Nov. 30, 1965 G. E. WISE 3,220,464

PROJECTION SCREEN

Original Filed June 26, 1960 2 Sheets-Sheet 1

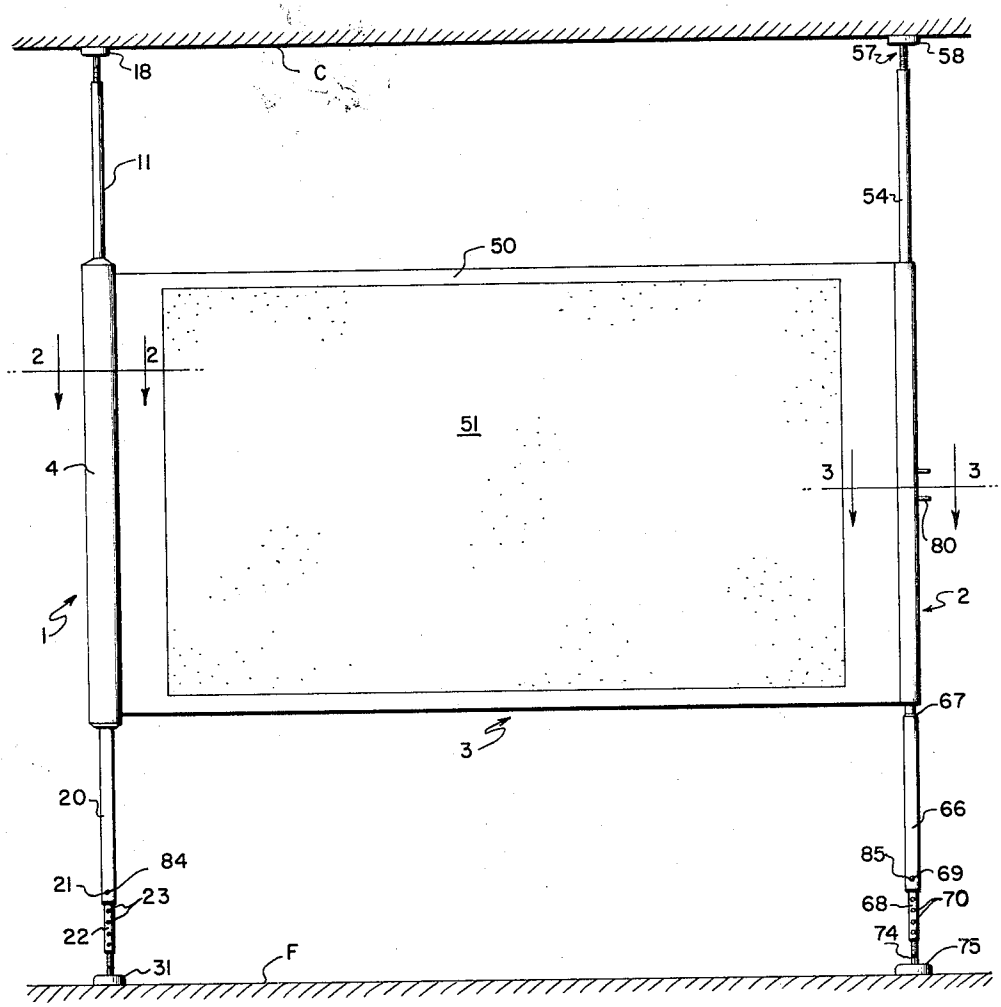


FIG. 1.

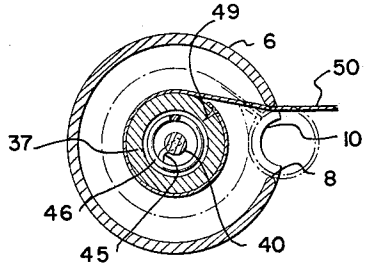


FIG. 3.

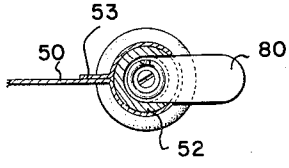


FIG. 2.

