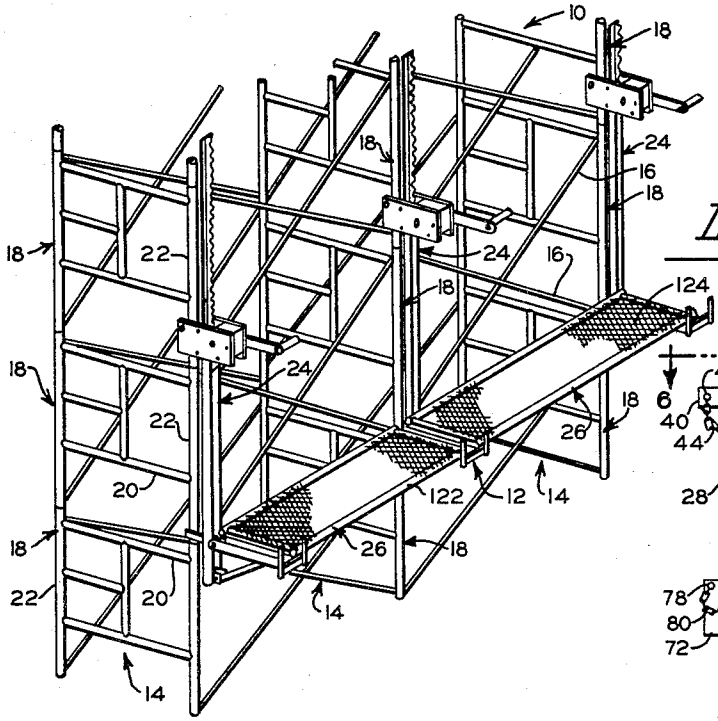

Fig. 1.

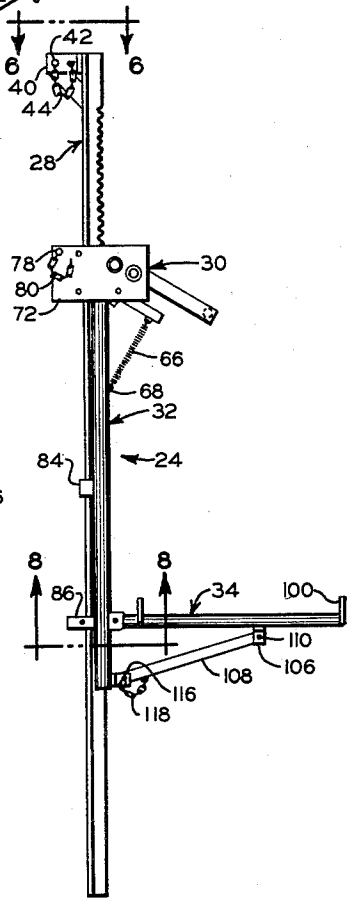

Fig. 2.

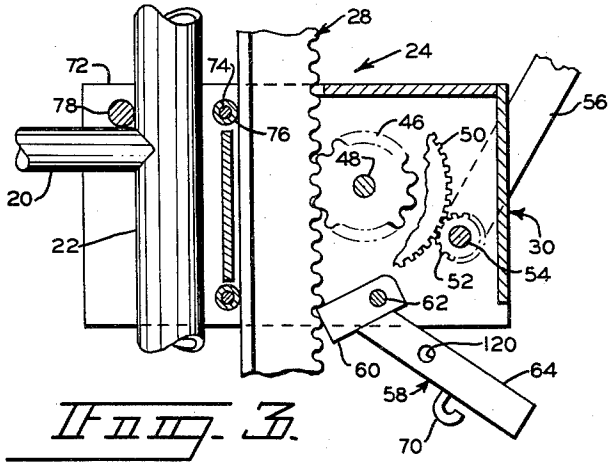

Fig. 3.

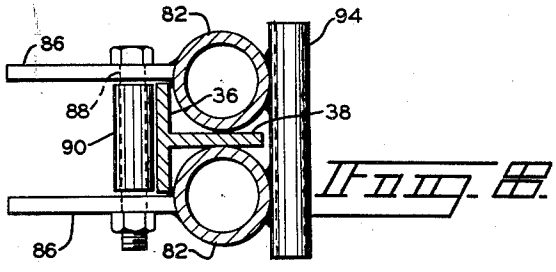

Fig. 4.

