PORTABLE MOVE SCREEN DEVICE
Russell E. Petrick, Park Ridge, Ill., assignor to Knox Manufacturing Co., a corporation of Illinois
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This invention relates to portable movie screen devices and more particularly to an improvement in the means for preconditioning a leg unit actuating means so that the leg unit is automatically urged from the supporting position to closed position when the stand is lifted from its supporting surface.

The primary object of this invention is to provide a new and improved actuating means for a portable movie screen support.

Another object of this invention is to provide an improved means for preconditioning the actuating means of a movie screen stand so that when the stand is lifted from the supporting surface, the leg unit will automatically move to a closed position.

Another object of this invention is to provide, in a movie screen stand having a leg unit and a spring means within the standard which cooperates with pivoted lever means to urge the leg unit towards closed position, a means associated with an arm-adjacent exteriorly of the standard for stressing the spring means to precondition the leg unit for movement towards the closed position when the leg unit is lifted from the supporting surface.

Still another object of this invention is to provide, in a movie screen stand having a leg unit with spring means within the standard cooperating with a pivoted lever means for urging the leg unit towards a closed position, an arm having a portion in the interior of the standard which is constructed and arranged to bias a spring means to a position in which the spring causes the lever means to urge the leg unit towards the closed position so that when the stand is lifted from its supporting surface, the leg unit is automatically urged to the closed position, the arm having another portion which extends to the exterior of the standard in the path of travel of the casing to bias the spring responsive to movement of the casing.

Another object of this invention is to provide in a movie screen stand having a casing pivoted to the standard and a leg unit with spring means within the standard cooperating with a pivoted lever for urging the leg unit towards a closed position, an arm having a shaft portion in the interior of the standard and mounting the arm to the standard for pivotal movement relative thereto with a cam fixed on the pivoted shaft to the interior of the standard and in a position to bias the spring to a leg unit actuating position, the cam and the spring having cooperating surfaces which normally urge the cam to a spring release position, and an exterior portion on the arm which extends across the path of travel and is responsive to movement of the casing to a carrying position to move the cam to the spring biasing position for urging the leg unit towards the closed position so that when the stand is lifted from its supporting surface, the leg unit is automatically urged to the closed position.

Other objects, features and advantages of the present invention will be apparent from the following description of the preferred embodiments illustrated in the accompanying drawings, in which:

FIGURE 1 is a side elevational view of the movie screen stand of this invention with the leg assembly or the leg unit in the closed position and the screen casing also held in closed position parallel to the standard;

FIGURE 2 is a side elevational view of the movie screen stand with the leg unit in supporting position, the leg unit having been released for outward movement to such supporting position by releasable means operative responsive to movement of the casing to the operative position as shown in full outline in FIGURE 2 and the telescoping member having been released to permit upward projection thereof and allow the casing to swing from the doted line position 90° to the full outline operative position perpendicular to the standard as shown;

FIGURE 3 is an enlarged fragmentary sectional view taken along the line 3—3 of FIGURE 2;

FIGURE 4 is an enlarged sectional view taken along the line 4—4 of FIGURE 2;

FIGURE 5 is an enlarged fragmentary sectional view of the lower end of the standard showing the position of the legs of the leg unit in the supporting position (only one leg being shown for clarity) and illustrating the cam means in the spring released position whereby torsion springs act between each of the braces and the legs urge the leg unit toward supporting position;

FIGURE 6 is an enlarged fragmentary sectional view of the lower end of the standard, similar to FIGURE 5, showing one leg of the leg unit in closed position and illustrating the cam means in the spring stressing position with the spring means partially compressed, having pivoted one of the pivoted lever means which urge the leg unit toward closed position.

FIGURE 7 is a sectional view taken along the line 7—7 of FIGURE 5 showing the slidable collar at the upper end of the assembly.