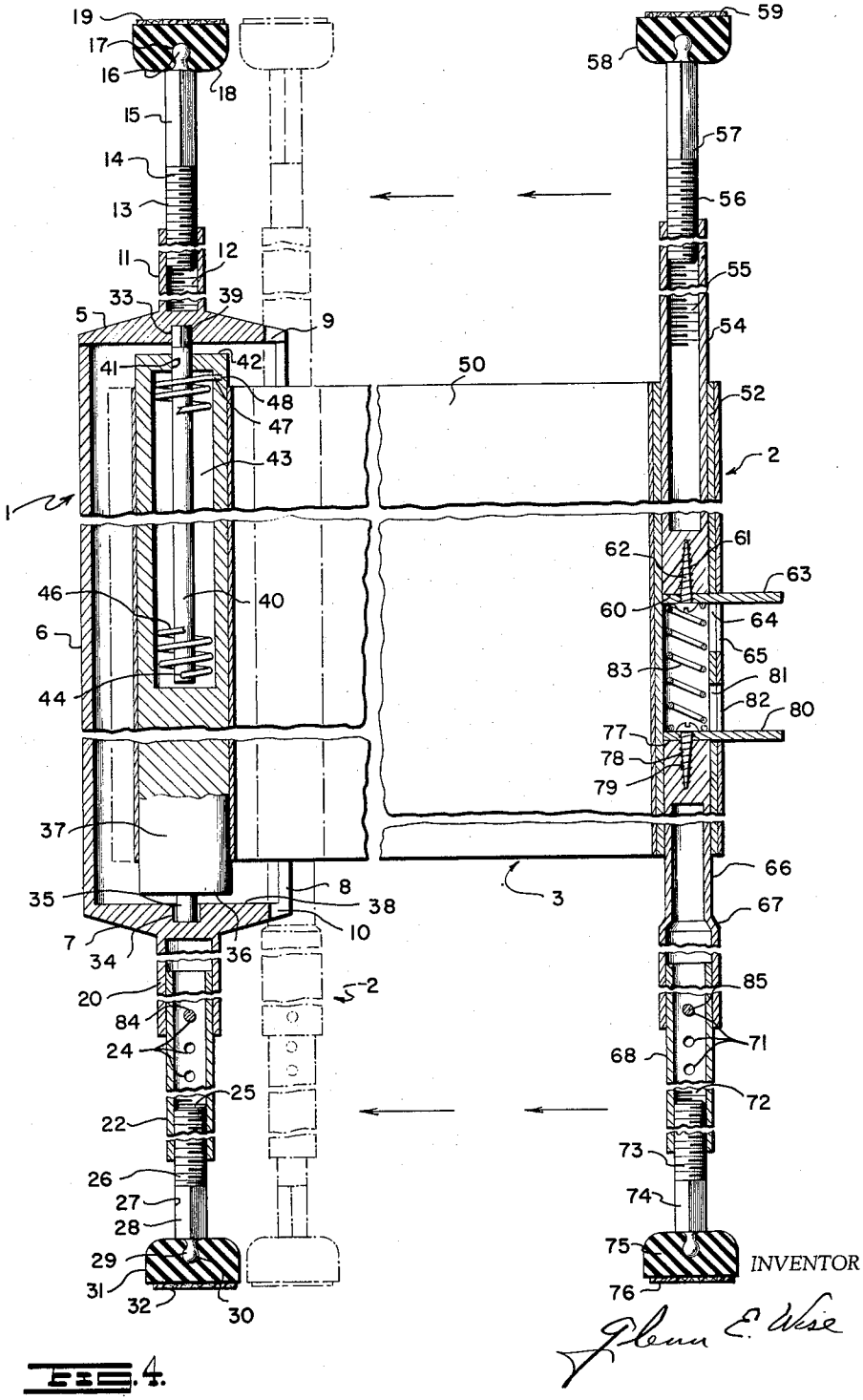
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Nov. 30, 1965 G. E. WISE 3,220,464

PROJECTION SCREEN

Original Filed June 26, 1960 2 Sheets-Sheet 2



INVENTOR

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FIG. 4.

