Aug. 23, 1949. K. O. CECHMANEK 2,479,812

PROJECTION SCREEN

Filed Feb. 5, 1947 2 Sheets-Sheet 1

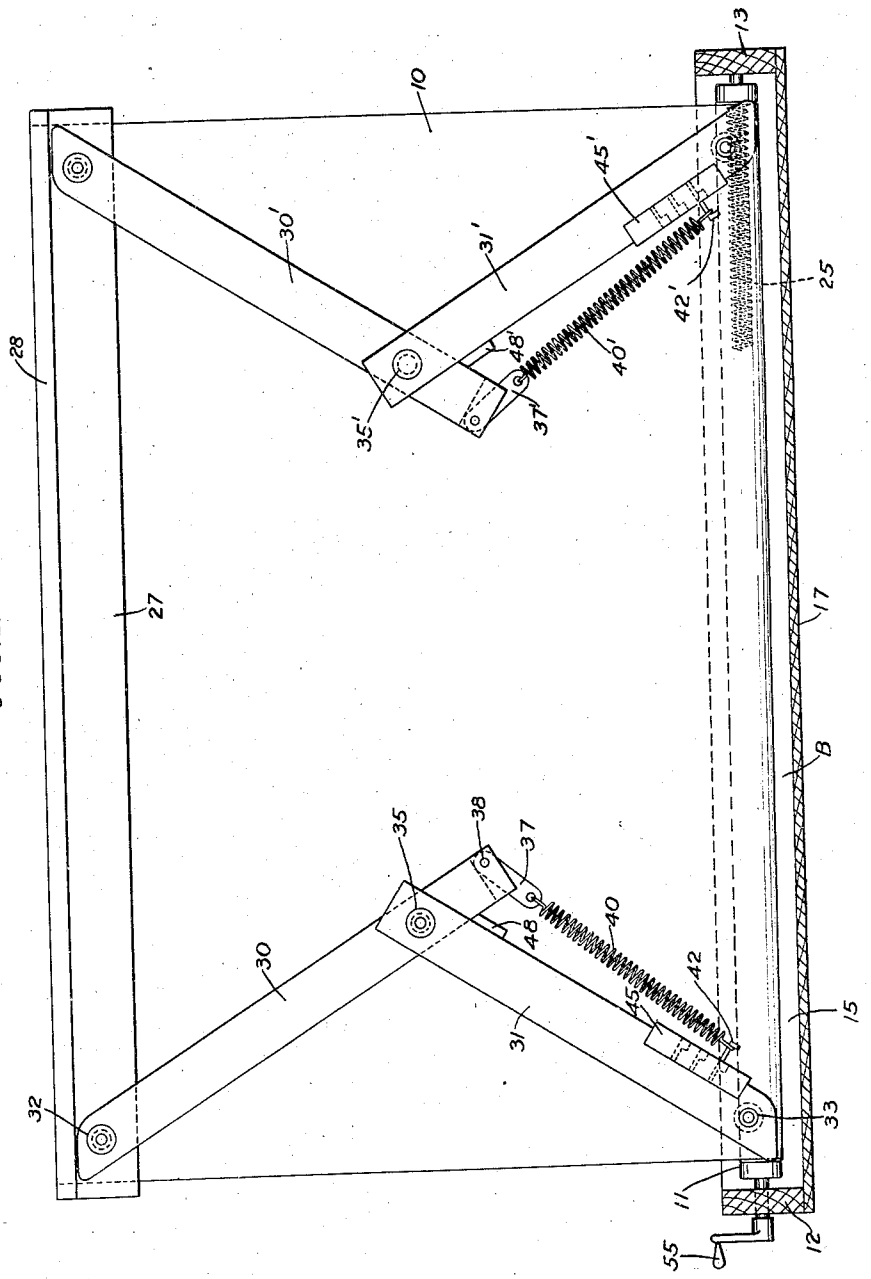


FIG. 1.

INVENTOR.
KARL O. CECHMANEK
BY
ATTORNEY

Aug. 23, 1949. K. O. CECHMANEK 2,479,812

PROJECTION SCREEN

Filed Feb. 5, 1947 2 Sheets-Sheet 2

FIG. 2.

