Nov. 22, 1960 J. B. TAYLOR 2,961,060

EXTENSIBLE LADDER AND SCAFFOLD CONSTRUCTION

Filed April 6, 1959

FIG. 2.

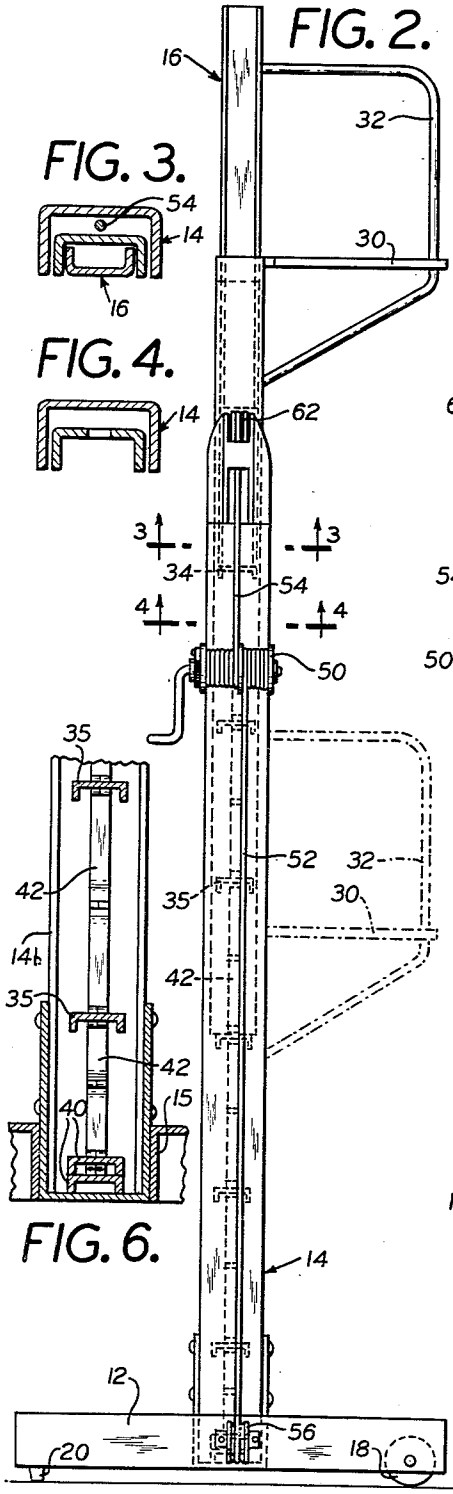


FIG. 3.

FIG. 4.

FIG. 1.

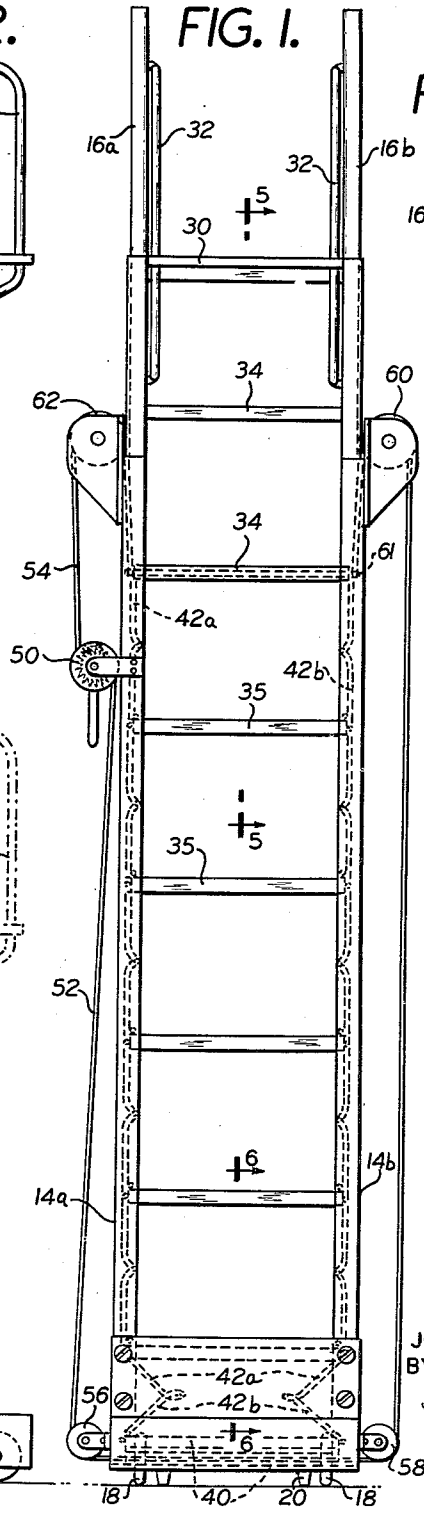


FIG. 5.