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3,220,464

PROJECTION SCREEN

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Continuation of application Ser. No. 45,430, June 26, 1960. This application May 10, 1963, Ser. No. 296,881
2 Claims. (Cl. 160—24)

This application is a continuation of my application, Serial No. 45,430, filed July 26, 1960, entitled "Projection Screen."

This invention relates to a screen, and, more particularly, to a screen upon which may be shown motion or still pictures. This type of screen is commonly called a projection or "movie" screen.

My screen is particularly designed for employment in establishments such as homes, schools, church meeting rooms, or the like where a movie screen is required only occasionally, and where, when pictures are not being shown, it is desired to render the screen as unobtrusive and as compact as possible, for storage, and to preserve the screen. Some contemporary screens are capable of being folded to small dimensions, but the required folding maneuvers are time consuming, and, even when the screen is folded, it usually is removed to a closet or the like for temporary storage, since the screen, when folded, is rather unsightly, and is generally not self-supporting. This is particularly true of the tripod-supported type of movie screens.

With my projection screen, I have overcome the necessity for folding a supporting structure, and I have also negated the necessity for removing the screen from its points of use for storage.

To accomplish my stated ends, I provide a projection surface which is supported by and between two novel vertical poles. The poles are portable, when it is desired to move them, but normally they are retained in a given position by their being compressively held between the floor and ceiling of a room. One of the poles includes a hollow housing inside of which is located a rotatable spring-biased roller to which one end of the projection surface is attached. The other pole is attached to the opposite end of the projection surface. By moving the other pole relative to the one pole, the projection surface may be substantially withdrawn from or housed within the first pole. Manually operable means are provided in the other pole so that it may easily be contracted in length for movement relative to the aforementioned floor and ceiling.

One object of my invention is to provide a screen structure which, when it is once installed for use, is capable of being stored in situ, and will be accessible for substantially instant reuse at any given time.

Another object of my invention is to provide novel means for supporting and positioning a movie screen within a room.

A further object is to provide a movie screen structure which may be stored compactly and unobtrusively within a room at its point of use.

Other objects will be apparent from the remainder of the specification and from the drawings.

In the drawings which form a part of this application:

FIGURE 1 is a front elevation showing my screen device compressively supported in its use position between the floor and ceiling of a room;

FIGURE 2 is a partial sectional view taken on the line 2—2 of FIGURE 1, and showing in phantom lines the screen as it would appear in its stored position;

FIGURE 3 is a partial sectional view taken on the line 3—3 of FIGURE 1; and,

FIGURE 4 is a partial front elevational view with certain parts broken away to disclose internal structure, and

showing in phantom lines how my screen would appear in its stored condition.

Referring now to the drawings, the screen of my invention is composed of three basic assemblies, namely a housing and roller carrying pole, designated generally as 1, a spring-biased contractible pole, designated generally as 2, and an image-receiving projection surface designated generally as 3.

More particularly, the pole 1 includes a substantially closed cylindrically shaped housing 4 which is composed of a top portion 5, removably bolted to a vertical wall portion 6 by a plurality of bolts, not shown, and a bottom portion 7. I described the housing 4 to be substantially closed because it would be a closed hollow cylinder if wall 6 were not cut away to form slot 8, and if top portion 5 and bottom portion 7 were not cut away to form reliefs 9 and 10, respectively. The purpose of slot 8 and reliefs 9 and 10 will be described shortly.

Extending upwardly from and integral with top portion 5 is an upwardly opening socket 11, in which are formed internal threads 12. Engaged with threads 12 are external threads 13 formed on the lower periphery of a first vertically extending upper pole extension element 14. Element 14 is round in cross section at its threaded portion, but it is squared off along an upper portion of its length to provide a hand or tool-gripping portion 15. On the extreme upper end of element 14 is formed a ball-like element 16 which engages in a socket 17 formed in a hard rubber pressure pad 18. A circular sheet of felt, or the like 19, is glued to the upper surface of pad 18 so that it will prevent pad 18 from marring the finish on the lower surface of a ceiling C when it is compressively forced thereagainst, as to be described.

