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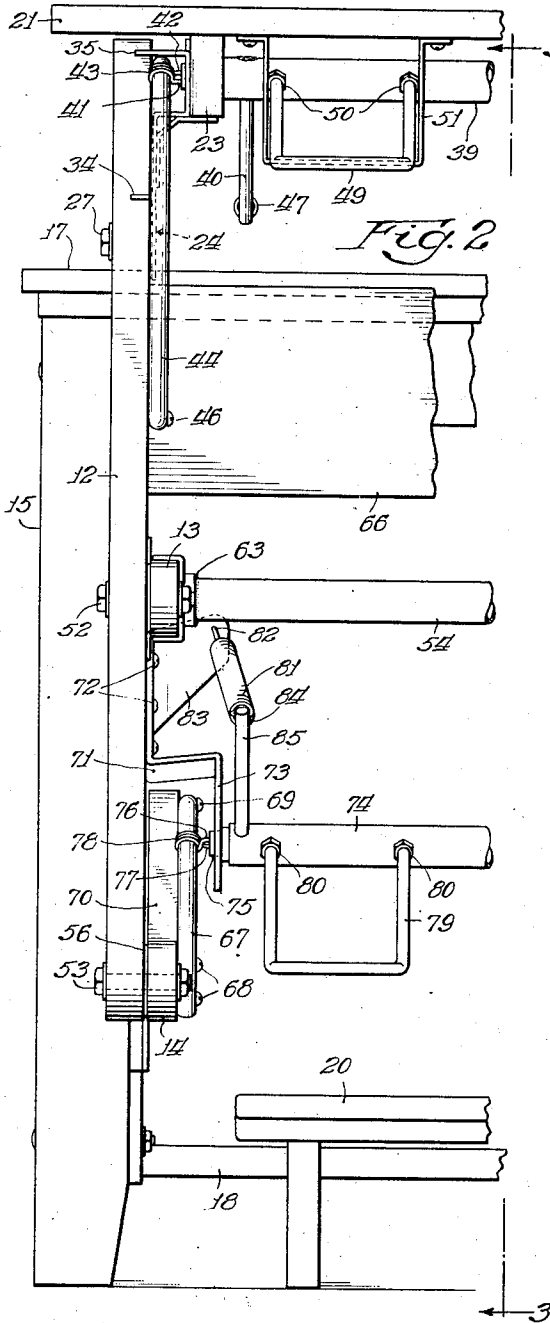
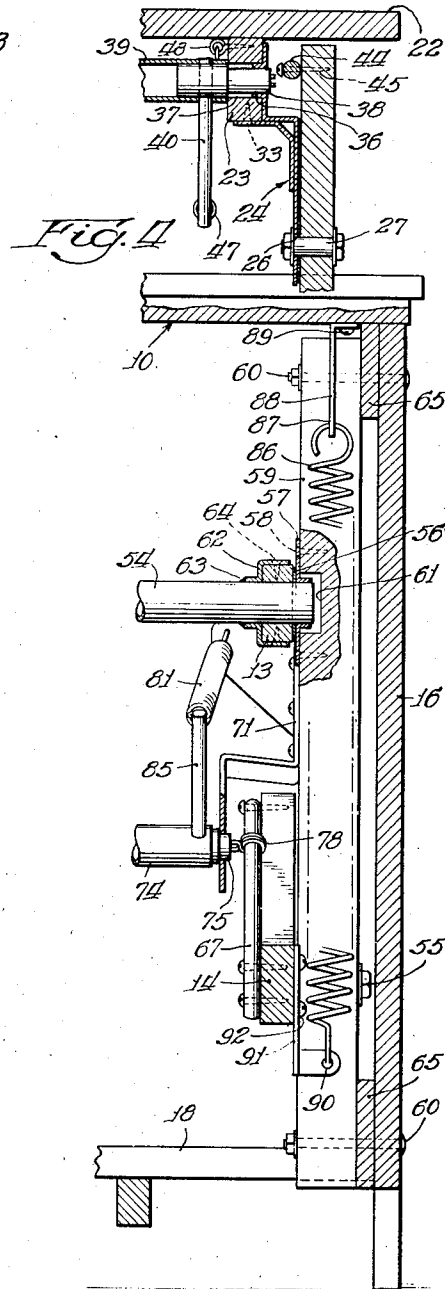
G. E. FROELICH