INVENTOR.
JONATHAN BECK, JR.
BY
Owen & Owen
ATTORNEYS

Jan. 1, 1963 J. BECK, JR 3,071,205

ADJUSTABLE SCAFFOLDING

Filed May 22, 1961 2 Sheets-Sheet 2

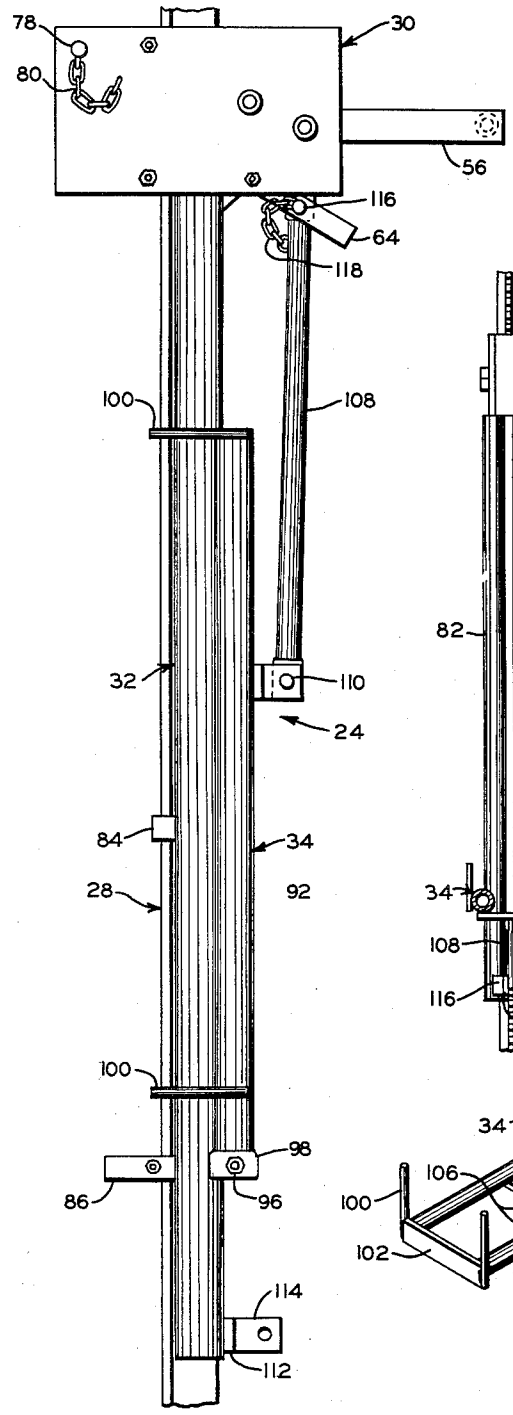

Fig. 4.

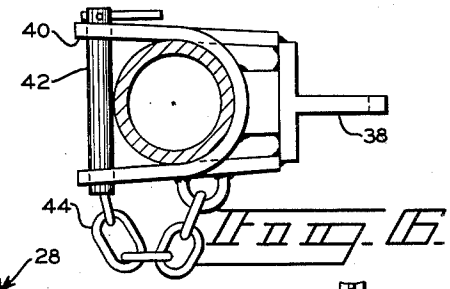

Fig. 6.