FIGURE 8 is an enlarged fragmentary sectional view of the lower end of the standard, similar to FIGURE 5, showing one of the bracing links of the leg unit in the supporting position and illustrating the cam means in the spring stressing position with the spring means fully compressed and bearing against one of the pivoted lever means which urges the leg unit towards a closed position;

FIGURE 9 is an enlarged fragmentary sectional view of the lower end of the standard similar to FIGURE 8 showing one bracing link of the leg unit in closed position and showing, in dotted outline, the movement of the cam means from the spring release to the spring stressing position; and

FIGURE 10 is a sectional view taken along the line 10—10 of FIGURE 8 showing the means for imparting stress to the spring means.

The structure of the present invention is an improvement in the invention disclosed in the patent to Armstrong, 3,164,348, issued Jan. 5, 1965, and assigned to the assignee of this invention as well as in an improvement of the co-pending Bieschke application, S.N. 446,904, filed Apr. 9, 1965, now Patent Number 3,282,543, issued November 1, 1966, and also assigned to the assignee of this invention.

In this and the aforementioned movie screen devices, the leg unit is preconditioned for movement to the closed position when the stand is lifted from the supporting surface by compressing a spring which is biased against pivoted lever means. When the stand is in the spread apart supporting position on a supporting surface, the weight of the stand prevents the tripod-like leg unit from collapsing. However, when the stand is lifted from the supporting surface, the spring force against the pivoted levers causes the levers to urge the leg unit towards the collapsed position adjacent the standard. In the co-pending Armstrong and Bieschke applications, the coil spring which is biased against the pivoted levers is relatively strong and is compressed by depressing a member which is mounted in the standard for movement longitudinally of the standard against the coil spring and locking the member in the depressed condition.

As mentioned in the aforementioned co-pending Bieschke application, some degree of force is needed to depress the member against the action of the coil spring, and in the case of large portable screens, such as those exceeding 6 ft. in dimension, it is relatively difficult to
compress the coil spring by depressing the telescoping rod. This invention provides a means for compressing a coil spring in a very easily manipulated manner, yet which does not require a movement separate from that normally associated with placing the movie screen device in a storage condition. The structure shown in the co-pending Bieschke application provides the means for depressing the member at a more accessible position, to wit, associated with the handle structure. However, the action is still directly downwardly against the coil spring. In addition, it requires a separate movement not normally associated with placing the movie screen device in a condition for carrying and storage.

Whereas in the aforementioned Armstrong patent, the compression of the coil spring is accomplished by depressing the telescoping rod during the act of engaging the locking end of the bail support with a mating locking member in the standard, in the co-pending application, the act of compressing the spring is accomplished as an added manipulative act—movement of the handle longitudinally of the standard. It is the purpose of this invention to provide an improved means for preconditioning the leg unit according to the standard as shown in the operative response to a normal function involved in placing a movie screen device in a carrying and storage condition and which does not require direct manual compression of a plunger against the coil spring but rather employs a crank operated cam surface which slidingly abuts and compresses the spring means when the casing is turned parallel to the standard.

With particular reference to FIGURES 1 and 2, a standard, generally indicated 12, is provided with a tripod-type leg unit generally designated 13 to adapt the standard for use in an upright position. A handle member, generally designated 14, is slidably mounted on the standard for adjustably positioning the handle member 14 vertically of the standard. The forward face of the handle member 14 affords a mounting surface to which a conventional screen casing, generally designated 16, is mounted by suitable means such as described in the Petrick et al. Patent No. 3,022,816 entitled "Portable Movie Screen," issued Feb. 27, 1962. This type of a mounting means permits the casing to automatically pivot 90° to an operative position generally perpendicular to the standard as shown in FIGURE 1 when the casing is released from its carrying position parallel to the standard as illustrated in FIGURE 1. Further included in standard 12 is a main tubular member 17 and a telescoping rod 18 slidably received in tubular member 17. A conventional clamping member 21 is received in the upper end of the tubular member for holding the telescoping rod in different positions of extended adjustment relative to the standard. Preferably the clamping member is spring biased so that it may be manually released from its normal clamping position to permit adjustment of the telescoping rod 18.

