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G. E. WISE

3,225,818

PROJECTION SCREEN

Original Filed Oct. 14, 1960

2 Sheets-Sheet 1

Fig. 1

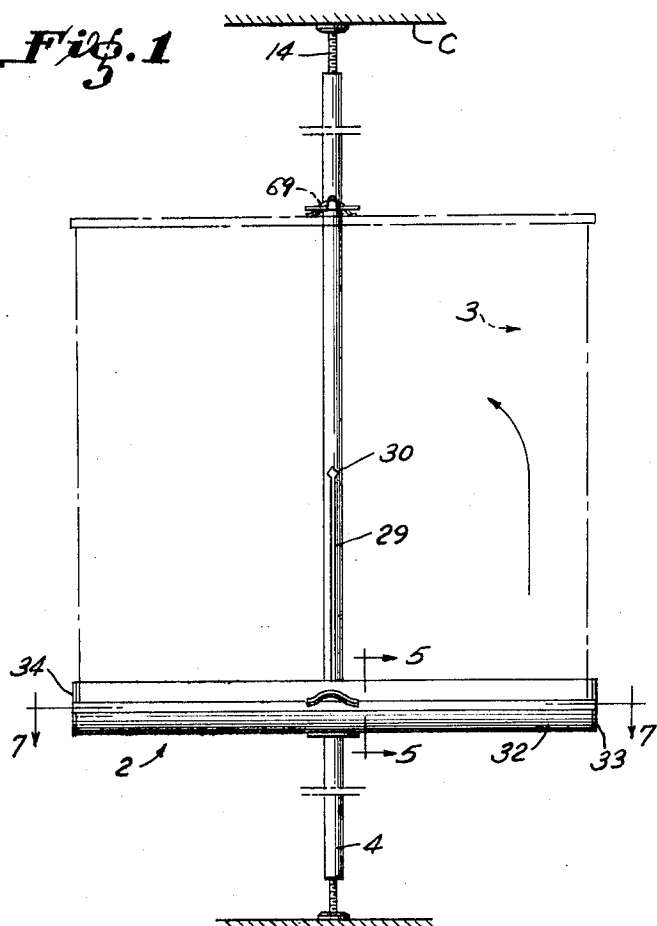
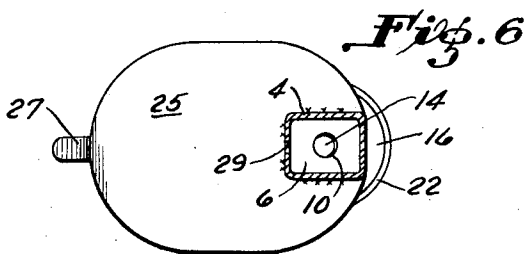
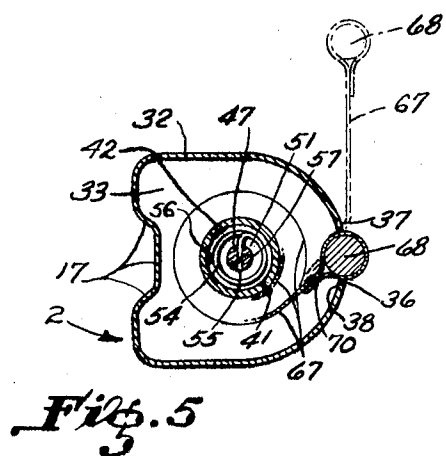
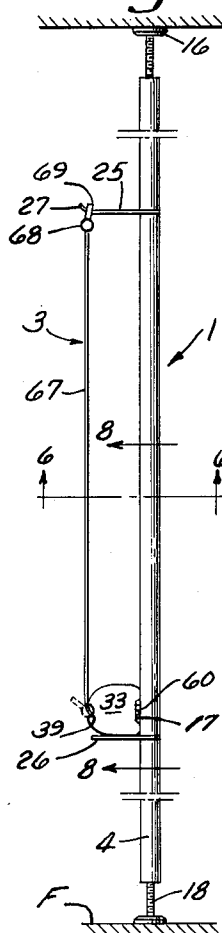


