July 10, 1934. T. J. BEHYMER 1,965,875

PICTURE PROJECTING DEVICE

Filed June 8, 1933

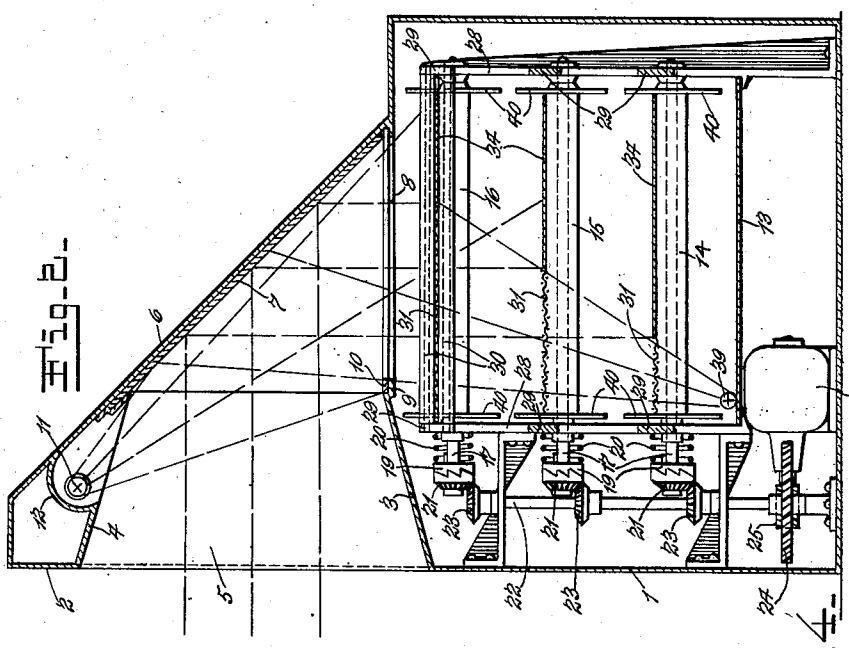

Fig. 2.

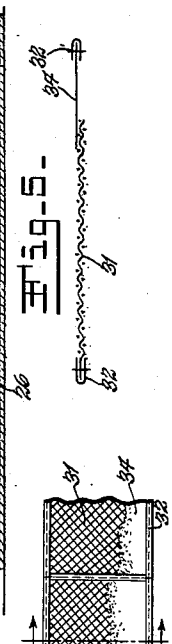

Fig. 5.

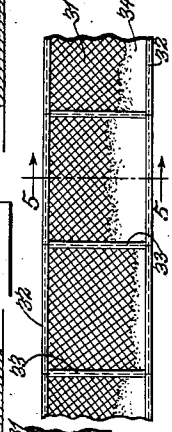

Fig. 4.