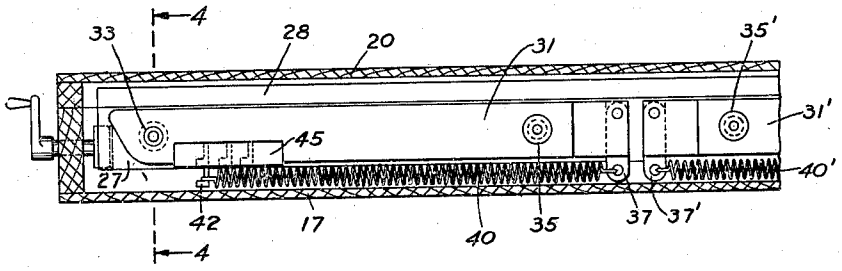


FIG. 3.

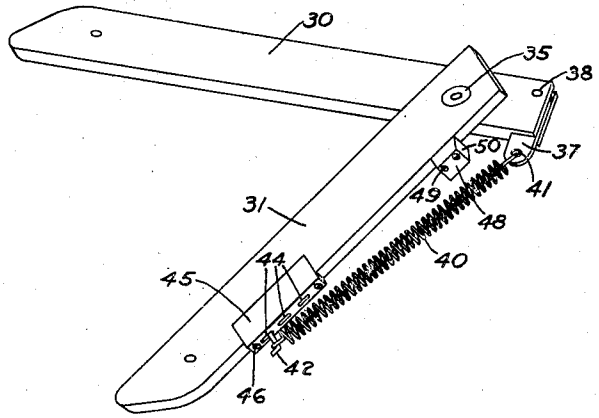
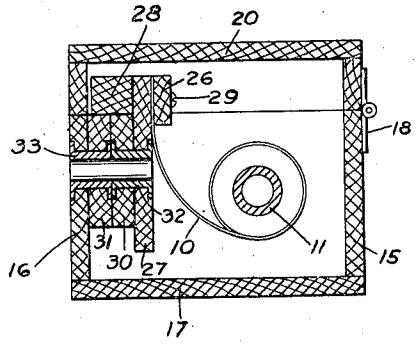


FIG. 4



INVENTOR.
KARL O. CECHMANEK
BY
ATTORNEY

Patented Aug. 23, 1949 2,479,812

UNITED STATES PATENT OFFICE

2,479,812

PROJECTION SCREEN

Karl Oswald Cechmanek, Amsterdam, Netherlands

Application February 5, 1947, Serial No. 726,567
In the Netherlands March 25, 1946

4 Claims. (Cl. 160—24)

1

The present invention relates to screens upon which to project motion pictures and particularly to screens of the roll-up type such as are used in the projection of motion pictures in the home. This application corresponds to the application of the present inventor, Serial No. 124,309, filed March 25, 1946, in the Netherlands, and applicant claims the benefit of the date of that application under the International Convention.

For home exhibition purposes, the projection screens provided are ordinarily of the roll-up type. They are usually mounted in a suitably shaped case or box. When the screen is not in use, it is protected and out of the way, wound-up in the box. When it is to be used, it is unwound from its roll and pulled out to give the required exhibition area. In some cases, the screen is adapted to be supported in its extended or open position by engaging a ring, which is carried by a bar attached to the free end of the screen, with a hook carried by the upper end of a telescoping rod that is pivotally mounted on the box and that may be erected to support the screen. In other cases, the screen is adapted to be held in its open position by hinged braces, one leg of a brace being pivotally connected at its free end to the bar to which the free end of the screen is attached, and the other leg of the brace being pivotally connected at its free end to the box in which the screen or curtain is housed.

Both types, as heretofore constructed, have the objection that the screen is not rigidly supported when extended; it is not held in such way as to provide the smooth, unwrinkled surface which is required to secure the best type of projection. With one type the telescoping rod supports the screen at its center but its sides may droop after the screen has been used several times. With the other type, as previously constructed, the braces are not rigidly held when open. They can be moved in relation to each other not only in the plane of their hinging movement, but in a plane perpendicular thereto. Moreover, the screen must be manually pulled all of the way out in order to open it, and if pushed slightly toward closed position, it may collapse or wind-up entirely. Previous designs of these screens are very wobbly with the result that the pivotal connection between the braces tends to wear, only increasing the disadvantages of the structure. The erect, open position of the screen is not assured; and, furthermore, the opening movement of the braces is jerky.

In screens of the types heretofore built, more-

2

over, it is difficult to erect the screen without assistance, since the spring, which operates to wind the screen on the roller, resists the effort to open the screen. A person has to hold onto the box while pulling up the bar to which the free end of the screen is secured.