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ADJUSTABLE STAND FOR DRAFTSMEN OR THE LIKE

Filed June 22, 1942

3 Sheets-Sheet 2



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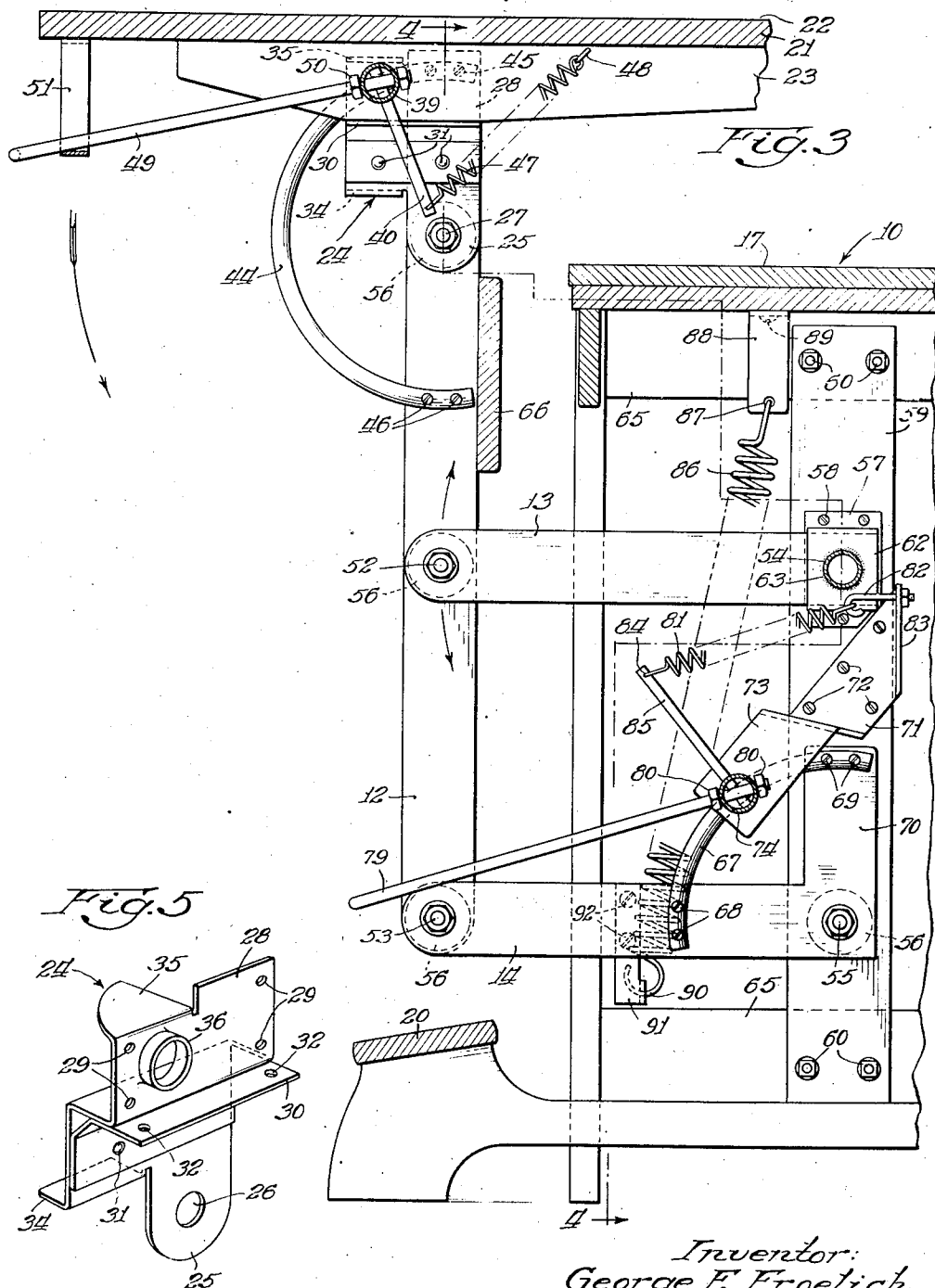
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UNITED STATES PATENT OFFICE

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ADJUSTABLE STAND FOR DRAFTSMEN
OR THE LIKEGeorge E. Froelich, Two Rivers, Wis., assignor
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7 Claims. (Cl. 45—90)

This invention relates to adjustable stands for draftsmen or the like and more particularly of the class broadly described and claimed in my prior Patent No. 1,956,546 of April 24, 1934.

