July 7, 1964 W. CLAYTON 3,139,951

SUPPORT STAND

Filed Dec. 4, 1961 2 Sheets-Sheet 1

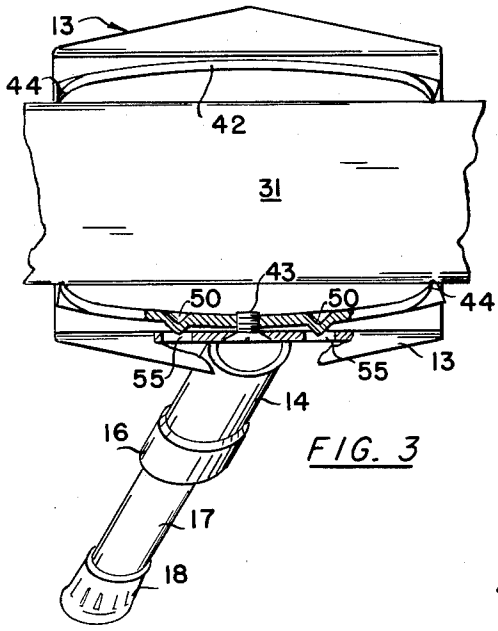


FIG. 3

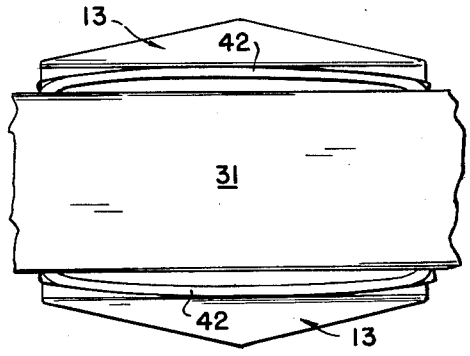


FIG. 4

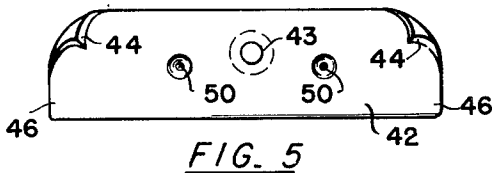


FIG. 5

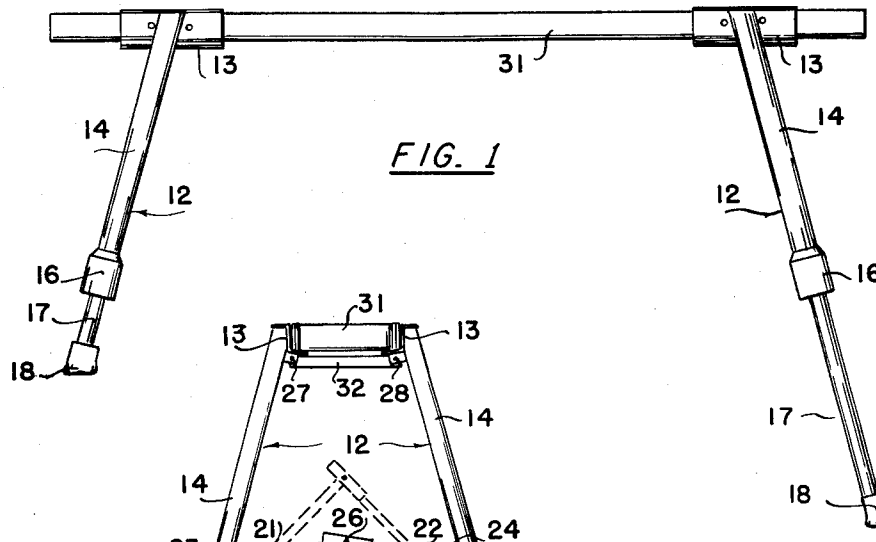


FIG. 1

FIG. 2

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July 7, 1964 W. CLAYTON 3,139,951