A ball support 22 is carried on the upper or free end of the rod 18 for supporting the free end of the movie screen in a conventional manner. The casing and ball support are further provided with suitable structure, such as described in the co-pending application of Lee J. Armstrong, S.N. 302,201, filed Aug. 14, 1963, entitled "Latch for Movie Screen Casing," now Patent No. 3,214,121, issued Jan. 5, 1965, and assigned to the assignee of this invention, for holding the casing in its carrying position parallel to the standard as shown in FIGURE 1. In general, this includes a depinning stud or lug 23 at the free end of the ball support which is of a size to cooperatively fit within a spring-loaded latching means in the screen casing end cap 24 so that latching engagement may be accomplished by movement of the casing toward the standard after the telescoping rod has been depressed inwardly of the standard.

The lower end of the tubular member 17 is provided with a coil spring or spring means 25. The upper and lower ends of the spring are provided with end caps 26a and 26b, respectively, affording guiding and bearing surfaces to the coil spring. The function of the coil spring is to cooperate with portions of the leg unit and with a means 27 for imparting stress to the spring means, so that the leg unit 13 can be held adjacent the standard 12 in a closed position, unless desired, and so that the leg unit can be permitted, when desired, to move outwardly to supporting position.

To assist in accomplishing these functions, the leg unit is provided with an upper collar 28 slidably embracing the lower end portion of the tubular member 17 and with a lower collar 30 fixedly secured at the lower end of the tubular member 17. Both the upper and lower collar may be provided with three pairs of spaced ears 31 and 32, respectively, peripherally spaced about each collar as shown in FIGURES 3 and 4. A channel-like clamping member 33 is provided with each pair of ears 31 by a rivet 34, and a channel-like bracket member 35 is riveted at one end to each pair of ears 32 by means of rivet 36. At its opposed end, each bracing link is riveted to the medial portion of each leg member 33 by a rivet 37.

When the leg unit is swung towards a closed position adjacent the standard, the upper collar 28 advances upwardly relative to the tubular member and each leg 33 pivots about its connection 34 with the upper collar. At the same time, each bracing link pivots about its connection with the lower collar as well as its connection 37 with each leg. Conventionally, when the leg unit is moved to the spread supporting position, the upper collar 28 again slides relative to the tubular member, but this time in an opposite direction and the legs and bracing links pivot about their respective connections 34, 35, and 37, respectively.

Torsion springs 38 are preferably provided enclosing each of the rivets 37. The free ends 38a and 38b of each torsion spring bear opposite directions against the medial web of each of the bracing links and leg members to provide a means for causing the leg unit to be swung automatically to an outwardly spread supporting position.

When the spring means 25 is stressed, such as being compressed by the means 27, it exerts forces on a lever means 40 which holds the leg unit adjacent the standard against such outward movement.

Each lever means 40 is pivoted between each pair of ears 32 on lower collar 30 by rivets 36. Each lever has an inwardly extending arm 41 which extends into the lower end of tubular member 17 through a slot 42 in the tubular member, and an arcuate arm 43 which extends outwardly and has a free end engaging the web of the adjacent bracing link 35. When sufficient downward force is exerted on the lever, the lever extends into the tubular member 17, and the leg unit 13 is lifted from its supporting surface, each arcuate arm 43 pivots counterclockwise with sufficient force to overcome the forces exerted by torsion springs 38 so each bracing link 35 and attached leg member 33 will be urged inwardly towards a closed position adjacent the standard. In the preferred embodiment, the lever means and bracing link are shown as two different structural members. It is to be understood that the lever 40 is an extension of bracing link 35 and that the two can be formed as a one-piece structure without departing from the scope of this invention.