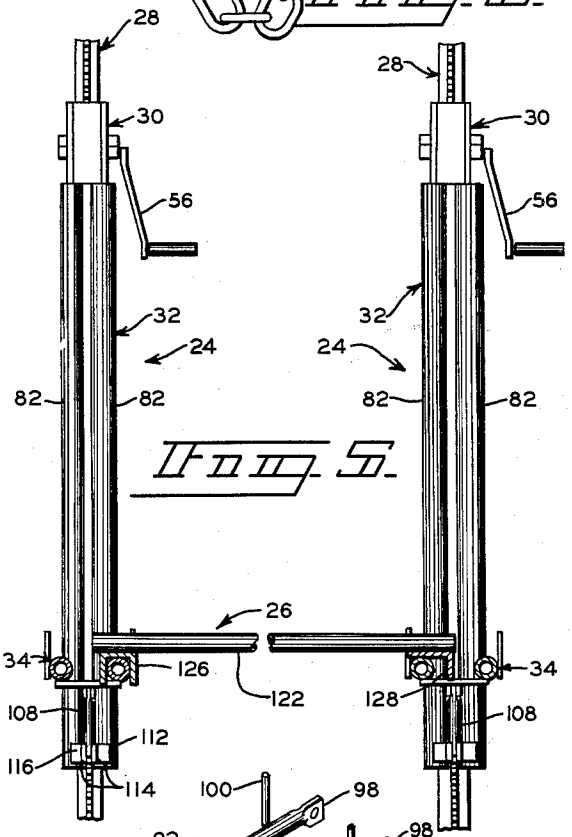

Fig. 5.

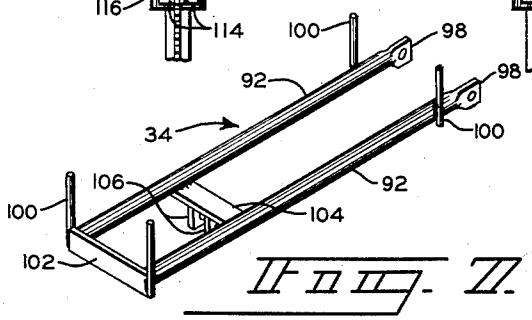

Fig. 7.

INVENTOR.
JONATHAN BECK, JR
BY Owen & Owen
ATTORNEYS

United States Patent Office 3,071,205 Patented Jan. 1, 1963

3,071,205

ADJUSTABLE SCAFFOLDING

Jonathan Beck, Jr., West Unity, Ohio, assignor to Bil-Jax, Incorporated, Archbold, Ohio, a corporation of Ohio

Filed May 22, 1961, Ser. No. 111,822
1 Claim. (Cl. 182—146)

This invention relates to adjustable scaffolding and more particularly to an adjustable platform structure for use with conventional scaffolding.

While many adjustable platform structures are known in the art, the present invention provides an adjustable platform structure having many advantages thereover. The new platform structure is especially designed for use with modular scaffolding which is in widespread use, particularly in the construction industry. The new platform structure can be raised and lowered over the entire height of scaffolding with which it is employed by only one person who can remain standing on the platform during the entire operation. The new structure is also designed to employ two or more platform sections in serial alignment so that the over-all platform can be made in any length desired. Another advantage of the new adjustable structure is that it can be easily disassembled and collapsed to consume minimum space for easier transportation. At the same time, the elements of the structure, when collapsed, are locked in a manner to prevent any relative movement therebetween during transportation or handling.

It is, therefore, a principal object of the invention to provide an improved adjustable platform structure especially designed for use with modular scaffolding.

Another object of the invention is to provide an adjustable platform structure which can be of any desired length.

A further object of the invention is to provide an adjustable platform structure which can be raised or lowered safely by one person.

Yet another object of the invention is to provide an adjustable platform structure in which units thereof can be collapsed and locked to facilitate handling and transportation.

Other objects and advantages of the invention will be apparent from the following detailed description of a preferred embodiment thereof, reference being made to the accompanying drawings, in which:

FIG. 1 is a view in perspective of an adjustable platform structure according to the invention and a portion of modular scaffolding for which the structure is specifically designed;

FIG. 2 is a side view in elevation of a platform unit constituting part of the adjustable platform structure shown in FIG. 1;

FIG. 3 is an enlarged, detailed view, partially in cross section, of a gear head of the platform unit shown in FIGS. 1 and 2, along with a portion of a gear rack forming part of the unit, and a portion of the modular scaffolding shown in FIG. 1;

FIG. 4 is an enlarged view in side elevation of a portion of the platform unit shown in FIG. 2, with elements thereof in a collapsed position;

FIG. 5 is a front view in elevation of part of the platform structure shown in FIG. 1 with only a portion of one of the platforms being shown;

FIG. 6 is an enlarged view taken along the line 6—6 of FIG. 2 of a scaffolding connection for the gear rack of the platform unit;

FIG. 7 is a detailed view in perspective of a platform support constituting part of the platform unit; and

FIG. 8 is a view partially in cross section taken along the line 8—8 of FIG. 2.