The present invention is also specially adapted for use with devices shown in my co-pending application Serial No. 351,381, filed August 4, 1940, which has issued as Patent No. 2,312,636 granted March 2, 1943, and including an arcuate bar and a torsion spring normally gripping the bar to provide a friction clutch mechanism usable for adjusting two relatively movable members.

Among other objects, the present invention aims to provide a structure of this type of enhanced simplicity and economy of manufacture, while at the same time affording the many advantages attendant to such structure in which the stand has two working surfaces, one afforded by the top of the base, which may be a table or desk having drawers in one face thereof, and the other working surface by a drafting board mounted at the other face thereof, the drafting board being readily adjustable by a touch of the foot or hand of the draftsman to regulate both its height and its inclination, for enhanced comfort and speed of work.

These and other objects and advantages will be apparent from the following description, taken together with the accompanying drawings, in which—

Figure 1 is a side view of a stand embodying the present improvements;

Figure 2 is a front view of the left-hand side of the structure shown in Fig. 1 looking at Fig. 1 from the left somewhat enlarged;

Figure 3 is a section taken on the line 3—3 of Fig. 2;

Figure 4 is a section taken on the irregular line 4—4 of Fig. 3 but as the structure appears at the right-hand side of Fig. 1, looking at Fig. 1 from the left;

Figure 5 is a detail perspective view of parts shown in the earlier referred to figures and still further enlarged;

Figure 6 is a view similar to Fig. 1 but showing another selective position of the parts; and

Figure 7 is also a view similar to Fig. 1 but showing still another selective position of the parts.

In the illustrative construction shown in the drawings, the numeral 10 represents a base for the drawing board 11, which is mounted on struts 12, the latter being articulated as by links 13 and 14 with the desk 10.

The desk 10 may have the usual side walls 15

and 16, and working top surface 17, and may be reinforced near its bottom by a cross-piece 18. A drawer 19, shown partially open in Fig. 1, may be located accessible at one face of the desk 10, that is, what may here be called its rear face. Extending from the desk cross-piece 18 is shown a foot rest 20 at what may be termed the front face of the desk and for use by the draftsman who may be using the drawing board 11 at this face of the stand. It will be observed from the drawings and particularly looking at Figs. 2 and 4 together, that there are here shown a pair of struts 12, a pair of links 13 and a pair of links 14, two links for each strut. The struts adjacent their tops mount the drawing board 11 in a manner which will next be described.

The drawing board 11 comprises a drawing board proper 21 having a smooth flat working surface 22 suitable for making mechanical drawings or the like thereon. To the underside of the drawing board proper 21 adjacent each side margin thereof are secured a pair of cleats 23. Pivoted adjacent the upper end of each of the struts 12, which may be of wood to conserve metal, is here shown a metal bracket member 24, the shape of which is best seen from Fig. 5. The leg 25 of the bracket member 24 is perforated as at 26 to pass therethrough the pivot bolt 27 which also passes through the strut 12 adjacent its upper end as best seen in Fig. 4, the bracket being upon the inner face of the strut. At its free end the bracket 24 has an offset portion 28 through holes 29 in which screws pass into the outer face of the cleat 23 of the drawing board. For reinforcement an angle plate 30 may be riveted to the bracket 24 as at 31 to underlie the lower edge of the cleat 23 and, through holes 32 in which plate, screws 33 may pass into the cleat. Thus the drawing board is securely but rotatively mounted on the struts. The bent portions 34 and 35 of the bracket 24 may act as stops to limit backward rotation of the drawing board on the struts by contacting with the struts when the drawing board is rotated to a horizontal position.

Drawn from the offset portion 28 of the bracket 24, I have shown a cylindrical bushing part 36 which enters a through passage 37 in the cleat 23 and forms a bearing for a reduced end of a trunnion 38, the other end of which has passed over it a hollow rock shaft 39 which thus connects the two trunnions 38 at each side of the structure, the trunnions forming end plugs for the shaft. Adjacent each end of the hollow rock shaft 39, an arm 40 passes through the rock shaft and also advantageously through the trunnion

38, keying the rock shaft and trunnions together for common rotation in the bracket members 24. Since the rock shaft is slightly larger in diameter than the through passages 37, lateral movement of the rock shaft is limited.