Fig. 2



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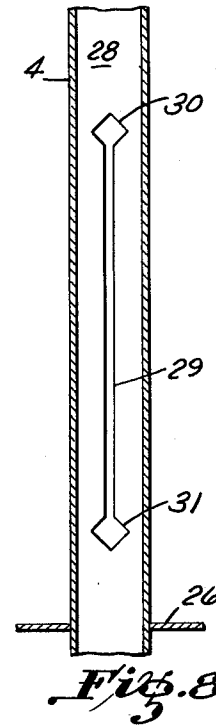
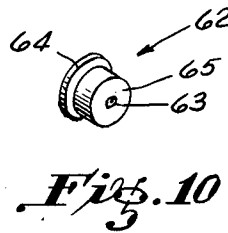
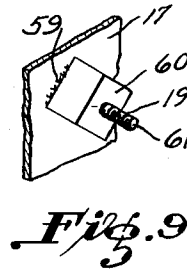
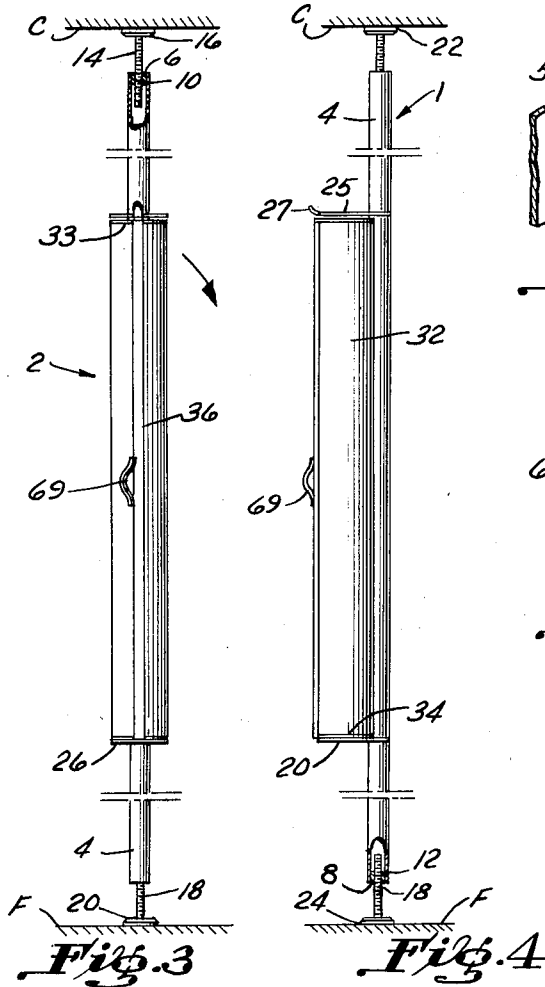
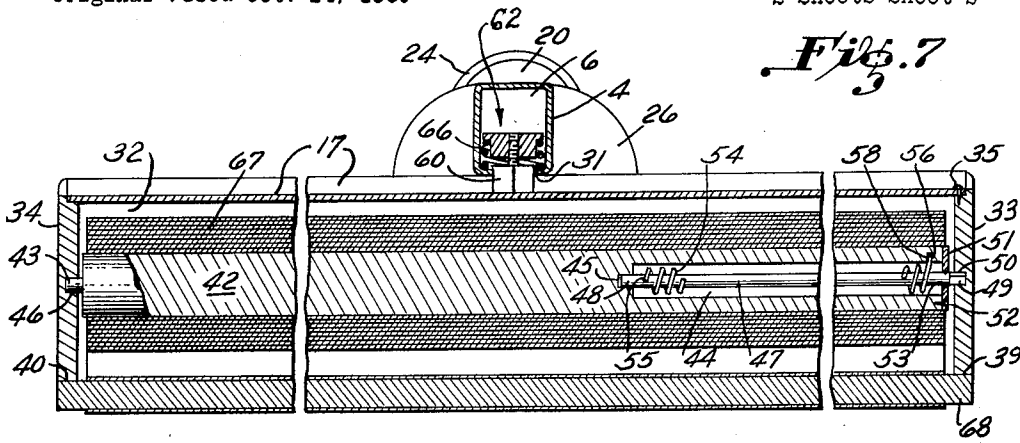
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2 Sheets-Sheet 2



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PROJECTION SCREEN

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Continuation of application Ser. No. 62,743, Oct. 14,
1960. This application Aug. 14, 1963, Ser. No. 303,215
5 Claims. (Cl. 160-24)

This invention relates to a screen structure, and, more particularly, to a structure having a surface upon which may be shown still or motion pictures. This type of structure is commonly called a projection or "movie" screen. This application is a continuation of my co-pending application, Ser. No. 62,743, filed Oct. 14, 1960, now abandoned.