Extending downwardly from and integral with bottom portion 7 is a downwardly opening socket 20, in which is formed an aperture 21, the purpose of which will be described. Extending snugly, but adjustably, upwardly into socket 20 is a vertically disposed first tubular elongator element 22 in which is formed a plurality of diametrically opposed pin-receiving apertures 23 and 24. The lower inside surface of elongator 22 is provided with internal threads 25, and these threads 25 mate with external threads 26 formed along the upper periphery of a first vertically extending lower pole extension element 27. Element 27 is round in cross section at its threaded portion, but it is squared-off along a lower portion of its length to provide another hand or tool gripping portion 28, similar to portion 15, previously described. On the extreme lower end of element 28 is formed a ball like element 29 (identical to element 16) which engages in a socket 30 formed in a second rubber pressure pad 31. A circular sheet of felt, or the like, 32 is glued to the bottom surface of pad 31 so that it will prevent pad 18 from marring the finish on the upper surface of a floor F when it is compressively forced thereagainst, as to be described.

In order to provide for the reception of a spring-biased, projection surface-attached roller structure, a shallow square recess 33 is formed in the center of the lower face of top portion 5, and a shallow circular recess 34 is formed in the center of the face top of bottom portion 7. Loosely fitted into recess 34, for rotation relative thereto, is a roller extension 35 which is integral with and extends vertically downward from the center of the lower end 36 of a cylindrical roller body 37. The length of extension 35 is such that end 36 is spaced upwardly a small clearance distance from the top side 38 of portion 7. Force fitted into recess 33, and extending vertically downwardly therefrom is the top square end portion 39 of an otherwise cylindrical reaction rod 40. Rod 40 extends downwardly through a bearing-forming aperture 41 at the center of the top 42 of roller body 37 into a hollow 43

formed in roller body 37. Rod 40 fits within aperture 41 in such fashion that roller 37 can turn relative to rod 40 when necessary. Through the lower end of rod 40 is formed a circular aperture 44, and fixed in aperture 44 is the lower end tang 45 of a coil spring 46 which surrounds a portion of the length of rod 40. The upper end tang 47 of spring 46 is fixed in a circular bore 48 which extends from hollow 43 horizontally a short distance into roller 37. Spring 46, as shown in FIGURE 4, is stressed and in condition to rotate roller 37 counterclockwise.

Attached to roller 37 by means of tacks 49, or the like, is one end of a flexible web 50, and, as seen in FIGURE 2, web 50 is attached to roller 37 in such manner that it will wind thereon to its stored position when roller 37 is rotated counter-clockwise and will be unwound therefrom when roller 37 is rotated clockwise.

A large area of one side of web 50 is coated with glass beads, or other conventional projection enhancing means, to form projection area 51. Thus elements 50 and 51 form the projection surface designated generally by 3.

The end of web 50 opposite the one attached to roller 37 is looped around and fastened by means of glue or the like to a vertically disposed tubular guide element 52, and also to itself as at 53, as seen in FIGURE 3. Guide element 52 is one part of the contractable pole, designated generally at 2, which will now be described.

Slidingly disposed within the top portion of guide element 52 is a vertically extending, upwardly opening round socket member 54. Socket member 54 carries internal threads 55, as seen in FIGURE 4, and mating with these threads are external threads 56 formed on a lower portion of the length of a second vertically extending upper pole extension element 57. Element 57 is identical to element 14, and it carries at its top end a pad 58 to which is fastened a circular sheet of felt or the like 59. Since elements 57, 58 and 59 are, in all respects, identical to elements 14, 18 and 19, previously described, further description of these parts is believed unnecessary.

In the lower, horizontal end 60 of socket member 54 is drilled a hole 61, and engaged against end 60 and fixed to socket 54, by means of a metal screw or the like 62 entered into hole 61, is a horizontally extending upper finger tab 63 which projects radially through upper tab clearance apertures 64 and 65 cut out of guide element 52 and web 50, respectively.