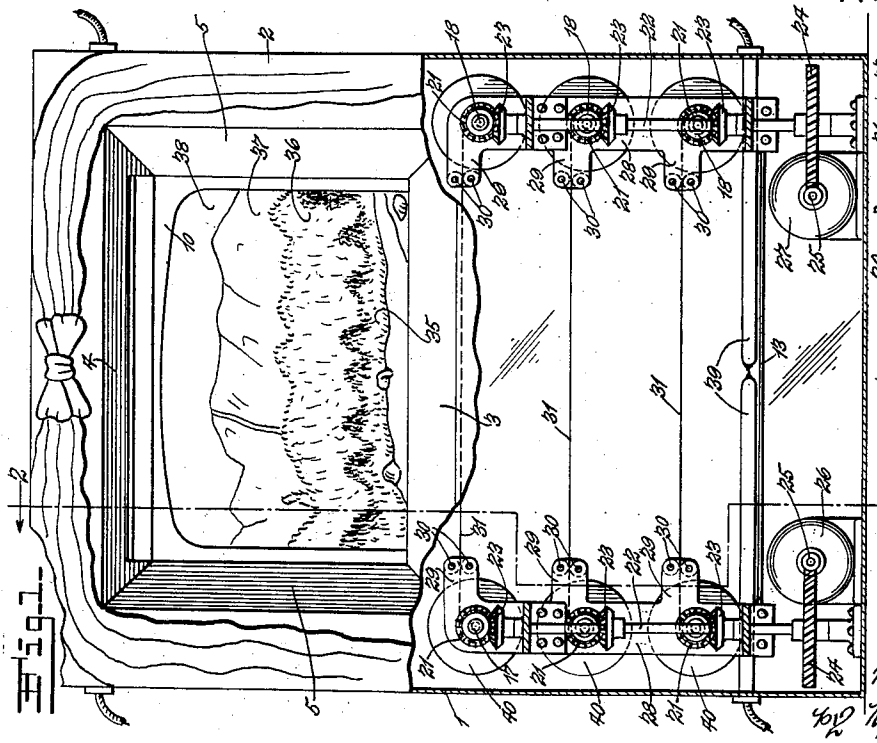

Fig. 3.

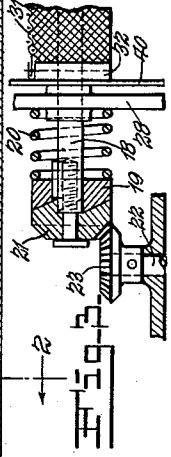

Fig. 6.

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PICTURE PROJECTING DEVICE

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10 Claims. (Cl. 88—24)

This invention relates to picture projecting devices, and has special reference to projecting devices whereby a number of separate pictures, in motion or stationary, may be supported and projected by means of a reflector in order to represent as a unitary picture with perspective the scenes and objects represented by the separate pictures.

Objects of the invention are to provide an improved projecting device including a stationary reflector disposed and supported at an angle of inclination with respect to a number of stationary or moving pictures, or a number of stationary or moving strips representing parts of complete pictures, whereby the pictures are projected with perspective, or the parts of complete pictures with perspective representing a complete picture; to provide means for supporting these pictures or parts of complete pictures and the reflector in illuminated zones in order to heighten and enhance the artistic appearance and effect thereof when seen in the reflector; to provide improved means for supporting parts of pictures in spaced relationship in order to obtain the best effects of perspective; and to provide operating mechanism for moving the pictures or parts of pictures to represent scenic views, vehicles, people, or other pictures or objects.

Other objects will appear from the following description, reference being made to the annexed drawing, in which—

Fig. 1 is a front elevation, with parts in section, of my improved picture projecting device.

Fig. 2 is a vertical front to rear sectional view approximately on the line 2—2 of Fig. 1.

Fig. 3 is an enlarged detail sectional view of a part of the mechanism for moving the pictures or the parts of pictures and permitting movement thereof in either direction.

Fig. 4 is a diagrammatic view showing the general form of the flexible mesh, openwork or transparent picture supports.

Fig. 5 is an enlarged cross sectional view of one of these picture supports on the line 5—5 of Fig. 4.

In the construction shown, the operating mechanism is contained within a cabinet or enclosure formed by front, rear and side walls 1. From the front wall a frame 2 extends upwardly and has an opening from the lower edge of which a wall 3 inclines upwardly and rearwardly and from the upper edge of which a wall 4 inclines downwardly and rearwardly and from the side edges of which walls 5 converge rearwardly and have their lower and upper ends connected with the end edges of the walls 3 and 4, respectively. These walls 3, 4 and 5 constitute the walls of a frame or tunnel of decreasing area toward the rear.

A downwardly and rearwardly inclined wall 6 is mounted on the cabinet and a mirror or other type of good reflector 7 is attached to the under side of the wall or support 6 beyond the rear of the frame or tunnel provided by the walls 3, 4 and 5, so that the images of objects from below this reflector 7 will be easily observable therein through said frame or tunnel.

An opening 8 is provided in the upper end of the cabinet below the reflector 7 and has marginal supports 9 upon which an appropriately shaped proscenium frame 10 is mounted. This frame 10 is invisible but its image is reflected by the reflector 7.