In each reduced end of the trunnion 38 is anchored axially the ends 41 and 42 of a torsion spring 43 which encircles in somewhat wrapped around relation an arcuate bar 44 fixed at one end, as at 45, to the upper extremity of the strut 12, and, at its lower end, as at 46, to an intermediate part of the strut, the bar 44 extending in bowed formation outwardly of the strut toward the front face of the stand. The torsion springs 43 normally grip the bars 44 with sufficient friction to prevent unintentional movement of the torsion springs on the bars, and to assist in maintaining the torsion springs and at the same time the rock shaft 39, in gripping position, the arms 40 may each have their outer ends connected with a tension coil spring 47, the other end of which is hooked as at 48 to a drawing board cleat 23. To rotate the rock shaft 39 in the opposite direction to bias the parts to loosen the grip of the torsion springs 43 on the bars 44 against the pull of the tension springs 47, a hand lever 49 is provided in the form of a metal loop secured at its ends to the rock shaft 39 as at 50 (Figs. 2 and 3). The outer end of the hand lever 49 lies beneath the drawing board 21 and is accessible at the proximate side of this board, where a stirrup 51 guards the lever end.

So constructed and arranged, manual movement of the lever 49 in the stirrup 51 toward the board 21 will release the torsion springs 43 on the bars 44 and permit rotation of the brackets 24 carrying the drafting board 11 to any selected position from the horizontal as shown in Fig. 1 toward the vertical as shown in Fig. 6. Upon release of the lever 49, the inherent resilience of the torsion springs 43, aided by the tension springs 47, restores the gripping effect of the torsion springs 43 on the bars 44 and maintains the board 11 at its selected inclination most convenient to the draftsman. For example, with the adjustment shown in Fig. 6, the draftsman may use the board while seated on an ordinary chair.

Turning now to the means for lowering and raising the struts 12 to adjust the elevation of the board 11, it will be observed that the links 13 and 14 are pivoted to the strut 12 at each side of the stand at 52 and 53 respectively and to the desk 10 at 54 and 55 respectively. The pivot points 52, 53, 54 and 55 together define a parallelogram. In this instance, the links 13 and 14 may also conveniently be of wood and the pivots 52, 53 and 55 provided by pivot bolts of these members, metal washers 56 being interposed between the moving parts to minimize friction. In the case of the pivot 54, this is here shown constituted by a metallic rock shaft of this number which runs cross-wise of the desk 10 to connect the links 13 at each side of the desk. At each side, the rock shaft 54 passes through the links 13 and is journaled in a pivot plate 57, secured, as by screws 58 to a wood upright 59 carried by the inner face of each desk side 15 and 16, and fastened thereto as by the through bolts 60. The upright 59 is recessed as at 61 to journal the rock shaft 54 therein as best shown in Fig. 4, and the rock shaft is keyed to the link 13 as by a metal boxing 62 surrounding the rock shaft and welded thereto as at 63, the boxing also lapping the link 13 and being secured

thereto as by screws 64. Thus the rock shaft 54, boxings 62, and links 13 rotate as a unit in the pivot plates 57. It will be seen that the uprights 59 also carry the pivots 55 at the inner ends of the lower links 14, the uprights being spaced from the inner face of the desk by filler blocks 65 to permit free play of the links 14 on their pivots 55. Since the links 13 and 14 thus define a parallelogram in all pivoted positions, the strut 12 will always remain vertical. To assist in stabilizing the structure at both sides of the stand, a plank 66 may be disposed across the inner edges of the struts 12 and suitably fastened to each strut.

