This invention relates to collapsible stand structure and particularly to the two-stage type of stand structure wherein the sections are extensible to support the stand at various heights.

The object of this invention is the provision of a novel auxiliary unit adapted to be extended to support the stand and also adapted to be collapsed to permit folding of the stand in a minimum space, said auxiliary unit and the leg sections thereof, in addition to being easily collapsed, are also so arranged in combination with the various positioning and supporting parts therefor as to present a stand structure of the utmost rigidity and compactness. The leg sections of this auxiliary supporting unit are preferably pivoted to the stand frame and are so designed as to be automatically locked when extended to supporting or reinforcing position, the automatic locking means being such as to give the pivoted leg sections considerable reinforcing action to insure rigidity when in such extended supporting or reinforcing position.

In the drawings:

Fig. 1 is a perspective view of my novel two-stage stand structure with both the inner and outer units extended, the outer unit reinforcing the inner unit.

Fig. 2 is a perspective view of my novel locking plate which is adapted to be riveted or otherwise secured to the frame of the stand.

Fig. 3 is a perspective view of the tension and compression member, or the reinforcing link for the outer or auxiliary leg sections.

Fig. 4 is a sectional elevation taken transversely of the stand and illustrating the preferred form and positioning of the various cooperating parts of the outer leg sections, and the supporting and locking means therefor.

Fig. 5 is a fragmentary sectional view similar to Fig. 4 but showing one of the leg sections in a position just prior to being forced into locking position against the resilient retaining member.

Fig. 6 is a section taken on line 6—6 of Fig. 4.

Fig. 7 is a section taken on line 7—7 of Fig. 4.

The particular locking and reinforcing structure which forms an important feature of the present invention is particularly applicable to stand structure of the two-stage type, such as is more clearly illustrated and described in the pending application No. 130,574, filed by Earl W. Northrop and James Ironside.

This stand structure, in general, comprises a frame member which is preferably formed of material angular in cross section, as best shown in Figs. 6 and 7, and angular in formation, although it will be understood that such frame member may be of any desired formation or structure. Pivoted to this frame member 1, as at 2 and 3, are the main leg sections 4 and 5 which preferably fold longitudinal of the stand about such pivots 2 and 3. These leg sections preferably include two legs connected by the cross pieces 6. The pivots 2 and 3 are preferably spaced at a distance from the ends of the frame member 1 whereby the leg sections 4 and 5 are preferably positioned at an angle, as clearly illustrated in Fig. 1.

This foldable section forms a part of the present invention in that such inner section is reinforced when in extended position, as shown in Fig. 1, by outer foldable sections, and further, that such inner main foldable leg sections are retained in collapsed position by the collapsing of such outer sections. This outer reinforcing section comprises the leg sections 7 and 8 which are foldable about the pivots 9 and 10, and transversely of the frame member 1. The respective legs of each leg section 7 and 8 are connected by the suitable corrugated reinforcing members 11. The pivots 9 and 10 are preferably positioned as close as possible to the angular sides of the frame 1, as shown in Fig. 4, and the upper ends of the legs of the leg sections 7 and 8 are preferably arculate in shape, as shown, to permit pivoting of the leg sections about such pivots 9 and 10. By pivoting the outer leg sections, as at 9 and 10, and by reinforcing the same by the members 11, it will be obvious that the legs of such section are fitted snugly.
when extended, into the corners of the frame member 1, and in positions vertical to the plane of such frame member 1. This positioning and reinforcing of the outer leg sections serves to reinforce the inner main leg sections, as illustrated in Fig. 1, and is more fully described in said pending application above referred to.

If the leg sections 7 and 8 depended for their rigidity on the positioning of the pivots 9 and 10, and the contacting of the angular legs with the angular structure of the frame member 1, it would be obvious that in time considerable wear will take place, thus making the stand slightly wobbly and particularly when the inner leg sections 4 and 5 were collapsed, and only the outer shorter leg sections used for supporting the stand. To overcome this possibility of the wearing of the pivots and to make the entire stand structure, as well as the outer unit, more rigid, I have provided a reinforcing structure which depends for its operation on the cooperation of several parts. These parts going to make up this reinforcing and locking structure include a locking and guiding member 12 which is preferably angular in cross section and stamped from a single piece of metal, the shorter leg of the angle being provided with apertures 13 to permit suitable fastening to the upper leg of the angle forming the frame member 1, as clearly illustrated in Fig. 7. The other leg of this member 12 is provided with suitable slots 14 which extend, longitudinally of the member 12 and which slots are provided at their outer ends with suitable locking depressions or guideways 15 which are inclined downwardly relative to the guideways 14.

These members 12 are adapted to be positioned at each end of the frame 1 and centrally thereof, as shown in Fig. 4. A suitable link 16, which is adapted to serve as a tension and compression member, is pivoted to each of the legs of the leg sections 7 and 8, as at 17, and at the outer end such link is provided with a suitable pin 18 which is adapted to fit in and cooperate with the guideways 14 and 15 formed in the locking member 12.