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 point of use for storage.

To accomplish the aforementioned ends, I provide a projection surface assembly which is supported in both its use and stored conditions by a novel supporting pole. This pole is portable, when a user desires to move it, but it is normally retained in a given location by its being compressively wedged between the floor and ceiling of a room. Novel means, to be described, join the projection surface assembly to the supporting pole, and by performing certain manipulations a user can quickly move the surface assembly from its storage location to its use location, and vice versa.

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 thereby remains accessible for substantially instant reuse at any given time.

Another object of my invention is to provide novel means for supporting and positioning a projection surface 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 invention supported by and between the floor and ceiling of a room. The projection surface assembly is shown in its use position in phantom lines;

FIGURE 2 is a right side elevation of the structure of FIGURE 1 except that in this view the projection surface assembly is shown in its use position in full lines, and portions thereof are shown in phantom lines as they would appear when the major part of said assembly is retracted into a housing which provides for storage thereof;

FIGURE 3 is a front elevational view, with certain portions broken away, showing the invention as it would appear when completely stored;

FIGURE 4 is a right side elevation of the structure of FIGURE 3, with portions broken away to disclose additional structure;

FIGURE 5 is a sectional view taken on the line 5-5 of FIGURE 1, and showing a portion of the projection surface assembly withdrawn from the storage housing in phantom lines;

FIGURE 6 is a partial sectional view taken on the line 6-6 of FIGURE 2. In this view, the projection surface assembly has been omitted for clarity;

FIGURE 7 is a sectional view taken on the line 7-7 of FIGURE 1, but with certain parts shown in full for clarity;

FIGURE 8 is a partial sectional view taken on line 8-8 of FIGURE 2 to show certain details of the supporting pole only;

FIGURE 9 is a three dimensional showing of part of the means I employ to fasten and position the storage housing relative to the supporting pole; and,

FIGURE 10 is a three dimensional showing of another part of the means referred to in the description of FIGURE 9.

Referring now to the drawings by reference numerals, the screen of my invention is composed of three major assemblies, namely, a supporting pole designated generally as 1, a roller-including storage housing designated generally as 2, and an image-receiving projection surface assembly designated generally as 3.

More particularly, pole 1 is composed of an elongated, preferably rectangular, tubular main portion 4. In opposite ends of portion 4 are fixed, as by welding or the like, rectangular plugs 6 and 8. Plug 6 has a centrally disposed, vertically oriented, internally threaded aperture 10 formed therein, and plug 8 has a like aperture 12.

Screwed into aperture 10 is the lower end of an externally threaded upper extender element 14 which carries at its upper end an integral horizontally disposed circular pressure plate 16. Screwed into aperture 12 is the upper end of an externally threaded lower extender element 18 which carries at its lower end an integral horizontally disposed circular pressure plate 20. Fastened to the top surface of plate 16, and to the bottom surface of plate 20, by means of glue or the like, not shown, are circular compressible pads 22 and 24, respectively, composed of felt or rubber, or the like. The pads 22 and 24 are provided, so that the pole's pressure plates will not mar a room's floor or ceiling when they are engaged thereagainst in a manner to be described. The threads on the upper extender element 14 and plug 6 are opposites of those on the lower extender element 18 and plug 8 for a purpose also to be described.

Extending laterally from portion 4 are two spaced horizontally disposed shelf-like members. The upper shelf-like member is denoted 25, and the lower shelf-like member is denoted 26. Both of members 25 and 26 are fastened to portion 4 by means of welding. Member 26 provides a rest for the storage housing 2 in both its use and stored conditions, and with 25 protects the ends of 2 in its stored condition. At the forward end of member 25, there is provided an integral upturned hook 27 for a purpose to be described.

Through the front side 28 of portion 4 is formed a vertically oriented pivot-receiving and guiding slot 29, and communicating with the ends of slot 29 are upper and lower identical square apertures 30 and 31, respectively. As seen in FIGURE 8, the sides of apertures 30 and 31 are disposed 45 degrees to the horizontal.