Slidingly disposed within the bottom portion of guide element 52 is a vertically extending, downwardly opening round socket member 66. Socket member 66 is flared out as at 67 so as to provide a lower tubular reach to receive snugly, but adjustably, the upper end of a vertically disposed tubular second elongator element 68 which is identical to the first elongator 22. Near the bottom of socket 66 is formed a horizontal aperture 69, which is designed to be aligned with any pair of diametrically opposed pin-receiving apertures 70 and 71. The lower inside surface of elongator 68 is provided with internal threads 72, and these threads 72 mate with external threads 73 formed along the upper periphery of a second vertically extending lower pole extension element 74.

Pole extension 74 carries at its lower end a pad 75 to which is fastened a circular sheet of felt or the like 76. Since elements 74, 75 and 76 are, in all respects, identical to elements 27, 31 and 32, previously described, further description of these parts is believed unnecessary.

In the upper, horizontal end 77 of socket 66 is drilled a hole 78, and engaged against end 77 and fixed to socket 66, by means of a metal screw, or the like, 79 entered into hole 78, is a horizontally extending lower finger tab 80 which projects radially through lower tab clearance apertures 81 and 82 cut out of guide element 52 and web 50, respectively.

Disposed within guide element 52 and compressively engaged between the lowermost face of tab 63 and the uppermost face of tab 80 is a vertically disposed compression spring 83, for a purpose to be described.

In order to provide for the interlocking of the first and second elongator elements 22 and 68 relative to the sockets 20 and 66, respectively, at a plurality of positions, straight, elongated, round pins 84 and 85 are furnished. Pin 84 is designed to be inserted through aperture 21, and thence through any pair of opposed apertures 23 and 24 to lock element 20 to element 22. Likewise, pin 85 is designed to be inserted through aperture 69, and thence through any pair of opposed apertures 70 and 71 to lock element 66 to element 68.

The description of the elements comprising my invention is now complete. The preferred mode of operation of my invention follows:

When purchased, pole 2 of my invention as shown in phantom lines in FIGURE 4, would engage portions of the housing 4 of pole 1, and substantially all of projection surface 3 would be wound up around roller 37 and, thus, stored within housing 4.

After having decided on a particular room in which my invention should be installed for use, a person would measure the vertical distance between the floor F and ceiling C of such room. He then would adjust elements 14 and 57 so that they extended substantially identical amounts from sockets 11 and 54, respectively. (Equal adjustment of these elements, as described, insures that the top edge of web 50 will be substantially parallel to the floor and ceiling of the room once my invention is completely installed.) Next, he would adjust elements 20, 22 and 27, and elements 66, 68 and 72 relative to each other, by employing pins 84 and 85, as described, to extend pole 1 and pole 2 to equal lengths, just slightly less than the distance between the floor and ceiling previously measured.

Now the user would raise poles 1 and 2 to vertical position, and with felt elements 32 and 76 resting upon floor F he would extend elements 27 and 74 from elements 22 and 68 until pads 18, 31, 58 and 75 were compressed, thus placing poles 1 and 2 under sufficient compression between the floor F and ceiling C to firmly secure poles 1 and 2, wedgingly, against displacement. Pole 1, it will be noted, is in essence a screw-jack and, except for the slight compressibility of elements 17, 19, 31 and 32, is incompressible under axial loading. Pole 2, on the other hand is compressible under axial loading due to the inclusion therein of spring 83. For the reasons just set forth, pole 1 can be set much more rigidly between the floor and ceiling of a room than pole 2 and, thus, pole 1 can be considered as the anchor pole from which pole 2 is withdrawn and toward which pole 2 is returned.

Should a user now desire to use my screen to project pictures thereupon, he would manually force, or depress, tabs 63 and 80 toward each other against the force of spring 83, thus moving pads 58 and 75 away from ceiling C and floor F, respectively, a small distance. While holding tabs 63 and 80 depressed, and while maintaining poles 1 and 2 substantially parallel, he would move pole 2 away from pole 1 in a direction opposite the arrows in FIGURE 4. While pole 2 was moving, as described, web 50 would be unrolling from roller 37 and spring 46 would be storing sufficient energy to rewind web 50 on roller 37 when required.