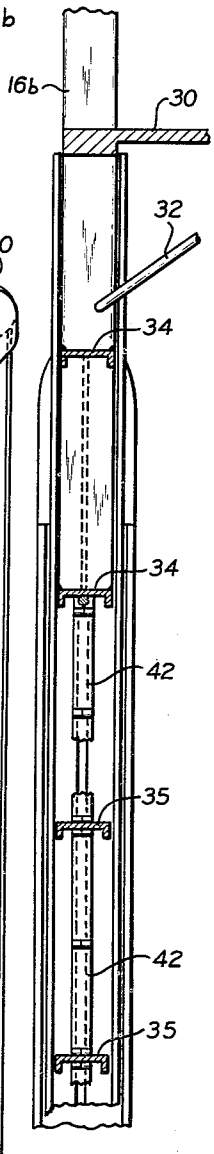


FIG. 6.

INVENTOR
JOHN B. TAYLOR
BY
Samuel J. Stone
ATTORNEY.

United States Patent Office 2,961,060 Patented Nov. 22, 1960

2,961,060

EXTENSIBLE LADDER AND SCAFFOLD CONSTRUCTION

John B. Taylor, Copiague, N.Y.
(55 Underhill Ave., Syosset, N.Y.)

Filed Apr. 6, 1959, Ser. No. 804,187
3 Claims. (Cl. 182—40)

This invention relates to an extensible ladder and scaffold construction.

The type of ladder and scaffold to which this invention pertains, is the professional type adapted for use by professional house painters, construction workers, building maintenance men, theater employees who change marquee signs and other persons who utilize ladders and scaffolds in the conduct of their business or employment. The invention is not intended to exclude use by non professionals, such as home owners who maintain their own homes as by painting and repairing them, but it will be apparent from the nature of the structure herein described and claimed that it is of greater use and advantage to those who always use ladders and scaffolds in the course of their business rather than to those who only occasionally use such devices, as would be the case with home owners.

An important object of this invention is the provision of a combination ladder and scaffold which is vertically extensible to increase its height when in use and to decrease its height for storage purposes.

This is not a case of two or more conventional ladder sections which are slidably attached to each other for extension purposes. Instead, use is made in the present invention of at least one ladder section having a plurality of permanently spaced rungs, and at least one ladder section having a plurality of rungs which are movable relative to each other. In one extreme position these movable rungs are disposed flat against each other for storage purposes. In the other extreme position they are supported in conventionally spaced relation to each other for purposes of use. It is an important feature of this invention that the series of movable rungs are not operated simultaneously but rather one at a time to the extent required. Thus, it may only be necessary to elevate the uppermost of said removable rungs to an operative position, leaving the remaining movable rungs in stored positions. Should it be required that two movable rungs be elevated to operative positions, this may also be done, and so on to the extent of all of the movable rungs in the device.

An important feature of the invention is the mechanism which elevates the movable rungs, one at a time, and the means for rigidly supporting said movable rungs in their elevated operative positions, to avoid sagging, tilting or shifting. In short, the movable rungs in the present invention are securely supported in their elevated, operative positions.

Another object of the invention is the provision of an extensible ladder of the character described, which is provided at the top with a relatively large platform on which it is possible to stand comfortably and safely during working operations.

This feature of the invention is really its prime object. The extensible feature, the movable rungs, all of the other features, all of these render the working platform accessible and positionably adjustable. It will therefore be understood that the working platform may be raised or lowered, as desired or as required to meet the needs of individual jobs, and that convenient access may be had to said platform, irrespective of its working elevation, by means of the rung assembly above described.

Another feature of the invention is the base which supports the ladder and scaffold in vertical operative position. The base is mounted on wheels and may be moved from one location to another. It is also provided with means for firmly holding it in any given location. The invention is not however limited to a ladder and scaffold construction mounted on a permanent base. The ladder is detachably mounted on the base and may be removed therefrom when it is desired to lean the ladder against the side of a building or other suitable support. In practice, the base is provided with a pair of sockets adapted to receive the side rails of the ladder. Said rails may be inserted into or removed from such sockets as desired.