The description of pole 1 is now complete.

Storage housing 2, more particularly, includes a casing 32, formed from a single piece of sheet metal, or the like, and having a substantially D-shaped cross section as best seen in FIGURE 5. The opposite ends of casing 32 are closed by interfitting caps 33 and 34 which are attached to the casing by means of metal screws 35 (see FIGURE 7), but at the front side of the casing the sheet metal's

front edges are left spaced slightly to provide an elongated opening 36 which runs the length of the casing. The edges, just mentioned, are rounded off as at 37 and 38 for a purpose to be described. The opening 36 provides a passageway through which passes a webbing 67 (to be described) which forms the image-receiving surface of the invention.

The front edge of both caps 33 and 34 is provided with a recess, as at 39 and 40, respectively, for a purpose to be described.

Within casing 32 is rotatably mounted a spring-biased roller means to which one end of the webbing 67 of the projection surface assembly 3 is attached as by tacks 41, FIGURE 5, and upon which the webbing may be wound as required. This roller means is best seen in FIGURES 5 and 7 and includes a round, elongated roller body 42 which has an integral pivot-forming projection 43 concentric with one end thereof, and which is hollowed out to form concentric bores 44 and 45 at the other end thereof.

Projection 43 is loosely journaled in a bore 46 which is formed in the inboard face of cap 34, and, thus, one end of roller body 42 is supported for rotation. The other end of body 42 is supported for rotation by and on an elongated reaction rod 47, one end 48 of which is round in cross-section and fits loosely in bore 45 aforementioned, and the other end 49 of which is square in cross-section and is force fitted and thus fixed in a square bore 50 formed in the inboard face of cap 33. The arrangement thus far described provides support for the right end of body 42, as it is seen in FIGURE 7, but such support alone would be insufficient, and, therefore, a secondary support is provided by circular end plate 51 which is fastened to the right end of body 42 by means of screws 52. Plate 51 has a central aperture 53 therein which is just slightly larger than the diameter of rod 47, and as seen rod 47 passes through aperture 53, and thus provides body 42 with the secondary support previously mentioned.

In order to provide means whereby the webbing 67 of projection surface assembly 3 may be retracted into casing 32, and wound up on roller body 42 when not being used, I provide the roller body with biasing means. These means comprise a spring 54 having opposite end tangs 55 and 56. Spring 54, as seen in FIGURE 7, is disposed in the bore 44 of body 42, and surrounds rod 47. Tang 55 is fixed in an aperture 57 in rod 47, and tang 56, after the spring is stressed so as to urge body 42 clockwise as seen in FIGURE 5, is fixed in a bore 58 which extends radially from bore 44.

Housing 2 is movably attached to pole 1 by novel pivot and detent means now to be described. To the center of the flat portion of a depression 17 formed in the rear side of casing 32 is attached, as by welding 59, a rearwardly extending square stub 60, the sides of which are disposed at 45 degrees to the longitudinal axis of casing 32. Stub 60 is dimensioned so that it will snugly enter either of apertures 30 or 31. In FIGURE 7, stub 60 is shown positioned in aperture 31. Integral with and extending rearwardly from the center of stub 60 is a stud 61 which carries external threads 19 at its free end. Stud 61 is dimensioned so that it can be just comfortably passed through slot 29, whereby it can travel along and be guided by said slot when required, as will be described.

Located within portion 4 is a spring retainer, designated generally as 62, having an internally threaded aperture 63 formed therein which receives the threaded rear end of stud 61. The rear portion 64 of retainer 62 is circular, as seen in FIGURE 10, and extending forwardly from portion 64 is an integral centrally located round boss 65, the diameter of which is somewhat less than that of portion 64.

In order to urge housing 2 toward portion 4 at all times, I provide a spring 66, which is compressed during

its assembly and remains compressed to varying degree throughout the life of the structure, as will be described.

Spring 66, as best seen in FIGURE 7, is disposed concentric with stud 61, and is of such internal diameter that its rear end surrounds boss 65 and bears against the front surface of rear portion 64. The front end of spring 66 bears, at all times against the rear surface of the front wall 28 of portion 4. Stub 60 is dimensioned so that it can travel forwardly out of and rearwardly into the space defined within the interior of spring 66. Thus, stub 60 may be moved forwardly, against the bias of spring 66, out of either aperture (30 or 31) in which it is located during operation of the invention, to be described.