Referring to the drawings, and more particularly to FIG. 1, modular scaffolding indicated at 10 is used with adjustable platform structure according to the invention indicated at 12. The scaffolding 10 includes three upright assemblies 14 connected by diagonal braces 16 which are removably attached thereto by means of suitable bolts and wing nuts (not shown) or other detachable fasteners. Each of the upright assemblies 14 include upright sections 18, each of which includes horizontal struts 20 and upright legs 22 which are aligned and connected with one another by suitable pins (not shown). Additional bracing can be employed for each of the sections 18, as shown. Corresponding upright legs 22 of each of the assemblies 14 lie in common planes to provide proper supports for the platform structure 12.

Modular scaffolding, such as that indicated at 10, has found widespread acceptance in the construction field in recent years. Such scaffolding is strong, yet relatively light in weight, and can be easily assembled and disassembled for transportation and storage, when no longer needed on a particular job. Any reasonable number of the sections 18 can be connected to build the modular scaffolding 10 to a desired height. Also, any number of the upright assemblies 14 can be used to build the scaffolding 10 to a desired width.

The adjustable platform assembly 12 basically includes an adjustable platform unit 24 for each of the upright assemblies 14 and platforms 26 extending between each adjacent pair of the platform units 24. By employing additional upright assemblies 14 connected by the braces 16, by adding additional adjustable units 24 for each of the upright assemblies 14, and by employing more of the platforms 26, the platform assembly 12 can be made as long as desired. Also, by employing more of the upright sections 18, the scaffolding 10 can be fabricated to any practical height and, as will be subsequently apparent, the platforms 26 can be raised and lowered over the entire height of the scaffolding 10. Thus, the scaffolding 10 and the platform assembly 12 can be adapted for use for a construction job of almost any size.

In use, the scaffolding 10 is constructed in a position adjacent a wall of a building, for example, being spaced from the wall a distance slightly in excess of the width of the platforms 26. The scaffolding 10 can be constructed all at once or can be built up as the need requires, using the platform assembly 12 to aid in the fabrication. In either case, the platform assembly 12 is attached to the scaffolding 10 and the platforms 26 are adjusted to any desirable height by means of the platform unit 24.

The combination has particular utility in the laying of a brick wall of a building, for example. In such an instance, the platforms 26 can be raised after every course or two of bricks are laid so that the bricklayer always remains at the most effective height with respect to the next course to be laid, thereby enabling maximum efficiency to be attained. When the scaffolding is to be used in connection with laying brick, boards can be placed on the horizontally extending struts 20 and bricks, mortar, and other supplies laid thereon to provide easy access for the bricklayers. This is more advantageous than laying the supplies on the platforms 26 because the bricklayers can work without obstruction on the platforms and the platforms can be of lighter construction so as to be more easily handleable. Further, the materials will be at a more convenient height with respect to the bricklayers.

Referring more particularly to FIGS. 2–5, each of the adjustable platform units 24 basically includes a gear rack 28, a drive head or gear head 30, a vertical supporting member 32, and a platform support 34. The rack 28 is T-shaped in lateral cross section and includes a backing strip or web 36 and a shank 38 on which teeth

are formed. On the upper end of the rack 28 is a U-shaped plate 40 (FIGS. 2 and 6) extending rearwardly from the backing plate 36 to form a generally U-shaped connector for attaching the rack 28 to the adjacent upright leg 22. The plate 40 has holes to receive a pin 42, connected to one leg of the plate by a chain 44. The pin 42 is located on the side of the upright 22 opposite the rack 28 and above one of the horizontal struts 20 to limit downward movement of the rack 28.