Means 27 includes a handle member generally designated 46 having a shaft portion 47 which is pivoted to the interior of the tubular member 17 to provide a rotational axis for handle 46 which is generally perpendicular to the plane of movement of the casing. Cam means 50 is fixed to the shaft 47 for movement therewith and, to accommodate the positioning and movement of cam 50, the opposite side walls of the tubular member are provided with openings 52a and 52b.

The lower end of the cam has a spring engaging surface including a first generally arcuate camming surface 54a, which terminates in a second generally linear surface 54b. As the shaft 47 is rotated to bring the cam into engage-
ment with the spring, the arcuate surface 54a first engages the slightly rounded portion 56 of the end cap 26a. This permits the cam to smoothly and relatively easily overcome the force of spring 25 to impart stress to, or compress the spring and ride into the position shown in FIGURES 6, 8 and 9. However, when the cam is in the spring stressing or compressing position, the force of the spring 25, in combination with the configuration of the surfaces 54a and 56 is such as to normally urge the cam outwardly which, in turn, would normally cause rotation of said 47. While the lower surface of the cam could be designed in a fashion as to tend to hold or lock the cam in the spring depressing position, it is preferable that means 27 for imparting stress to the spring be automatically releasable responsive to movement of some other component of the movie screen stand to a position preparatory to placing the standard in an operative condition so that this will permit the simultaneous and automatic release of the leg unit 13 of the spread supporting position.

For this reason, the handle member 46 is provided with a crank portion which is positioned exteriorly of the shaft on the outside of the cabaret member. The crank portion of the handle includes a handle portion 50 which extends generally upwardly at a right angle from shaft portion 47 and terminates in a laterally offset portion 50a. Portion 50a terminates in a rearwardly returned portion 62 which is provided with a free end arm portion 64 generally parallel to said shaft portion 47. Arm portion 64 provides a surface of the handle in a position to be struck by the casing as the casing is swung between the operative position generally perpendicular to the standard as shown in FIGURE 2, and the inoperative position generally parallel to the standard as shown in FIGURE 1. The cam is so fixed on the shaft portion 47 so that when the casing is in the upright position, as shown in FIGURES 1, 6 and 9, the cam will be in the stress imparting position compressing the coil spring 25. Thus as the casing is released or moved to the operative position, the force of the spring 25 against the cam surface 54a will cause the shaft 47 to rotate and automatically move the cam to release the stress imparted to the coil spring 25 and permit the torsion springs 38 to thrust the leg unit outwardly to the spread supporting position.

The latching engagement between the depending stud of the end cap of the casing serves to hold the casing in the upright position parallel to the standard and therefore prevents the movement of the handle means 46 responsive to the urging of the spring 25 against surface 54a of cam 50. Release of this latching engagement between the end cap and the ball support, and pivotal movement of the casing to the full outline position shown in FIGURE 2, automatically releases the spring 25 so that the torsion springs 38 will move the leg unit 13 to the spread supporting position. This will cause the handle 46 to swing to a point where the arm portion 64 is in the path of casing travel as shown in FIGURE 5 and in dotted outline in FIGURE 9. Thus when the casing is returned to the upright position parallel to the standard as shown in FIGURE 1, the casing will strike the arm 64, causing the cam to be moved to the spring stressing position where the cam compresses the spring, as shown in FIGURE 8. Then as soon as the standard is lifted from the supporting surface so that gravity no longer overcomes the force exerted by spring 25 on the arm 41, the lever 40 will pivot about rivet 36 so that the arcuate arm 43 will pivot counter clockwise to upright the leg unit to the closed position adjacent the standard as shown in FIGURES 1, 6 and in full outline in FIGURE 9.