The invention is illustrated in the accompanying drawing in which:

Fig. 1 is a front view of a combination ladder and scaffold construction made in accordance with this invention showing it in partly extended position.

Fig. 2 is a side view thereof.

Fig. 3 is an enlarged horizontal section on the line 3—3 of Fig. 2.

Fig. 4 is an enlarged horizontal section on the line 4—4 of Fig. 2.

Fig. 5 is an enlarged fragmentary vertical section on the line 5—5 of Fig. 1.

Fig. 6 is an enlarged fragmentary vertical section on the line 6—6 of Fig. 1.

The combination ladder and scaffold 10 shown in the drawing is provided with a base 12, a lower ladder section 14, and an upper ladder section 16. The base may be constructed in any desired manner and its horizontal dimensions should be such as to provide sufficient stability to the entire device when it is in its fully extended position and supporting a man. In the preferred form of this invention, the front end of base 12 is mounted on a pair of wheels 18. The back end is mounted on a pair of pegs or legs 20. The base may be tilted upwardly at its back end when it is desired to move the structure from one location to another. In such case, wheels 18 would facilitate movement of the structure. When it is desired to station the device in any given location, the upwardly tilted end of the base would be dropped so as to support said end by means of legs 20. These legs would frictionally engage the supporting floor or ground and the entire structure would thereby be confined to the selected location.

Lower ladder section 14 consists of a pair of channel members 14*a* and 14*b* respectively. At their lower end these channel members are removably mounted in sockets 15 formed in base 12. Upper ladder section 16 is also composed of a pair of channel members 16*a* and 16*b* respectively, said latter channel members being slidably and telescopically supported by the lower channel members 14*a* and 14*b*.

It will now be observed that a platform 30 is secured to the upper channel members 16*a* and 16*b*, said platform projecting forwardly therefrom. Guard rails 32 are fixed to the sides of said platform and to said channel members 16*a* and 16*b* in order to provide adequate support for said platform and also as a safety feature to prevent the occupant of the platform from falling off. Also secured to the upper channels 16*a* and 16*b* is a plurality of rungs or steps 34. It will at this point be stated that the invention contemplates the use of conventional ladder rungs as well as steps. In the preferred form of the invention the steps are shown to constitute relatively wide channel members, their respective side flanges projecting downwardly. The number of steps 34 which channels 16*a* and 16*b* support will vary with individual requirements. Solely by way of illustration, a typical ladder section 16 may be provided with one platform 30 and two steps 34 below said platform. In addition are movable steps 35 below fixed steps 34.

Turning now to the lower ladder section **14**, it will be seen that stored within its two channels **14***a* and **14***b* is a plurality of steps **40**. These steps resemble steps **34** and **35** of the upper ladder section **16** in that they are made in channel form with their respective side flanges projecting downwardly. The lowermost step **35** is situated at the lower end of ladder section **16** and when said ladder section **16** is in its lowermost position, said bottom step **35** is disposed in close proximity to the uppermost step **40**.

It will now be observed that between the lowermost step **35** and uppermost step **40** and also between each adjacent pair of steps **40**, is a pair of folding brace supports **42**. Each brace support consists of a pair of hingedly connected plates or bars **42***a* and **42***b* respectively, hinged not only to each other but also to the adjacent steps above and below them. The hinged connections between each pair of bars **42***a* and **42***b* are off center as the drawing clearly shows. The reason for this will shortly become apparent. Similar folding brace supports are provided between lowermost step **34** and uppermost step **35** and also between steps **35**.

A winch **50** is mounted on channel **14***b*. This is a conventional winch having a pawl-and-ratchet locking mechanism. Two cables or ropes **52** and **54** respectively are wound upon the drum of said winch and it will be observed that they are so related that they are simultaneously payed out or drawn in by the operation of the winch, depending upon its direction of rotation. Cable **52** extends downwardly and around a pair of pulleys **56** and **58** respectively supported on base **12** or on the lower ends of channels **14***a* and **14***b*. Cable **52** then continues upwardly and around pulley **60** mounted at the top of channel **14***b*. The cable then continues downwardly to a rod **61** on the lowest step **34** to which it is firmly secured. Cable **54** extends upwardly from the winch and then around pulley **62** which is mounted at the upper end of channel **14***a*. The cable then continues downwardly to the opposite end of rod **61** to which it is secured.