The unit 24 rides up and down on its rack 28 by means of the gear head 30 which includes a gear 46 (FIG. 3) mounted on a shaft 48, which gear meshes with the teeth of the rack 28. A larger gear 50 is also mounted on the shaft 48 and is driven by a pinion gear 52 on a separate shaft 54 which extends beyond the gear head housing and is attached to a crank 56. When the crank 56 is turned, the pinion 52 drives the gear 50 which rotates the rack gear 46 so as to move the gear head 30, the vertical supporting member 32, and the platform support 34 upwardly and downwardly with respect to the rack 28. The ratio of the pinion gear 52 to the larger, driven gear 50 can be sufficiently small that the unit 30 will not move downwardly with respect to the rack 28 even when it is free to do so and when there is weight on the platform 26.

To definitely prevent downward movement of the gear head 30 and its connected parts with respect to the rack 28, a locking member 58 (FIG. 3) is provided. The locking member 58 includes a locking dog 60 which is pivotally attached to a pivot pin 62 mounted on the gear head 30 and engages the teeth of the rack 28 to prevent downward movement of the gear head 30 unless the dog 60 is released by means of a handle 64. The handle 64 is urged downwardly by means of a spring 66 (FIG. 2) which is maintained in tension between an ear 68 on the vertical supporting member 32 and a hook 70 (FIG. 3) on the handle 64. The spring 66 thus maintains the locking dog 60 in engagement with the teeth of the rack 28 until the handle 64 is pulled upwardly by an operator who, at the same time, controls the crank 58 to move the gear head 30 up or down. The lock 58 cannot be accidentally released because the unit 30 must be cranked upwardly slightly in order that the handle 64 can be pulled upwardly to pivot the dog 60 around the pin 62 and separate it from the rack 28.

The gear head 30 has plate extensions 72 extending rearwardly beyond the rack 28 and the upright leg 22. The extensions 72 have axles 74 (FIG. 3) and rollers 76 immediately beyond the rack 28 so as to bear against the backing plate 36 of the rack 28 and thereby to prevent separation of the rack gear 46 from the rack 28. The extensions 72 also carry a stop pin 78 rearwardly of the upright 22 so that the pin 78 can contact a horizontal strut 20 and limit downward movement of the gear head 30. The pin 78 is slidably held in the extensions 72 and is connected thereto by a chain 80 (FIGS. 2 and 4). The axles 74 and the rollers 76, on the other hand, are permanently mounted between the plate extensions 72.

The vertical supporting member 32 includes two vertical legs 82 which are affixed to the bottom of the gear head 30 and extend downwardly parallel to the rack 28. The legs 82 are held on each side of the shank 38 of the rack 28 by means of a strap 84 (FIGS. 2 and 4) which is affixed to intermediate points on the legs 82 and extends around the backing strip 36 of the rack 28. At a point still further down on the vertical supporting member 32 are two guide plates 86 (also see FIG. 8) which are affixed to the rear of the legs 82 and extend outwardly therefrom. Near the base of the plates 86 is a bolt forming an axle 88 for a roller 90 which rides against the back of the backing strip 36 when the lower end of the rack 28 extends below the platform support 34. Even when the lower end of the rack 28 is above the support 34, the rack 28 is still held adjacent the vertical supporting member 32 by means of the strap 84. The guide plates 86 also extend on each side of the corresponding upright leg 22 so as to guide the lower end of the vertical supporting member 32 and maintain it parallel to the upright leg 22.

The platform support 34 includes two parallel platform arms 92 (FIG. 7) which are connected to the vertical legs 82 at a point spaced above the lower ends thereof. The arms 92 are pivotally attached to the legs 82 at this point by means of a tube 94 (FIG. 8) which is affixed to the legs 82 and a pin 96 (FIG. 4) which extends through flattened ends 98 (FIGS. 4 and 7) of the arms 92 and through the tube 94. The arms 92 also have stop pins 100 affixed thereto which extend upwardly on both sides of the platform 26 to limit lateral movement thereof. At the outer ends of the arms 92 is a connecting strip 102 to hold the arms 92 in spaced relationship, and at an intermediate point of the arms 92 is a pivot strip 104 from which pivot ears 106 extend downwardly to provide a pivotal connecting point for a platform brace 108. The brace 108 is pivotally connected between the ears 106 by a pin 110 (FIGS. 2 and 4). The lower end of the brace 108 is removably connected to the lower end of the vertical supporting member 32 by means of a connecting strip 112 extending between the legs 82 from which strip ears 114 project. The lower end of the brace 108 is held between the ears 114 by a pin 116 which is attached to the brace by a chain 118 (FIGS. 2 and 4).