SUPPORT STAND

Filed Dec. 4, 1961 2 Sheets-Sheet 2

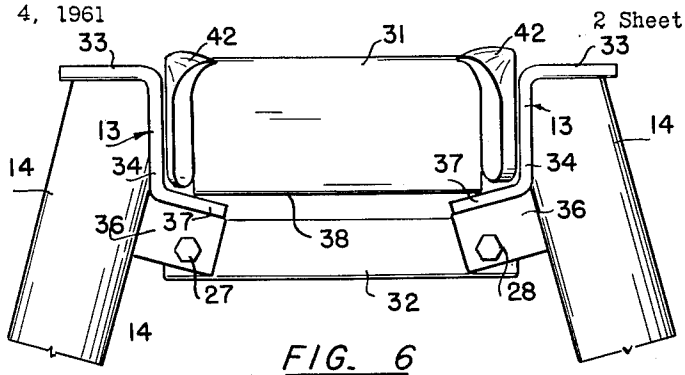


FIG. 6

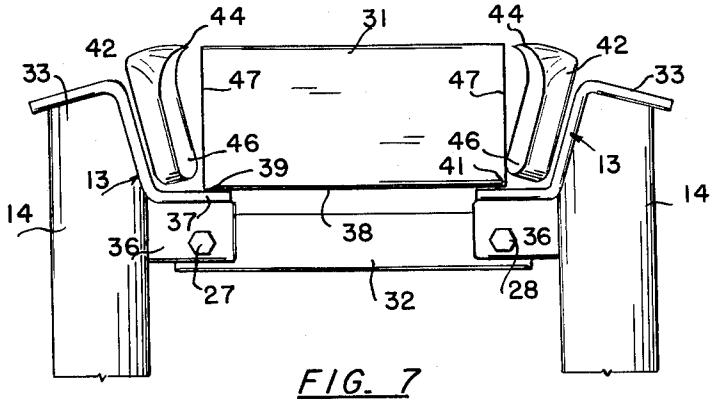


FIG. 7

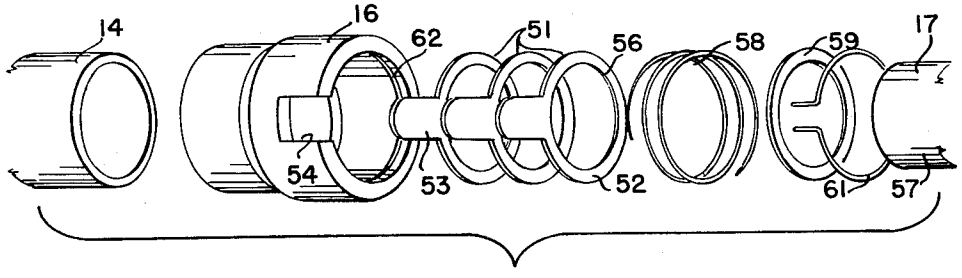


FIG. 8

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United States Patent Office 3,139,951 Patented July 7, 1964

3,139,951

SUPPORT STAND

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Filed Dec. 4, 1961, Ser. No. 156,705
4 Claims. (Cl. 182—186)

The present invention provides a collapsible support stand or trestle component which may be used together with dimensional materials to provide work stands, sawhorses, scafford supports or trestles for the support of tables, platforms and the like.

Previously, others, including the present inventor, have devised different designs and configurations for trestles, sawhorses and collapsible supports which, in general, have been intended for use in the assembly of working platforms, benches and scaffolding.

A primary object of many of the prior systems has been the provision of a support unit which could be readily assembled from collapsed elements for use at the job site. Likewise, prior inventions have been directed to the provision of a single type of support unit which could be used together with conventional dimensional materials to fabricate desired support stands, trestles and scaffolding.

The foregoing objects are again of guiding importance in the present development, which is intended to present improvements in the means and mechanisms used for the satisfaction of such objectives.

A further object of the present invention is to provide a support stand which is easily adjusted for use on stairways or on uneven terrain to maintain a flat or level working platform.

Another object of this invention is to provide a holding or locking mechanism which compensates for variations in the size of dimensional materials that are used with the support stands.

A further specific object of the present invention is the provision of a gripper jaw, platform support and locking mechanism which may be used to positively engage and hold dimensional materials in a manner to withstand the effects of multi-directional displacing forces.

A still further object of the present invention is to provide adjustment features inclusive of telescoping legs with readily engageable holding devices which utilize multi-plate locking members.

Further objects and advantages of the present invention will be apparent from the appended description and drawings, in which

FIG. 1 is a side elevation illustrating the use of two support stands to provide a level platform on uneven terrain,

FIG. 2 is an end elevation showing the basic arrangement of structural components and further illustrating the alternate positions of an extension lock mechanism,

FIG. 3 is a top view in partial cross-section illustrating the open jaw configuration for a support unit,

FIG. 4 is a top elevation showing the jaw and support stand fully engaged with a piece of dimensional lumber,

FIG. 5 is a side elevation showing features of a spring jaw member,

FIG. 6 is an end elevation further showing the engaged relation of the cooperative parts of a locking jaw,

FIG. 7 shows the disengaged configuration of the mechanism shown in FIG. 6, and

FIG. 8 is an exploded perspective illustration of the multi-plate holding mechanism used on the adjustable telescoping legs.