Selective adjustment means for the elevation of the struts 12, includes an adaptation of the torsion spring and bar mechanism already described with reference to the adjustment means for the inclination of the board 11, and in the case of the struts includes an arcuate bar 67 secured at one end as by screws 68 to each link 14 and at its other end as by screws 69 to an angular continuation 70 of the link 14, this continuation extending upwardly so that the arcuate bar 67 forms an upper quadrant of a circle within the desk 10. A bracket 71 is secured to the upright 59, as by screws 72 just above the link continuation 70 and clear of the latter. This bracket 71 functions somewhat similarly to the bracket 24 and has an offset portion 73 which is spaced from the upright 59 and laps the arcuate bar 67. In this offset bracket portion 73 at each side of the desk is journaled a rock shaft 74 as by trunnions or end plugs 75. In the trunnions 75 are anchored axially the ends 76 and 77 of a torsion spring 78 which encircles in somewhat wrapped around relation the bar 67 and normally grips the bar frictionally against relative movement of the torsion spring and bar. A foot lever 79 similar to the hand lever 49 passes through the rock shaft 74 and is secured thereto as by nuts 80 so that by depressing the foot lever 79 the rock shaft may be partially rotated to loosen the frictional grip of the torsion springs 78 on the arcuate bars 67 and permit relative movement of the torsion springs and bars, thus permitting swinging of the links 13 and 14 upwardly as indicated in Fig. 7 to any adjusted position for the elevation of the board 11 within the limits of possible relative movement of the torsion springs 78 on the bars 67. Thus as shown in Fig. 7 the drawing board 11 may be used by the draftsman comfortably when in standing position. When the foot lever 79 is released the inherent resilience of the torsion springs 78 restores the springs to gripping position and this may be aided by a tension coil spring 81, hooked at one end, as at 82, to a projection 83 of the bracket 71, and, at its other end, as at 84, to an arm 85 rigid with the rock shaft 74. The arms 85 similarly to the arms 40 may pass through the trunnions 75 and key these also to the rock shaft 74.

In order to carry a portion of the weight of the board 11 and thus minimize the effort necessary for raising the board, and to prevent jar when the board is lowered, a relatively heavy tension coil spring 86 is carried at each inner side of the desk 10, hooked at its upper end as at 87 to a lug member 88 secured as by screws 89 to the underface of the desk top, and, at its other end, hooked, as at 90, to another lug member 91 fastened as by screws 92 to the lower link 14, the springs 86 being under tension when

the drawing board 11 is lowered, and as best shown in Fig. 3.

It is intended to be understood that the strut 12 constitutes a relatively fixed member, and the board 11 a relatively movable member, the bracket 24 being carried by the relatively fixed member 12 and said bracket having an offset portion 28 spaced laterally of the relatively fixed member, and that the arcuate bar 44 is disposed between the relatively fixed member 12 and the offset bracket portion 28. Similarly, it is intended to be understood that the desk upright 59 constitutes a relatively fixed member and the link 14 a relatively movable member, the bracket 71 being carried by the relatively fixed member 59 and said bracket having an offset portion 73 spaced laterally of the relatively fixed member, and that the arcuate bar 67 is disposed between the relatively fixed member 59 and the offset bracket portion 73. The arcuate bar 44 or 67, as the case may be, is in either case carried by one of said members, in the case of the bar 44 by the relatively fixed member 12, and in the case of the bar 67 by the relatively movable member 14. In each case, the arcuate bar 44 or 67, as the case may be, plays in a slot constituted by the space between the bracket offset portion and the relatively fixed member, that is, the slot-like space between the bracket portion 28 and the relatively fixed member 12 in the one instance, and the slot-like space between the bracket portion 73 and the relatively fixed member 59 in the other instance.

It is to be understood that the invention is not intended to be limited to details of construction here shown for illustrative purposes. Other modifications may suggest themselves to those skilled in the art and having the benefit of the present disclosure. Furthermore, it is not intended that it be understood that all features of the present disclosure must be used conjointly, since it will be apparent to workers in the art that various combinations or sub-combinations may at times be advantageously employed.

Having described my invention, I claim—

1. In a structure of the class described embodying a relatively fixed member and a relatively movable member, the combination of a bracket carried by the relatively fixed member, said bracket having an offset portion spaced laterally of the relatively fixed member, and providing a slot-like space therebetween an arcuate bar carried by one of said members and disposed between the relatively fixed member and the offset portion of said bracket, and adapted to play in said slot-like space a torsion spring encircling said bar in normally gripping position thereon, a rotatable shaft journaled in said offset portion of the bracket, the ends of the torsion spring being anchored in said shaft, and means for rotating the shaft to loosen the torsion spring.