The member 12 is provided with a suitable spring member 19 which may be secured to such member 12 by the rivets or other means which position such member to the frame 1. These springs 19 are preferably in the form shown in Fig. 4 and they extend downwardly so as to exert a resilient force against the pins 18 when they approach the outer ends of the guideways 14 through the movement of the leg sections to extended position. These springs are preferably arcuate in shape and so positioned whereby as the leg section is moved outwardly, as shown in Fig. 5, and the pin gradually presses against the arcuate portion of the spring member 19, such end will be positively forced into the portion 15 of the guideway to positively lock the legs rigidly in extended position. In other words, as the pin 18 is moved to its outer position against the tension of the arcuate spring 19, it will pass the arcuate portion on the spring just as it reaches the point 20, at which time it will be positively forced down into the guideways 15 by the arcuate portion of the spring 19. It will be obvious that if such spring were merely stationary producing a general tension on the pins 18 that the leg sections might be moved to approximately extended position and be held in such approximate position by the friction, with the result, that upon placing any weight upon the table that such leg or legs might collapse. By the present construction the tendency of the operator is to fully extend the legs of the outer unit, and this tendency is assisted by the positive action of the spring in forcing the locking pins into positive locked position. A further feature of this arcuate shape of the spring 19 is that such pins 18 are held in the angular guideways 15 by such arcuate portion of the spring whereby it is not easy to collapse the stand except upon positive removal of the tension exerted by the springs.

In the operation of this novel, automatic locking, and rigid stand structure it will be obvious that in order to extend the outer shorter legs to supporting position that it will only be necessary to move the leg sections outwardly, as shown in Fig. 5, whereby the pins 18 sliding in the guideways 14 will contact with the arcuate portions of the spring members 19 until the outward movement overcomes the tension of the springs and such pins are positively forced into the angular locking guideways 15. As the pin moves downwardly into the guideways 15 the leg sections 7 and 8 are positively moved to their outer vertical position. When once in this position, it will be obvious that the links 16 serve as positive tension and compression members, due to this angular positioning of the guideways 15, whereby the legs of the leg sections 7 and 8 are positively reinforced in both directions thus making an extremely rigid and compact supporting unit when only the outer unit is used for supporting the stand, as shown in Fig. 4, and also serving as a rigid reinforcing unit for reinforcing the inner main leg sections when they are utilized to support the stand. By the arrangement shown considerable leverage is obtained, thus giving extremely rigid support to the leg sections 7 and 8.

In collapsing the outer leg sections, it is necessary to either press upon the links 16 to force the arcuate springs 19 outwardly, or pressure may be applied to the pins 18 whereby to press the spring members 19 and thus permit collapsing of the leg sections. If will
be obvious that this is a very simple operation as only one hand need be required in actuating the links 16 to depress the springs 19.

The parts comprising the members 12, links 16, and leg members 7 and 8 are so positioned and so cooperate that when folded into collapsed position a certain amount of friction is set up due to the contact of such relative parts, as shown in Fig. 6, whereby when the shorter leg sections are collapsed they will assist in maintaining the entire structure in collapsed position due to the frictional contact. It will be obvious that such spring members 19 may be formed to resiliently contact with the pins 18 at all times, but I have found that the parts may be maintained in collapsed position merely by the frictional contact of such parts.

The base of the stand structure, and more particularly the inner main unit, may be provided with suitable shelf units 30 and 31, which may be pivoted together and extended so as to reinforce the inner unit by means of the cantilever action set up by such unit and by means of the contact between the shelf sections and the cross members 6, as is more fully explained in the said copending application.

It will thus be seen that I have provided a simple, compact but rigid stand structure, the shorter leg sections of which are adapted to be positively and rigidly reinforced and locked in extended position, but which may be easily and quickly collapsed when desired. It will further be obvious that this rigid reinforcing and locking structure also assists in rigidly reinforcing the inner leg sections when the table is extended to its full height.

It will be understood that the depression or slot 15 is so formed as to constitute the arc of a circle whose radius is determined by the connecting link 18 when the legs 7 and 8 are extended, as in Fig. 4. This slot being arcuate makes the link 16 an accurate tension and compression member, but it will be understood that fairly good results may be obtained by forming such slot at an angle to the guide way 14, and approximately perpendicular to link 16, in the position shown in Fig. 4.

Having thus described my invention, what I claim is:

1. A collapsible stand structure adapted to be extended to a plurality of heights comprising an inner and outer unit mounted on the same side of a common frame member, one of said units being adapted to reinforce the other, link members pivoted to the legs of one of said units, and means secured to the frame member and adapted to receive and position said link members to form tension and compression members for reinforcing one of said units.

2. A collapsible stand structure comprising a frame member, inner and outer leg units pivoted to and foldable relatively thereto, one of said leg units adapted to rein-

In testimony whereof I affix my signature.

JAMES IRONSIDE.