Briefly stated, the present invention provides a support stand unit that may be readily engaged or disengaged with plank and beam members to provide a secure and safe joint that is able to withstand and efficiently transmit excess loads from the plank or beam to the stand supporting ground. Each support stand includes a locking jaw mechanism having a spring jaw gripping member which directly engages and holds the plank, beam or platform cross member irrespective of dimensional variations in the size of such cross member. The legs of the support stands move toward and away from each other to actuate the locking jaw and spring jaw members, and a scissors mechanism is used to hold the legs and locking jaw in engaged relation. Each of the support legs provides a telescoping extension which may be moved reciprocally to adjustable extended positions as necessary to maintain level support for the cross member when the support stands are to be placed on uneven terrain. The telescoping legs include a quick engaging multi-plate lock for holding the telescoped legs in adjusted positions.

Further details and specific features of embodiments of the invention will be more fully understood with reference to the accompanying drawings, in which FIGURES 1 and 2 are illustrative of the overall configuration of the support stand units. As seen in FIGURE 1, each of the support stands **12** provide a locking jaw **13** which is joined to and supported by hollow tubing leg members **14**. The legs **14** extend laterally outwardly and longitudinally away from the locking jaw **13** which normally is in horizontal position. The hollow legs **14** are provided with a lower lock socket **16** through which a telescoping leg extension **17** passes. The foot of the leg extension **17** is provided with a floor gripping member or tip **18** to minimize any slipping tendencies. A scissors mechanism **19** is provided to hold the separate legs **14** in what is essentially an A frame configuration. This scissors **19** includes arms **21** and **22** that are pivotally secured by means of the pins **23** and **24** to the legs **14** and to each other by a center pin **26**.

When the scissors mechanism **19** is moved to its full down position, the outwardly directed movement of the legs **14** results in a rotating movement of the locking jaws **13** about the upper pivot pins **27** and **28** to exert pressure against the platform cross member **31** engaged between the locking jaws **13**. While the full locked position for the scissors mechanism is not illustrated in FIGURE 2, it should be realized that when the links **21** and **22** are moved to or past an aligned position extending between pins **23** and **24** by pressure applied to foot actuator **29**, they will be locked and held in such dead center position until released by an upwardly applied pressure. Necessarily, the outward force exerted by the scissors linkage mechanism **19** results in an inwardly directed vice gripping force against the locking jaws **13**, since the engaging force exerted against the cross member **31** is resisted by a cross link **32** extending between the pins **27** and **28**.

The manner in which the vice like gripping force is exerted against the platform cross member **31** is illustrated in FIGURES 3 through 7. As illustrated in FIGURES 6 and 7, the locking jaws **13** are provided with a top flange **33** which is of flat triangular shape adapted for engagement with the tubular legs **14** at a center position. The legs **14** further engage the upright jaw face **34**, while the outwardly extended flanges **36**, which are welded to the tubular legs **14** and which provide support for the pivots **27** and **28**, are disposed beneath and may be welded to the angle base **37** of the locking jaws **13**.

The placement of the bases **37** with respect to the jaw faces **34** is at an angle of approximately 104 degrees to said jaw faces **34**. This placement provides a 14 degree taper or upwardly disposed slant for the base **37**, which regularly engages the bottom surface **38** of the platform cross member **31**. With this arrangement, pivoting movement of the locking jaws **13** from the position shown in FIGURE 7 to that shown in FIGURE 6 exerts a force against the bottom corners **39** and **41** of the cross member **31** which ordinarily would tend to force this cross mem-

ber 31 upwardly and out of the locking jaws 13. This upwardly directed force, however, is countered by a holding force applied inwardly and downwardly by the spring jaw 42.