2. In a structure of the class described embodying a relatively fixed member and a relatively movable member, the combination of a bracket carried by the relatively fixed member, said bracket having an offset portion spaced laterally of the relatively fixed member, an arcuate bar carried by one of said members and disposed between the relatively fixed member and the offset portion of said bracket, a torsion spring encircling said bar in normally gripping position thereon, a rotatable shaft journaled in

said offset portion of the bracket, the ends of the torsion spring being anchored in said shaft, a lever carried by the shaft for rotating said shaft to loosen the torsion spring, an arm also carried by the shaft, and a tension spring having one end anchored to one of said members and its other end to said arm to urge the shaft in the opposite direction.

3. In a structure of the class described embodying a relatively fixed member and a relatively movable member, the combination of a bracket carried by the relatively fixed member, said bracket having an offset portion spaced laterally of the relatively fixed member, an arcuate bar carried by one of said members disposed between the relatively fixed member and the offset portion of said bracket, a torsion spring encircling said bar in normally gripping position thereon, a rotatable shaft journaled in said offset portion, the ends of the torsion spring being anchored in said shaft, and a lever for rotating said shaft, wherein there are a pair of brackets and a pair of arcuate bars with a torsion spring for each bar, and the said shaft is common to both torsion springs.

4. In a device of the class described embodying a base, a pair of links pivotally connected thereto at each side thereof, a pair of counterbalancing springs connected with the base and respectively with one of the links of each pair, a strut pivotally connecting one end of the links of each pair and maintaining them in parallel relation, said strut being adapted to move downwardly with the links against the action of the counterbalancing springs, that improvement therein comprising the combination of an angular continuation of one of said links of each pair, an arcuate bar secured at one end to each said link having said continuation and at its other end to said continuation, a bracket carried by the base at each side thereof, a shaft journaled in the brackets, a torsion spring carried by the shaft at each end thereof frictionally gripping each arcuate bar in wrapped around relation thereto, and means for rotating the shaft for loosening the frictional grip of the torsion spring on the bar.

5. In an adjustable stand of the class described embodying a base, a pair of links pivotally connected thereto at each side thereof, a pair of counterbalancing springs connected with the base and respectively with one of the links of each pair, a strut pivotally connecting one end of the links of each pair and maintaining them in parallel relation, a drawing board carried by the struts, said struts being adapted to move downwardly with the links against the action of the counterbalancing springs, that improvement therein comprising the combination of an angular continuation on one of said links of each pair, an arcuate bar secured at one end to each said link having said continuation and at its other end to said continuation, a pair of brackets carried by the base at opposite sides thereof, each said bracket having a laterally offset portion offset toward the opposite bracket, a shaft journaled in the said bracket offset portions, a torsion spring carried by the shaft at each end thereof frictionally gripping each arcuate bar in wrapped around relation thereto, and resilient means carried by the base at least in part through the intermediation of the shaft for rotating the shaft for affecting the frictional grip of the torsion spring on the bar, said bars being adapted to play in the spaces between the

bracket offset portions and the base side during said movement of said struts.

6. In a device of the class described embodying a base, a pair of links pivotally connected thereto, a counterbalancing spring connected with one of the links at one of its ends and with the base at its other end, a strut connecting one end of the links and maintaining them in parallel relation, said strut being adapted to move downwardly with the links against the action of the counterbalancing spring, that improvement therein comprising the combination of an angular continuation of one of said links, an arcuate bar secured at one end to said link having said continuation and at its other end to said continuation, a rockable member mounted on the base, a torsion spring carried by the rockable member frictionally gripping said bar in wrapped around relation thereto, and means carried by the base at least in part through the intermediation of said rockable member for af-

fecting the frictional grip of the torsion spring on the bar whereby the links may be swung on their pivots for raising or lowering the strut.

7. In a device of the class described embodying a relatively fixed member and a relatively movable member having angularly related portions mounted thereon, that improvement therein which comprises an arcuate bar carried by the relatively movable member through the intermediation of said angularly related portions, a rockable member mounted on said relatively fixed member, a torsion spring carried by the rockable member and encircling said bar in wrapped around normally gripping relation thereto, and means carried by the relatively fixed member at least in part through the intermediation of said rockable member for affecting the gripping action of said torsion spring for relative movement of the fixed and movable members.

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