One object of the present invention is to provide a screen of the roll-up or curtain-rod type which will be securely maintained in erect position when open.

Another object of the invention is to provide a screen of the type described which will virtually erect itself automatically once the slightest initiating pressure is applied toward opening the screen.

A further object of the invention is to provide a projection screen of the character described which will be maintained smooth, flat, and unwrinkled when open.

Other objects of the invention will be apparent hereinafter from the specification and from the recital of the appended claims.

In a projection screen built according to the present preferred embodiment of the invention, two pairs of hinged braces are provided for holding the screen in open, or erect position. One leg of each brace is pivotally connected at its free end to the bar to which the free end of the screen is secured, and the other leg of each brace is pivotally connected at its free end to the box in which the screen is mounted. One leg of each brace is extended beyond the point of pivotal connection of the two braces; and the end of this leg is connected by a pivoted link with a coil spring which is connected to the other leg of the brace. The tension of this coil spring is adjusted to counter-act the tension of the coil spring in the roll on which the screen is wound. The two braces are mounted at opposite sides of the screen and are so arranged that their hinge points or knees face one another. Stop lugs on one leg of each brace prevent the screen from being opened beyond a certain limit.

When the screen is collapsed, it is wound-up on its rod or roll by the tension of the spring in the rod or roll, and at this time the two legs of each brace fold alongside one another in the box. The legs are held in folded position by the tension of the roll-spring and also by the coil spring that connects the legs, this spring being so mounted that while it is under maximum tension when the legs are folded, it is parallel to the legs when they are folded, and thus tends to hold them in folded position.

With this construction, however, it is only nec-

essary to move the bar, to which the free end of the screen is attached, slightly upwardly with a touch of the finger, and the two coil springs that are attached to the two braces will automatically open the screen the rest of the way to the full limit of its erect position, as determined by the stops placed on the braces. With this construction, moreover, the two braces extend behind the screen in such way as to give full effective support to the screen while the tension of the spring of the roller, on which the screen is wound, serves to maintain the screen, when opened, smooth, flat, and unwrinkled. Thus an ideal projecting surface is assured.

These advantages are enhanced because the legs of the braces are preferably made flat, and are preferably constructed so that the flat sides of the legs pivot on one another. In this way, the legs of the braces cover each other sideways and are flush against each other with their flat surfaces contacting so that they provide for each other sidewise support over a large surface. This effect is further improved by extending the end of the leg to which the coil spring is attached beyond the hinge point of each brace, at least as much as the width of the legs. Thus, ample room is provided for attaching the coil spring, which causes movement of the legs relative to one another and which supports the brace in extended position; and thus, this spring can be so fastened as to be out of the way when the brace is collapsed.

One embodiment of the invention is illustrated in the accompanying drawings in which:

Fig. 1 is a view looking from the rear at the opened screen, one side of the box, which is adapted to contain the screen in its collapsed position, being removed;

Fig. 2 is a fragmentary longitudinal sectional view through the box, showing the screen in collapsed or rolled up position;

Fig. 3 is a perspective view showing one of the supporting braces in partially collapsed position; and

Fig. 4 is a transverse sectional view through the box taken on the line 4—4 of Fig. 2, showing the screen collapsed and the cover of the box closed.

Referring now to the drawings by numerals of reference, 10 denotes the projection screen itself. This may be made of any suitable material. The screen is secured at one end to a roller 11, which is of the curtain-rod type and which is journalled at its opposite ends in the side walls 12 and 13 of a box that is designated as a whole at B. The front wall of this box is denoted at 15, its rear wall at 16, and its bottom or base at 17. Hingedly connected to the front wall 15, by means of a hinge 18 is a cover 20.

The screen 10 is adapted to be wound on the roller 11 by operation of a coil spring 25, which is housed in the roller 11, and which may be of any conventional or suitable construction. The free end of the screen 10 is secured by a strap 26 (Figs. 1 and 4) to a supporting strip 27, which, in turn, is secured to a bar 28, screws 29 serving to fasten the screen and these several parts together.

The screen is adapted to be held in open or erect position by two hinged braces. The two legs of one brace are denoted at 30 and 31, respectively. The two legs of the other brace are denoted at 30' and 31', respectively. The two braces are identical, but they are so arranged that their apexes or hinge points, face one another. Because of their similarity, the construction and manner of attachment of only one brace will be described in detail. Corresponding numerals will be used to designate the corresponding parts of the other brace, but these numerals will be primed.