It should be pointed out that once spring retainer 62 has been screwed on stud 61 to the extent seen in FIGURE 7 a small weldment (not shown) may be made to unite elements 61 and 62 so that they can not thereafter move relative to each other to alter the bias of spring 66.

The projection surface assembly 3 includes a webbing 67, one end of which, as has already been described, is tacked to roller body 42, as seen in FIGURE 5, so as to wind clockwise about the body. The opposite end of webbing 67 is looped around and fastened to a stiffening rod 68, by means of glue or the like, not shown, and reversed and attached to itself by means of stitching, or the like, at 70. For the sake of clarity, only portions of the ends of webbing 67, and its wound-up limit are shown in FIGURE 5.

The length of rod 68 is equal to the overall length of housing 2, and, as seen in FIGURES 1, 3, 4 and 7, the opposite ends of rod 68 are designed to lie in recesses 39 and 40 when the surface assembly 3 is in its non-use or stored condition. The mid-portion of rod 68, at such time, substantially fills the opening 36 in casing 32, thus preventing any appreciable amount of dust or dirt from entering housing 2.

Attached to the center of the frontal face of rod 68, by means of screws, or the like, not shown, is a handle 69 which is used to withdraw webbing 67 from housing 2, and which is also engageable over hook 27 to hold webbing 67 in its use position.

Webbing 67 may be any one of several types of conventional image-receiving and enhancing means. For example, it may be a fabric having the major portion of the front face thereof coated with tiny glass beads.

The description of the various elements which comprise the invention is now complete.

To install my projection screen structure, it is necessary first to manipulate the extender elements 14 and 18 relative to portion 4 until the overall length of pole 1 becomes just slightly less than the distance between the floor F and ceiling C of a room. Next pole 1 is brought to vertical position and one of the extenders is extended until pole 1 is wedged between floor F and ceiling C. At this juncture rotation of portion 4 about a vertical axis in the proper direction will cause pole 1 to wedge even more tightly between F and C (since the threads on extenders 14 and 18 are opposites) until the desired rigidity and orientation of pole 1 is achieved. The pads 22 and 24 would now be considerably compressed, but, due to their consistency, would not mar the floor or ceiling's surface.

Once installed, the invention would normally repose in the configuration shown in FIGURES 3 and 4. This configuration I term the screen's stored condition. When the screen is in its stored condition the central portion of the front part of portion 4 reposes in the depression 17 of casing 32 under the urging of spring 66, and stub 60 extends into the interior of portion 4 through aperture 30. At this time stub 60 is rotated 90 degrees counterclockwise from its orientation seen in FIGURE 7.

To manipulate the screen to its use condition as shown in FIGURE 2, a user would first pull straight forward on housing 2 (as it is seen in FIGURE 3) an amount sufficient to remove stub 60 out of aperture 30. He would

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then rotate housing 2 ninety degrees clockwise, that is, in the direction of the arrow in FIGURE 3. (Shelf-like members 25 and 26 are spaced far enough apart to allow such rotation.) Next, housing 2 is lowered to rest upon member 26. During such lowering, stud 61 first travels along and is guided by slot 29, and then enters aperture 31. Concurrently, spring 66, which surrounds boss 65 and stud 61, is carried downwardly and is disposed rearwardly of aperture 31, with its axis substantially aligned with the center of aperture 31, whereby the rear end of stub 60 can project slightly into the interior confines thereof after said stub enters apertures 31. During such downward movement of spring 66, (and, in fact, during any movement of spring 66) its front end slides against the rear surface of wall 28. When housing 2 engages member 26 as seen in FIGURE 1, stub 60, integral therewith, is urged into aperture 31 by spring 66 to occupy the position seen in FIGURE 7, thus effectively locking housing 2 perpendicular to pole 1. Now, by pulling upwardly on handle 69, a user is able to withdraw the image-receiving webbing 67 upwardly out of housing 2. Webbing 67 is withdrawn in this manner until handle 29 can be slipped rearwardly over hook 27. At this juncture, my invention is in its use condition. During the withdrawal of webbing 67, roller body 42 is caused to rotate counterclockwise as seen in FIGURE 5, and in so doing body 42 causes spring 54 to be stressed sufficiently to fully retract webbing 67 to its storage location when such is desired.