When the platform assembly 12 is in use, the brace 108 is connected to the ears 114 to provide support for the arms 92, as shown in FIG. 2. However, when the unit 24 is to be carried to another job site or is to be stored, the arms 92 are pivoted upwardly parallel to the vertical supporting member 32, as shown in FIG. 4, and the brace 108 is detached from the ears 114 and is likewise swung upwardly, so that the end previously connected to the ears 114 is now swung upwardly adjacent the handle 64 of the lock 58. The pin 116 is then inserted through a hole 120 (FIG. 3) in the handle 64 and through the end of the brace 108 so as to prevent the brace and the arms 92 from swinging downwardly, maintaining them generally parallel to the vertical supporting member 32. The unit 24 thus takes up a minimum amount of room when collapsed.

In addition, the collapsible arrangement of the arms 92 and the brace 108 provides another advantage. When the brace 108 is connected to the handle 64 of the lock 58, it prevents upward movement of the handle 64 and thus prevents the possibility of the dog 60 (FIG. 3) being released from the teeth of the rack 28. Thus, the gear head 30 is held in a fixed position with respect to the rack 28 and relative movement between the two is prevented during transportation or handling of the unit 24. It may be noted that by changing the position and length of the brace 108 slightly, or by moving the gear head 30 downwardly, the pin 116 could be inserted in the gear head 30 just above the handle 64 so as to again prevent upward movement thereof. Thus, the brace 108 need not be connected directly to the lock 58.

The platform 26 preferably is of lightweight construction and includes a tubular frame 122 (FIGS. 1 and 5) of rectangular shape with a mesh metal floor 124 (FIG. 1) affixed thereto. The frame has a plurality of laterally extending crossbars (not shown) under the floor 124 to provide additional support therefor.

One end of the platform 26 has a U-shaped connection 126 (FIG. 5) affixed to the bottom thereof, which connection is designed to fit over one of the arms 92 of one of the platform supports 34 and holds the platform 26 against any movement relative to the arm in a direction longitudinally of the platform. The opposite end of the platform 26 has a stop member 128 depending from the platform 26 between another of the pairs of arms 92 of one of the supports 34. The stop member 128 enables the platform 26 to slide relative to the arm 92 in a direction longitudinally of the platform 26 yet limits the ex-

tent of sliding so that the platform 26 cannot possibly be separated from the arm 92.

The particular connections 126 and 128 for the platform 26 are advantageous because they enable one man operation of the platform 26. Thus, one man can raise one end of the platform perhaps six to eight inches and then raise the other end up a similar amount above the first end. During this movement, it is essential that the platform 26 be capable of sliding relative to the platform supports 34 as the platform tilts during movement of one end thereof. The connection 128 enables the sliding movement to be accomplished and yet both of the connections 126 and 128 cooperate to prevent the possibility that the platform 26 might be separated from the supports 34.

As mentioned previously, the double arms 92 of the platform supports 34 enable each of the supports 34 to hold ends of two of the platforms 26 at any given time, as shown by the intermediate platform unit 24 of FIGURE 1. Thus, the platform 26 can be aligned in end-to-end relationship for any desired length. Of course, the arms 92 must be spaced apart sufficiently to enable limited sliding movement of at least one of the platforms 26 held thereon.

It may be noted from the illustration of FIGURE 1 that there always will be one more of the platform units 24 and one more of the upright assemblies 14 than there are platforms 26.

While the operation of the scaffold assembly 12 with respect to the modular scaffolding 10 will be apparent from the foregoing discussion, a brief description of the operation will be set forth. The units 24 are assembled with respect to the uprights 22 of the scaffolding 10 by placing the U-shaped connections 40 of the racks 28 around the upright legs 22 and by inserting the pins 42 behind the uprights. The racks 28 cannot then move downwardly below the nearest one of the horizontal struts 20. The crank 56 can then be turned to move the gear head 30 upwardly and downwardly with respect to the rack 28, thereby moving the vertical supporting members 32 and the platform support 34 upwardly and downwardly, too. The pin 78 need not be inserted in the extensions 72 behind the upright legs 22 to attach the unit 30 to the legs 22 during this movement, although such can be done as a safety measure if desired. If the pin 78 is inserted, it must be removed every time one of the horizontal struts 20 is passed.