It will now be evident that when the winch is operated in one angular direction, the cables will be drawn in and wound upon its drum. This will cause channels **16***a* and **16***b* to move upwardly and they may be locked in any desired elevated position by means of the conventional pawl-and-ratchet mechanism of the winch. Remembering that the lowermost step **34** in channels **16***a* and **16***b* is connected to the uppermost step **34**, and that steps **34** are interconnected and also connected to steps **40** in channels **14***a* and **14***b*, all by means of hinged brace supports **42**, it will be understood that the upward movement of said lowermost step **34** will eventually cause an upward movement of the uppermost step **35**, said hinged brace supports **42** serving as the pulling means. Similarly, as said uppermost step **35** is moved into elevated position, it will pull into elevated position the second step **35** in line and by the same token, said second step will pull the third and the third will pull the fourth and so on until all of the stored steps **35** are supported in elevated positions, properly spaced from each other. The lowermost step **35** will pull uppermost step **40** into elevated position, and this will then happen to the succeeding steps **40** until all are raised into vertically spaced, elevated positions.

When it is desired to lower the upper ladder section **16** and the platform unit mounted thereon, the lock on the winch is released and the winch is caused to operate in the opposite direction from that previously indicated. Steps **40** and then steps **35** will move downwardly and each in turn, beginning with the second step from the bottom, will move into abutment with the step below it. Each pair of hinged braces **42** will fold upwardly into the step above. This would happen because of the offset positions of their respective hinges. At the same time, the upper ladder section **16** and the platform unit will descend in channels **14***a* and **14***b* until the desired lower position is attained.

The foregoing is illustrative of a preferred form of this invention and it will be understood that this preferred form may be modified and other forms may be provided within the broad scope and principles of the invention.

I claim:

1. An extensible ladder construction of the character described, comprising a lower pair of parallel channels, an upper pair of parallel channels slidably telescopically disposed in the lower channels, a plurality of steps fixedly secured to the upper ends of the upper channels, a plurality of steps slidably mounted in said upper channels below said fixed steps, a plurality of steps slidably mounted in the lower channels, hinged braces between the slidable steps in the upper channels, additional hinged braces between the slidable steps in the lower channels, and hinged braces between the lowermost slidable step in the upper channels and the uppermost slidable step in the lower channels, a winch on one of said lower channels, cables operatively connected to said winch, pulleys at the upper and lower ends of said lower channels, one of said cables extending downwardly and around the pulleys at the lower ends of the lower channels and then upwardly and around the pulley at the upper end of one of said lower channels and then down to the corresponding upper channel to which it is secured, the other cable extending upwardly and around the pulley at the upper end of the other of said lower channels and then downwardly to the corresponding upper channel to which it is secured, whereby operating the winch in one direction causes the upper channels to move upwardly relative to the lower channels and to raise the slidable steps, first of the upper channels and then of the lower channels, by means of said hinged braces, whereby operating the winch in the opposite direction causes the upper channels to descend and thereby to lower the slidable steps, first of the lower channels and then of the upper channels, each of the slidable steps in the upper and lower channels, and the lowermost of the fixed steps in the upper channels, comprising a channel of inverted U-shape in cross section, the yoke of the U-shaped channel comprising the step proper and the legs comprising a pair of downwardly extending flanges which extend along both side edges of the yoke, the hinged braces being pivotally secured to said flanges on the inside thereof and being adapted to fold into the space between said flanges to permit nesting of said slidable steps one upon the other.

2. An extensible ladder construction in accordance with claim 1, wherein said ladder construction is provided with a base receptacle adapted to receive and store the slidable steps in their lowermost positions, said ladder construction also having a base support mounted on wheels, said base support having a pair of sockets formed therein and said lower channels being removably mounted in said sockets, the winch being provided with a pawl and ratchet locking mechanism adapted to lock the same at any elevated position of the upper channels.

3. An extensible ladder construction in accordance with claim 2, wherein the uppermost fixed step on the upper channels comprises a platform of a size which renders it comfortable to stand on, a pair of guard rails being provided at the sides of said platform and being attached both to the platform and said upper channels, thereby securely supporting the platform on said upper channels.

References Cited in the file of this patent

UNITED STATES PATENTS

537,631	Cooper	Apr. 16, 1895
987,585	Mayer	Mar. 21, 1911
1,101,808	Michel	June 30, 1914
2,310,119	Reinhardt	Feb. 2, 1943
2,762,659	Harlan	Sept. 11, 1956
2,829,814	Warner	Apr. 8, 1958