Thus this invention provides a novel improved means for preconditioning the actuating means for automatically moving the leg unit to a closed position when the stand is lifted from a supporting surface and automatically moving the leg to a spread supporting position when the stand is being set up for use. The means of this invention for preconditioning the actuating means operates responsive to normal operations involved in placing the movie screen stand in a storage condition. Furthermore, comparatively little effort is required in performing the function which simultaneously preconditions the actuating means. It is to be understood that, if desired, the handle means which moves the cam between the spring stressing and spring release positions could be mounted on the standard so as to not lie in the path of screen casing travel and therefore be manually operable, but it is preferred that the handle be so constructed and arranged so as to be operative responsive to movement of one of the other movie screen members, such as the movie screen casing.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, as some modifications may be obvious to those skilled in the art.

I claim:

1. A stand adapted to be maintained in an upright position upon a supporting surface, comprising: an elongated standard; a plurality of leg members swingably mounted at the lower end portion of the standard for movement together between a closed position adjacent the standard and a spread supporting position in which the standard is maintained uprightly; a bracing link extending between one of the leg members and the lower end portion of the standard having one end pivotally secured to said lower end portion of the standard and the other end pivotally secured to said one leg member; spring means positioned at the lower end portion of the standard; lever means extending inwardly of the pivot at the one end of said bracing link so as to be positioned to receive thrust exerted from the spring means and to transmit that thrust to the bracing link in a direction tending to swing said bracing link toward the standard and thereby fold the leg member and the bracing link adjacent to the standard; means intermediate the ends of the standard for imparting stress to the spring means when the legs are in supporting position so as to provide thrust upon the lever means, said means including a cam mounted on the standard for movement between a spring release position and a spring cocking position to deform and impart stress to the spring means; and means for holding the stress imparting means in spring cocking position in position to the stress in the spring means as to maintain the thrust against the lever means when the leg members are in supporting position, whereby when the standard is removed from the supporting surface the lever means and said bracing link will be rotated by the thrust of the spring means to pivot the bracing link and leg members inwardly to closed position adjacent the standard.

2. A stand adapted to be maintained in an upright position upon a supporting surface, comprising: an elongated standard; a casing pivoted to said standard for movement between a first operative position generally transverse to the standard and a second carrying position generally parallel to the standard; a plurality of leg members swingably mounted on the lower end portion of the standard for movement together between a closed position adjacent the standard and a spread supporting position in which the standard is maintained uprightly; a plurality of back ing links extending between the leg members and the lower end portion of the standard each of said bracing links having one end pivotally secured to said lower end portion of the standard and the other end pivotally secured to a leg member; a compression spring positioned at the lower end portion of the standard; lever means extending inwardly of the pivot at the one end of said bracing link so as to be positioned to receive thrust exerted from the spring means and to transmit that thrust to the bracing link in a direction tending to swing said bracing links toward the standard and thereby fold the leg member and the bracing link adjacent to the standard;
a cam mounted to the standard for movement between a spring release position and a spring cocking position. said cam operatively associated with said casing by means responsive to movement of said casing between said operative and carrying positions to move said cam between said spring release and spring cocking position; means for locking the cam in said spring cocking position on the standard in opposition to the stress in the spring so as to maintain the thrust against the lever when leg members are in supporting position, whereby when the stand is removed from the supporting surface, the lever and bracing links will be rotated by the thrust of the spring to pivot the bracing links and leg members inwardly to closed position adjacent the standard.

3. A stand as specified in claim 2 wherein said cam is operatively associated with said casing so as to be positioned in the spring cocking position when the casing is moved to the carrying position.

4. A stand adapted to be maintained in an upright position upon a supporting surface, comprising: an elongated standard; a plurality of leg members swingably mounted on the lower end portion of the standard for movement together between a closed position adjacent the standard and a spread supporting position in which the standard is maintained uprightly; a bracing link extending between one of the leg members and the lower end portion of the standard having one end pivotally secured to said lower end portion of the standard and the other end pivotally secured to said one leg member; said means positioned at the lower end portion of the standard; lever means extending inwardly of the pivot at the one end of said bracing link so as to be positioned to receive thrust exerted from the spring means and to transmit that thrust to the bracing link in a direction tending to swing said bracing link toward the standard and thereby fold the leg members and the bracing link adjacent to the standard; means for imparting stress to the spring means when the legs are in supporting position so as to provide thrust upon the lever means, said means including an arm extending outwardly of the standard and having a cam portion operatively engaging the spring means, the arm being pivoted to the standard to move the cam portion between a spring release and a spring cocking position to deform and impart stress to the spring means; and locking means for holding the arm in position upon the standard in opposition to the stress in the spring means so as to maintain the thrust against the lever means when the leg members are in supporting position, whereby when the stand is removed from the supporting surface, the lever means and bracing link will be rotated by the thrust of the spring means to pivot the bracing link and the leg members inwardly to closed position adjacent the standard.