Elongated electric lamps 11 are supported in concealed position above the plane of the rear end of the upper frame wall 4 adjacent to a reflector 12 whereby the light of said lamps is reflected downwardly against the reflector 7, upon the proscenium frame 10 and through the opening 8.

A support 13 is mounted in the cabinet a suitable distance below the opening 8 and may be painted, or otherwise characterized, to represent the sky with or without cloud effects, or other appropriate background.

A vertical series of horizontal rollers or spools 14, 15 and 16 are attached to rotary shafts 17 at one end of the cabinet and a similar series of rollers are attached to horizontal rotary shafts 18 at the opposite end of the cabinet, this series of rollers being beyond the ends of the opening 8.

A sliding beveled tooth clutch member 19 is splined on the end of each of the shafts 17 and 18 and actuated outwardly by a spring 20 to clutching engagement with the beveled pinion 21 loosely mounted on the end portion of each of said shafts 17 and 18. This construction provides a positive drive whereby forward turning of each pinion 21 will positively rotate the corresponding shaft 17 or 18 but will permit each of said shafts to be rotated in the reverse direction by escaping action of the clutch member 19 against the pinion 21. Instead of the specific arrangement shown, I may use endless belts showing the picture parts thereon.

A vertical shaft 22 is mounted adjacent to the ends of the shafts 17 and to the ends of the shafts 18, respectively, and have attached thereto beveled pinions 23 in permanent mesh with the pinions 21 on said shafts 17 and 18, respectively. Each shaft 22 has attached thereto a large gear 24 meshing with a small pinion 25 driven by the

respective motors 26 and 27, the motor 26 driving the gearing for rotating the shafts 17 and the motor 27 driving the gearing for rotating the shafts 18. These motors do not run simultaneously but only run alternately, so that when the motor 26 is running the motor 27 remains stationary, and vice versa.

The supporting frames 28 for the shafts 17 and 18 have inwardly extended arms 29 supporting pairs of tensioning rollers 30, there being one pair of each of said rollers 30 for each shaft 17 and also one pair of said rollers for each shaft 18.

Strips of mesh, transparent or openwork 31 have ends attached to the rollers or spools 14, 15 and 16, respectively, and their opposite ends attached to similar rollers or spools on the shafts 18. These mesh, transparent or openwork supports 31 extend between and are tensioned by the pairs of rollers 30 and may have along their front and rear marginal edges strips 32 of inelastic material, which may be connected by transverse strips 33 of inelastic material providing frames, as should be understood by reference to Fig. 4 of the drawing. Strips 34 containing pictures of parts of scenes or entire scenes or objects to be projected in perspective relationship with respect to other parts of scenes or other objects are attached to each of the mesh, transparent or openwork supports 32, extending forwardly from the rear edges of said mesh, transparent or openwork supports toward but terminating short of the front marginal strip 32.

The arrangement shown in Fig. 2 of the drawing should be sufficient to make clear an appropriate relationship of these picture strips 34 with respect to each other and with respect to the background on the support 13. As there shown, these picture strips extend forwardly having their front edges of irregular formation, as shown in Fig. 4 and by the projected reflection thereof in Fig. 1. Thus, the part of the perspective picture represented by the strip 34 on the upper support 31 is the foreground 35; the part of the perspective picture represented by the strip on the next lower support 31 represents the middle portion 36; the part represented by the strip on the lower support 31 represents the background 37; and the background of the support 13 represents the sky portion 38 of the projected perspective view or scene.

Lamps 39 are supported in a concealed part of the cabinet below the mesh, transparent or openwork supports 31 and cast their rays upwardly toward and against the reflector 7 along the front picture edges 34, the mesh, transparent or openwork supports 31 forming no obstruction to these light rays particularly when any small or insignificant shadows on these supports 31 are dissipated by the rays of the lamps 11.

Flanges 40 on the ends of the respective rollers or spools 14, 15 and 16 and their analogues that are attached to the shafts 18 guide the frame strips 32 of the mesh, transparent or openwork supports 31.