The leg 30 is pivotally connected by means of a grommet-like trunnion 32 to the strip 27. The leg 31 is pivotally connected by means of a grommet-like trunnion 33 to the rear wall 16 of the box B. The two legs 30 and 31 are hinged together by a grommet-like trunnion 35.

The legs 30 and 31 are made from flat pieces of board or metal and are pivoted together and to the box and piece 27, respectively, on their flat sides. Thus, the braces have large surfaces of contact with one another and with the rear wall 16 of the box and the strip 27, respectively, which makes for rigidity. It will be noted, further that the braces are not rounded-off at their pivot points, but protrude beyond the pivot points as much as room allows in order to provide as large contact surfaces as possible with the parts to which they are connected. It has been found that in this manner a very strong and stable construction results so that even after long use the braces remain firm and steady in open position, and the opening and closing of the braces can take place smoothly and an absolutely vertical erected position of the screen is assured.

The leg 30 extends beyond the point 35 of its pivotal connection with the leg 31 and this extended part of the leg 30 is slotted to receive a link 37 which is pivotally connected at 38 with leg 30. One end of a coil spring 40 is secured in a hole 41 in the link 37. The other end of this coil spring is adapted to be connected to a hook member 42. This hook member is adapted to be secured selectively in one of a plurality of slots 44 that are formed in a retaining member 45 which is secured by screws 46 in a recess formed in the leg 31. By placing the hook member 42 in different slots 44, the tension of the spring 40 can thus be adjusted.

A stop lug 48, that is secured to one side of the leg 31 by screws 49, serves to limit the distance to which the screen 10 can be raised or opened. This stop lug has a slanting upper surface 50 which is adapted to engage the leg 30.

Because of the attachment of the spring 40 to both legs 30 and 31, several advantages result. In collapsed position, the link 37 permits the spring to lie parallel alongside leg 31. Thus, the leverage is zero. Therefore, the box cover 20 can be closed without having to put pressure on the bar 28. Moreover, a light pull on the bar 28 is sufficient to cause the screen to come out of the box and erect itself, because the springs 40 and 40' have maximum tension with the braces completely folded. With the decrease in tension of spring 40, which is produced by slightly lifting on bar 28, the leverage increases, when bar 28 is raised slightly, so that the opening of the screen proceeds automatically and expeditiously. When fully extended position of the screen is reached, the leverage is smaller; and the tension of spring 40 is decreased. Hence, the bar 28 does not jump to its final position with a forceful slap, but a smooth, even opening movement of the screen is obtained.

All that is necessary, when it is desired to open the screen is to raise the cover 20 and lift the top bar just a little by the finger. The screen then moves itself further automatically without jerking or jolting and without any shock when

it arrives at its full open position. The screen is adapted to be closed or collapsed against the tension of the springs 40 and 40', whose tension, however, is counteracted by the tension of the spring 25 in the rod 11 so that the screen can be rolled-up without effort. For closing the screen again, the top bar 28 can be pushed downward or a crank 55 may be used for that purpose. This crank is adapted to be connected to the shaft of the roller 11, outside of the box.

When opening the screen, the roller spring 25 and the springs 40 and 41 work against one another so that the tension of the springs 40 and 40' have to be adjusted accordingly. When the screen is completely open the tension of the springs 40 and 40' is stopped because the leg 30 contacts the limit stop 48 on the brace leg 31. The stretching of the screen is therefore done entirely by the roller spring 25, whose tension can be adjusted for that purpose by winding. This spring 25 serves to maintain the screen taut and unwrinkled when open.

The spring 40 attaches on the narrow sides of both legs 30 and 31, which is advantageous in connection with the described opening movement of the screen, and also in saving space in the box, as is shown in Fig. 2, when the screen is collapsed. The link 37 prevents the spring 40 from being bent. This link follows the relative displacement between the end of leg 30 and the end of the spring 40, so that the spring can not become twisted and produce a turning moment in the completely folded position of the brace. If the spring became twisted, the movement would not be smooth because the spring would scrape along the leg 30 of the brace. The hook members 42 and 42' not only permit of adjusting the tension of the spring 40, to fit conditions of use, but allow of the tension on the spring 40 to be reduced to a minimum when the screen is not to be used for a long time so that the strength of the spring can be preserved.