5. A stand as specified in claim 4 including a bracing link extending between each of the leg members and the lower end of the standard, each bracing link having one end pivotally mounted to the lower end portion of the standard and the other end pivotally mounted to its respective leg member, and further including lever means on the lower end portion of the standard extending inwardly of the pivot at the one end of each of said bracing links.

6. A stand as specified in claim 4 wherein said locking means includes a casing pivoted to the standard for movement between an operative position and a carrying position and wherein said casing holds the arm in opposition to the spring stress in one of said casing positions.

7. A stand adapted to be maintained in an upright position upon a supporting surface, comprising: an elongated standard; a casing pivoted to said standard for movement between a first operative position generally transverse to the standard and a second carrying position generally parallel to the standard; a plurality of leg members swingably mounted on the lower end portion of the standard for movement together between a closed position adjacent the standard and a spread supporting position in which the standard is maintained uprightly; a plurality of bracing links extending between the leg members and the lower end portion of the standard, each of said bracing links having one end pivotally secured to said lower end portion of the standard and the other end pivotally secured to a leg member; a compression spring positioned at the lower end portion of the standard; lever means extending inwardly of the pivot at the one end of each of said bracing links so as to be positioned to receive thrust exerted from the spring means and to transmit that thrust to the bracing link in a direction tending to swing said bracing link toward the standard and thereby fold the leg members and the bracing links adjacent to the standard; a cam pivoted to the standard for movement between a spring release position and a spring cocking position; a handle connected to the cam and projecting exteriorly of the standard in the path of casing travel, movement of the casing to the upright position parallel to the standard causing the casing to strike the handle and move the cam to a spring cocking position; means for locking the cam in said spring cocking position on the standard in opposition to the stress in the spring so as to maintain the thrust against the lever means when the leg members are in supporting position; and thereby when the stand is removed from the supporting surface, the lever means and bracing links will be rotated by the thrust of the spring to pivot the bracing links and leg members inwardly to closed position adjacent the standard.

8. A stand as specified in claim 7 wherein means are provided for locking said casing in the carrying position and said handle is held in the spring cocking position by engagement with the casing when the casing is maintained in the carrying position.

9. A stand as specified in claim 7 wherein said spring means and said cam having cooperating surfaces constructed and arranged to normally urge said cam to the spring release position so that after the casing has been moved to the operative position releasing the handle for movement, the cam will be free to move relative to the standard responsive to urging from the spring means to release the spring and permit the legs to swing outwardly to the spread supporting position.

10. A stand as specified in claim 9 wherein said handle includes a shaft portion to which the cam is fixed, said shaft portion being pivotally located to the interior of the standard generally normal to the plane of movement of the casing, and the shaft has a crank portion extending exteriorly of the standard with an offset arm extending across the path of casing travel to pivot the shaft and cam as the casing moves relative to the standard between the operative and carrying position.

11. A stand as specified in claim 10 in which the cam is fixed on the shaft so as to be in spring cocking position when the crank is positioned in the plane of the standard and the casing holds the crank in such a plane by engagement with the arm when the casing is in the carrying position and wherein means are provided for locking the casing in the carrying position.

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CLAUDE A. LE ROY, Primary Examiner.
ROBERT P. SIEFFER, Assistant Examiner.