The structural features and the working movement of the spring jaw 42 is illustrated in the mentioned FIGURES 3 through 7. In these figures it will be seen that spring jaw 42 is essentially a flat leaf spring type structure having a considerable arch or curvature away from its center mounting screw 43. When disengaged, as shown in FIGURES 3 and 7, the arch and curvature of the spring jaw 42 is just sufficient to bring the inwardly and downwardly turned corners 44 into position for engagement with the cross member 31. Initial movement of the legs 14 away from the collapsed or disengaged positions will bring the inwardly turned corners 44 and the outer lower edges 46 of the spring jaw 42 into engagement with the sides of cross member 31. Further pivoting movement of the legs 14 about the pivots 27 and 28 will cause the leaf spring jaw 42 to be flattened, as shown in FIGURE 4, and will further cause the turned corners 44 to be dug inwardly and downwardly into the lateral side faces 47 of the cross member 31. If the cross member 31 is relatively oversized when compared with the standard or average dimensions for dimensional materials, the spring jaw 42 will be fully flattened against jaw faces 34 and corners 44 will be buried in such cross member. If the cross member 31 is undersize, the spring jaw 42 will be slightly flattened, and the corners will be held in engagement by leaf spring pressure. By design the spring jaw 42 is adapted to exert a secure holding force when only slightly deformed. Whether such cross member 31 is over or under size, the holding force to be exerted is a spring force. Further, the forces exerted against the cross member 31 are directed inwardly and downwardly by the spring jaw 42 and upwardly by the slanted base 37. With the application of multi-directional holding forces, any loads tending to displace the cross member 31 will be efficiently resisted, and a strong and safe connection will be preserved.

The actual transfer of forces from the spring jaws 42 to locking jaws 13 is mainly by direct contact between such elements. In order to hold spring jaws 42 in place, center mounting screws 43 extend through the upright jaw face 34 and spring jaws 42. Actually, mounting screws 43 need only be of size sufficient to prevent loss of the spring jaws 42, since most of the resistance force used to keep the spring jaws 42 from pivoting in the locking jaws 13 is operative against the struck dimples 50 in the spring jaws 42 and the mating openings 55 in the upright face 34 of locking jaws 13. The application of a gripping force to the locking jaws 13 through movement of the legs 14 flattens spring jaws 42 and brings the dimples 50 into intimate contact with the openings 55. This contact holds spring jaws 42 and locking jaws 13 in secure positions to maintain the cross member 31 and the support stands 12 in their desired relative positions. Necessarily, direct fastening members could be substituted for the struck dimple and opening combination, but it has been found that this particular structure has a further advantage, inasmuch as it permits slight adjusting movements between the spring jaws 42 and locking jaws 13 even when such locking jaws are fully engaged.

The preferred angular relationships between the locking jaws 13 and the rest of the support stand 12 is illustrated in FIGURES 1 and 2. This arrangement in which the legs 14 extend laterally outwardly and longitudinally away from the locking jaws 13 is used to provide increased stability for any platform held by the support stands 12. When two of the support stands 12 are engaged with a plank, beam or cross member 13, each of the support stands 12 tends to resist the other, and unwanted movements of the working platform are avoided.

For most efficient use, it is important that the angular relationship between the legs 14 and the locking jaws of

single or multiple support stands be preserved. Accordingly, provision is made for adjusting the effective length of each of the support legs as necessary to compensate for changes in the level of the supporting ground. An efficient extension system is illustrated in the present embodiment of the invention. Here adjustments in the effective length of the legs is obtained through provision of a telescoping leg system. Leg extensions 17 are adapted to move in and out of the hollow tubular legs 14. While it is recognized that telescoping extension legs have previously been used for support scaffolds and the like, the present system presents an improvement in such arrangements, inasmuch as the telescoping leg system includes an easily applied and released locking device.

The structure of the preferred locking device is illustrated in FIGURES 2 and 8. Here it will be seen that the hollow tubular leg 14 is joined to lock socket 16 as by welding or other suitable fastening means, and the leg extensions 17 are allowed to move reciprocally in and out of the hollow tubular legs 14 and through the lock socket 16. Lock socket 16, which is of size greater than legs 14, provides an inner cylindrical receptacle which is adapted to receive multi-plate lock members 51. These multi-plate lock members 51 are of essentially ring structure 52 having a release extension 53 which extends out of the lock socket 16 through the cut notch 54. The inner diameter of the ring segment 52 provides a surface 56, which closely engages the exterior surface 57 of leg extensions 17. This close engagement between the inner surface 56 of the multi-plate lock members 51 together with clearance in the lock socket 16 sufficient to permit relative movement between each of the multi-plate lock members 51 provides an efficient, secure and safe lock for holding the leg extensions 17 in their desired adjusted positions.