The strip 27 is located between the screen 10 and the legs 30 and 30' so that it protects the screen at all times.

In contrast with previous constructions, the two braces are connected to the screen and box, respectively, so that the apex points or knees of the braces fall toward each other when the screen is closed and are in alignment with each other and level in the box, as can be seen from Fig. 2. With the present invention, independent adjustment of the two members of a brace is made possible because each brace alone eliminates play in the opening movement of the screen. Moreover, inter-connection of the two braces is not necessary.

The box B may be made of wood, or of a metal, such as aluminum, or of plastic material. The braces can also be made of wood or metal, or various combinations of these materials may be employed, as will be obvious to those skilled in the art.

While a particular embodiment of the invention has been disclosed, then, it will be understood that the invention is capable of further modification, and this application is intended to cover any adaptations, uses, or modifications of the invention following, in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains and as may be applied to the essential features hereinbefore set

forth and as fall within the scope of the invention or the limits of the appended claims.

Having thus described my invention, what I claim is:

1. In apparatus of the character described, a box, a spring actuated roller journalled in the box, a projection screen secured at one end to said roller and adapted to be wound thereon, a bar to which the other end of said screen is secured, and means for holding the screen in extended position comprising a hinged brace having legs pivoted together to fold into the box when the screen is wound up on the roller, one of the legs being pivotally connected at one end to the bar and the other leg being pivotally connected at one end to the box and being pivotally connected to the first leg at a point spaced from the free end of said first leg, and a coil spring pivotally connected at one end to the free end of said first leg and being connected at its opposite end to the other leg.

2. In apparatus of the character described, a box, a spring actuated roller journalled in the box, a projection screen secured at one end to said roller and adapted to be wound thereon, a bar to which the other end of said screen is secured, and means for holding the screen in extended position comprising a hinged brace having legs pivoted together to fold into the box when the screen is wound up on the roller, one of the legs being pivotally connected at one end to the bar, and the other leg being pivotally connected at one end to the box, and the two legs being pivotally connected at a point spaced from the free end of the first leg, a coil spring, means for pivotally connecting said spring at one end to the free end of the first leg, means for adjustably connecting said spring to the second leg to adjust the tension of said spring, said spring being under maximum tension when the legs are completely folded, and a stop member secured to one leg to engage the other leg to limit the extent to which the brace may be opened.

3. In apparatus of the character described, a box, a spring actuated roller journalled in the box, a projection screen secured at one end to the roller and adapted to be wound thereon, a bar to which the other end of the screen is secured, and means for holding the screen in extended position comprising a hinged brace having legs of greater width than thickness and whose sides in the direction of the width of the legs are flat, one of the legs being pivotally connected at one end to the bar, and the other leg being pivotally connected at one end to the box and at its opposite end to the other leg at a point spaced from the free end of the first leg, the flat sides of the two legs contacting, and the flat sides of the two legs lying flat against the bar and box, respectively, at said pivot points, a link member pivotally connected to the free end of side of the first leg, a coil spring connected at one end to said link member and at its opposite end to one narrow side of the other leg, said spring counteracting the tension of the roller spring and being under maximum tension when the legs are completely folded, and means for limiting the extent to which the brace may be opened.

4. In apparatus of the character described, a box, a spring actuated roller journalled in the box, a projection screen secured at one end to said roller and adapted to be wound thereon, a bar to which the other end of the screen is secured, and means for holding the screen in extended position comprising a hinged brace having

two legs, each of such legs having two side surfaces and a top and a bottom surface, one leg being pivotally connected at one end to the bar and the other leg being pivotally connected at one end to the box, the two legs being pivotally connected together at a point spaced from the free end of the first leg with side surfaces contiguous, a link pivotally connected to the first leg between said last named pivot point and the free end of said leg, a coil spring secured at one end to said link and at its opposite end to the other leg at a point on the bottom side of the other leg, whereby, when the screen is collapsed, the legs lie alongside one another with the coil spring in substantial parallelism to the legs, and means for limiting the distance which the brace may be opened.

KARL OSWALD CECHMANEK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,800,627	Heck	Apr. 14, 1931
1,946,639	Riddell	Feb. 13, 1934
1,981,444	Wittel	Nov. 20, 1934
2,395,303	Stableford	Feb. 19, 1946