To return the screen structure from its use condition (FIGURE 2) to its stored condition (FIGURES 3 and 4) the following steps are performed: (1) Handle 1 is detached from hook 27; (2) webbing 67 is allowed to retract into housing 2; (3) housing 2 is pulled forwardly to remove stub 60 from aperture 31; (4) housing 2 is rotated 90 degrees counterclockwise as it is being lifted vertically (along the path indicated by the arrow in FIGURE 1) to a point where stub 60 can enter aperture 30 under the urging of spring 66; and (5) housing 2 is now freed so that it can move rearwardly to embrace pole 1 as seen in FIGURE 2.

It is obvious that many changes might be made in this invention without departing from the spirit thereof as defined by the appended claims. For example, other spring-biased roller arrangements, or other leg extender means might be employed.

Having now described one complete embodiment of the invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination: a hollow elongated supporting pole; a housing; connecting means joining said housing to said pole and providing for movement of said housing radial of, parallel to and angularly of the longitudinal axis of said pole, said connecting means including means rigid with said housing extending through slot means formed in said pole and terminating within said pole; biasing means within said pole engaging said connecting means for urging said housing toward said pole; and additional means on said pole providing auxiliary support for said housing in at least two different positions.

2. The combination of claim 1 including: spring-biased roller means rotatably mounted in said housing; an elongated aperture in said housing; a web extending through said aperture having one end attached to said roller means and having an opposite end; first means extending from said pole adapted to support the opposite end of said web when said housing is in one position and to protect one end of said housing when said housing is in another position; and said additional means extending from said pole adapted to provide auxiliary support for said housing and protect one end of said housing when said housing is in said another position and to provide auxiliary support for said housing when said housing is in said one position.

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3. The combination of claim 2 wherein said slot means extends substantially parallel with the longitudinal axis of said pole and is located between said first and second means extending from said pole.

4. In combination: an elongated vertically extending pole structure having opposite ends and having a hollow portion between said ends; an elongated storage housing, said housing extending substantially parallel with said pole structure and including a depression extending the entire length thereof in which is nestingly received at least a portion of said pole structure; and connecting means joining said housing to said pole structure, said connecting means passing through an aperture in said pole structure and being partially located in said hollow portion and providing for radial and pivotal movement of said housing relative to the longitudinal axis of said pole structure of such extent that said housing may be moved radially out of nesting relationship with said pole structure and then pivoted to an orientation wherein the longitudinal axis of the housing lies substantially perpendicular to the longitudinal axis of said pole structure, and biasing means located within said hollow portion and engaging said pole structure and said connecting means for urging said housing toward said main portion.

5. A screen structure of the character described comprising: an elongated vertically extending supporting pole structure, said pole structure including an elongated hollow vertically extending main portion having an upper end and a lower end and pressure-plate including means attached to each end of said main portion adapted, respectively, to engage the floor and ceiling of a room and thereby support said screen structure, at least one of said pressure-plate including means and the end of said main portion to which said one means is attached including cooperable means adjustably mounting said one means for longitudinal movement relative to said main portion whereby the overall length of said pole structure may be adjusted; an elongated storage housing having opposite ends, said housing being movably connected to said pole structure and adapted, in one orientation thereof, to extend substantially parallel with said pole structure; and connecting means joining said housing to said pole structure; said connecting means extending through an aperture in said main portion and providing for pivotal movement of said housing relative to the longitudinal axis of said pole structure of such extent that said housing may be pivoted to a second orientation wherein the longitudinal axis of the housing lies substantially perpendicular to the longitudinal axis of said pole structure, said aperture being an elongated slot extending substantially parallel with the longitudinal axis of said main portion, said slot and said connecting means also providing for movement of said housing in addition to said pivotal movement, in a plane substantially parallel to the longitudinal axis of said pole structure; biasing means located within said main portion and cooperatively associated with said connecting means for urging said housing toward said main portion; and means extending from said pole structure for providing auxiliary support for said housing in said one and second orientations thereof.

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