The further elements used in the lock device include a coil spring 58 which acts against the multi-plate lock members 51, a retainer washer 59 and a retainer spring 61 which is adapted to fit in the cut groove 62 formed on the inner cylindrical surface of the lock socket 16. When all the described elements are in place within the lock socket 16 with the retainer washer 59 being held by the lock spring 61, the coil spring 58 will hold the multi-plate locking members 51 in desired position about the leg extensions 17 until a release pressure is applied against the release extensions 53. Since the release pressure must be applied upwardly against the release extensions 53 and, further, since the release extensions are disposed in a protected position beneath the scissors mechanism 19, any undesired release of the locking device is avoided.

From the foregoing description and drawings, it should be apparent that the present invention presents a highly serviceable and efficient support system which may be used to satisfy many and varied requirements. Further, it is realized that features of the present invention are adaptable to various modifications and changes. All such modifications as come within the scope of the appended claims are considered to be a part of this invention.

I claim:

1. A support stand unit for use in the fabrication of scaffold, trestles, sawhorses and the like from structural materials comprising locking jaw members, leg elements secured to said locking jaw members for the support of said locking jaws in elevated positions, pivot means securing separate leg elements and jaw member elements pivotally together whereby outward movement of said leg elements causes a corresponding inward gripping pressure to be exerted by said locking jaw members, and a leaf spring member of inwardly concave curvature disposed on the inner face of said locking jaws with the longitudinal free ends of said leaf spring being disposed for deforming contact with structural materials disposed between said springs when subjected to the inward gripping pressure exerted by the pivotally moved legs and locking jaw members, with the spring pressure exerted

by the deformation of said spring members holding said structural materials in assembled relation between said locking jaws and on said support stand.

2. A support stand unit for use in the fabrication of scaffold, trestles, sawhorses and the like from structural materials comprising locking jaw members, leg elements secured to said locking jaw members for the support of said locking jaws in elevated positions, pivot means securing separate leg elements and jaw member elements pivotally together whereby outward movement of said leg elements causes a corresponding inward gripping pressure to be exerted by said locking jaw members, a leaf spring member of inwardly concave curvature disposed on the inner face of said locking jaws, and inwardly directed projections of tapered contour on the longitudinal free ends of said leaf spring member for inward initial engagement with structural materials disposed between said spring members with the said inward gripping pressure exerted by said locking jaws and legs being utilized to deform said leaf spring whereby said projections are moved longitudinally along said structural materials to hold the structural materials in assembled relation therebetween.

3. A support stand unit for use in the fabrication of scaffold, trestles, sawhorses and the like from structural materials comprising locking jaw members having a support face and a lower base disposed at an angle directed upwardly toward said face when the face is in a substantially upright position, leg elements secured to said locking jaw members for the support of said locking jaws in elevated positions, pivot means securing separate leg elements and jaw member elements pivotally together whereby outward movement of said leg elements causes a corresponding inward gripping pressure to be exerted by said locking jaw members, and a leaf spring member of inwardly concave curvature disposed on the inner support face of said locking jaws with the longitudinal free ends of said leaf spring being disposed for deforming contact with structural materials disposed between said springs when subjected to the inward gripping pressure exerted by the pivotally moved legs and locking jaw members, with the spring pressure exerted by the deformation of said spring members holding said structural materials in assembled relation between said locking jaws and downwardly against the lower angle base of said locking jaws members.

4. A support stand unit for use in the fabrication of scaffold, trestles, sawhorses and the like from structural materials comprising locking jaw members having a support face and a lower base disposed at an angle directed upwardly toward said face when the face is in a substantially upright position, leg elements secured to said locking jaw members for the support of said locking jaws in elevated positions, pivot means securing separate leg elements and jaw member elements pivotally together whereby outward movement of said leg elements causes a corresponding inward gripping pressure to be exerted by said locking jaw members, a leaf spring member disposed on the inner support face of said locking jaws, and inwardly directed projections on the longitudinal free ends of said leaf spring member for inward initial engagement with structural materials disposed between said spring members with the said inward gripping pressure exerted by said locking jaws and legs being utilized to deform said leaf spring whereby said projections are moved longitudinally along said structural materials to hold the structural materials in assembled relation between said locking jaws and downwardly against the lower angle base of said locking jaw members.

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