After web 50 has been pulled out of housing 4 a desired distance, manual pressure on tabs 63 and 80 is released and spring 83 expands to once again place pole 2 in compressive engagement between floor F and ceiling C. Now slides or movies can be shown on the projection area 51.

After the showing, web 50 can be rehoused in housing 4 by reversing the order of the steps previously described, thereby once again bringing pole 2 into engagement with pole 1. Note that, when my invention is not in its open or use condition, element 54 rests in relief 9 and element 66 rests in relief 10 of housing 4, and at the same time guide 52 surrounded by web 50 substantially fills slot 8 in housing 4, thus preventing any great amount of dust from entering the housing, and also giving my in-

vention a neat and unobtrusive appearance in its nonuse or stored condition.

If desired, the exterior of housing **4** and other portions of poles **1** and **2** can be painted or otherwise ornamented to blend with the locale in which my invention is employed. Also, if desired, a lighting or tray device may be appended to either pole, but preferably pole **1** to make my invention capable of some use in its stored condition. Such a light would also be useful between periods of projection or during the projection of slides or movies, for example, for notetaking in classes.

It is obvious that many modifications and substitutions could be made in my invention without departing from the spirit thereof. For example, many other types of spring-biased roller means might be substituted for the roller means I show.

Having now described the elements which comprise my invention and the mode of operation thereof, what I claim as new and desire to secure by Letters Patent is:

I claim:

1. A projection screen structure of the character described adapted to be supported in use position by compressive engagement of portions of said structure between two spaced stationary substantially parallel confronting surfaces comprising: a first elongated pole-like member including substantially coaxial pad-including elements at each end and an elongated tubular housing with closed ends intermediate the ends fo said member, spaced socket-forming means of lesser cross-sectional area than said housing attached to each end of said housing, said socket-forming means each extending away from said housing in opposite directions coaxial with said elements, first means having one end attached to one of said elements and another end inserted within one of said socket-forming means for joining said one element to said one socket-forming means, second means having one end attached to the other of said elements and another end inserted within the other of said socket-forming means for joining said other element to said other socket-forming means, at least one of said joining means and its associated socket-forming means including means for altering the overall length of said first member; a flexible substantially rectangular web, one end of said web extending through a slot in said housing and attached to a storage roller located therein, spring-including means rotatably mounting said roller within said housing and providing for spring retraction of a portion of said web into said housing and around said roller subsequent to extraction of said web portion out of said housing and off of said roller, a second elongated pole-like member including substantially coaxial pad-including elements at each end and an elongated intermediate tubular section to which the end of said web opposite said one end is attached, spaced hollow members each having a portion located within said tubular section and extending from each end of said tubular section in coaxial alignment with the elements on said second pole-like member, third means having one end attached to one of said elements on said second pole-like member and another end inserted within one of said hollow members for joining said one element on said second pole-like member to said one hollow member, fourth means having one end attached to the other of said elements on said second pole-like member and another end inserted within the other of said hollow members for joining said other element on said second pole-like member to said other hollow member, biasing spring means located within said tubular section and engaging at least one of said last-mentioned hollow members for urging said last-mentioned hollow member outwardly of said tubular section, and stop means on the hollow member which is engaged by said biasing spring means for preventing said last-mentioned hollow member from being urged completely out of said tubular section.

2. The combination of claim **1**, said biasing spring means engaging both of said hollow members for urging both of said hollow members outwardly of said tubular section, and stop means on both of said hollow members for preventing said hollow members from being urged completely out of said tubular section, said stop means each being connected to handle-forming means which extend outwardly of said tubular section through at least one aperture in said section, said slot being dimensioned relative to said third and fourth means and said tubular section so that said slot will be substantially closed by said third and fourth means and said tubular section when said portion of said web is retracted.

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