Whether or not the pin 78 is inserted in the extensions 72, nevertheless the diagonal braces 16 are removed from the uprights 22 when the gear head 30 is moved past them. This is easily accomplished by the quick-acting fasteners for the braces 16 and is of no concern because the platforms 26 are raised and lowered very slowly during the course of work on the adjacent wall so that separation of the braces 16 need be accomplished only occasionally.

When the gear head 30 and its connected elements 32 and 34 are raised to a point near the top of the rack 28, the pin 78 is inserted in the extension 72 of the gear head 30 preferably just above the horizontal strut 20 which lies immediately below the strut 20 which the pin 42 contacts. The pin 42 is then removed from the connection 40 so that the platform unit 24 thereby is connected to the scaffolding 10 by means of the pin 78 rather than the pin 42. With the pin 78 in place the crank 56 of each of the units 24 is then turned in a direction tending to move the gear head 30 downwardly with respect to the gear rack 28. However, the gear head 30 cannot move downwardly because of the engagement of the pin 78 with one of the horizontal struts 20. Therefore, the gear head 30 remains stationary and the rack 28 moves upwardly. When the rack 28 is at or near its uppermost position, the pin 42 is again inserted in the connection 40 and pin 78 is removed from the extensions 72 of the gear head 30 so that support of the unit 24 is again transferred to the upper pin 42 but at a higher point on the scaffolding 10. When the crank 56 is turned in the opposite direction, the gear head 30, the vertical supports 32, and the platform support 34 will again rise. By repeating these steps, it will be understood that the platforms 26 can be raised the entire height of the scaffolding 10 even though the individual gear racks 28 are only six feet high, for example.

During the raising or lowering of the platforms 26, one of the units 24 can be raised or lowered a distance of about six to eight inches and the adjacent unit can then be similarly raised or lowered to a point six to eight inches above or below the previously adjusted unit, with the steps being repeated until the desired height is reached. This one-man operation is made possible, as previously discussed, because the platform 26 can slide relative to at least one of the platform arms 92.

Numerous modifications of the above described embodiment of the invention will be apparent to those skilled in the art and it is to be understood that such modifications can be made without departing from the scope of the invention, if they are within the spirit and tenor of the accompanying claim.

I claim:

An adjustable scaffolding assembly comprising modular scaffolding including a plurality of upright legs positioned in a common vertical plane, means for supporting said upright legs in said plane and in spaced relationship with respect to one to another, an adjustable platform assembly for use with said modular scaffolding including an adjustable platform unit for each of said upright legs, each of said platform units comprising a gear rack, means on said gear rack for removably attaching said rack to its corresponding upright, a drive head, means associated with said drive head for effecting longitudinal movement between said head and said rack, a vertical supporting member attached to said drive head and extending therebelow, a horizontally-extending platform arm pivotally attached to said vertical supporting member, a diagonal brace pivotally attached to said platform arm at a point spaced from said vertical supporting member, means for removably connecting said brace to said vertical supporting member at a point spaced from the pivotal attachment of said platform arm, receiving means associated with said drive head for making a connection with said brace to hold said brace and said platform arm generally parallel to said rack when in a collapsed position, a locking member for locking said drive head with respect to said rack, said locking member being associated with said receiving means, said receiving means and said brace cooperating to hold said locking member in a locked position with respect to said rack when said brace is in its collapsed position.

References Cited in the file of this patent

UNITED STATES PATENTS

394,781	Maurer	Dec. 18, 1888
788,171	Schwerin	Apr. 25, 1905
1,307,610	Yeagley	June 24, 1919
1,366,487	Pitou	Jan. 25, 1921
2,796,299	Freeman	June 18, 1957
2,904,126	Meng	Sept. 15, 1959
2,928,642	Anderson	Mar. 15, 1960

FOREIGN PATENTS

815,098	Germany	Oct. 31, 1951