The motors 26 and 27 may be controlled by any appropriate switch or controlling mechanisms for intermittent operation thereof in order to stop and start said motors, as desired and as required to obtain best results if such results are obtained by intermittent operation of the scenes portrayed on the picture strips 34. Devices and mechanism for intermittently operating motors are well known and are not illustrated in the annexed drawing.

In operation of this machine, the desired picture scenes attached to the mesh, transparent or openwork supports 31 are placed in the machine, the ends of said supports 31 being attached to the rollers or spools 14, 15 and 16 and the analogues thereof on the shafts 18. Then one of the motors 26 or 27 is operated, while the other remains stationary, to rotate the corresponding rollers or spools and wind thereon simultaneously and at equal or varying speeds the mesh, transparent or openwork supports 31, this being permitted by the escaping action of the clutch members 19 corresponding to the motor that is not operating. The motor may be stopped and started as desired to present the scenes in the chosen or most effective manner.

The construction and operation of the device may be varied as widely as equivalents will permit without departure from the nature and principle of the invention. I do not restrict myself beyond these limits, but what I claim and desire to secure by Letters Patent is:

1. A projecting device of the character described comprising a visible reflector supported in an inclined position, a number of supports through which light rays may be projected mounted below said reflector, strips having picture portions thereon carried by said supports and being of gradually increasing width from the one nearest said reflector to the one at the greatest distance from said reflector, and an illuminating device mounted below and in position to project rays of light through said supports and against approximately the entire reflecting surface of said reflector.

2. A projecting device of the character described comprising a visible reflector supported in an inclined position, a number of supports through which light rays may be projected mounted below said reflector, strips having picture portions thereon carried by said supports and being of gradually increasing width from the one nearest said reflector to the one at the greatest distance from said reflector, an illuminating device mounted below and in position to project rays of light through said supports and against approximately the entire reflecting surface of said reflector, and an additional illuminating device supported in a concealed position above the reflecting surface of said reflector.

3. A projecting device of the character described comprising a number of supports in vertically spaced relationship, strips having picture portions thereon carried by said supports respectively and being of gradually increasing width from the upper one to the lower one of the series, a visible reflector mounted in a forwardly and upwardly inclined position above said supports and strips and having its lower rear edge adjacent to the rear edge of the upper strip, and an illuminating device mounted below and in position to project rays of light through said supports and against approximately the entire surface of said reflector.

4. A projecting device of the character described comprising a number of supports in vertically spaced relationship, strips having picture portions thereon carried by said supports respectively and being of gradually increasing width from the upper one to the lower one of the series, a visible reflector mounted in a forwardly and upwardly inclined position above said supports and strips and having its lower rear edge adjacent to the rear edge of the upper strip, an illuminating device mounted below and in position to project rays of light through said sup-

ports and against approximately the entire surface of said reflector, and an additional illuminating device supported in a concealed position above the reflecting surface of said reflector and in different angular relationship with respect to the reflecting surface of said reflector from said first illuminating device.

5. A projecting device of the character described comprising a series of vertically spaced approximately horizontal strips having picture portions thereon respectively and being of increasing width from the upper to the lower strip of the series, a forwardly and upwardly inclined visible reflector having its lower rear edge adjacent to the lower rear edge of said upper strip, and illuminating devices supported in concealed and relatively different angular positions with respect to the reflecting surfaces of said reflector and arranged to project rays of light onto the reflecting surface of said reflector.

6. A projecting device of the character described comprising a series of vertically spaced approximately horizontal strips having picture portions thereon respectively and being of increasing width from the upper to the lower strip of the series, a forwardly and upwardly inclined visible reflector having its lower rear edge adjacent to the lower rear edge of said upper strip, illuminating devices supported in concealed and relatively different angular positions with respect to the reflecting surfaces of said reflector and arranged to project rays of light onto the reflecting surface of said reflector, and mechanism for moving said strips in unison.

7. A projecting device of the character described comprising a series of vertically spaced approximately horizontal strips having picture portions thereon, a stationary support having a background for the composite picture represented by said picture portions, a visible reflector mounted in a forwardly and upwardly inclined position above said strips and having its lower rear edge adjacent the rear edge of the upper strip of the series, and a concealed illuminating device mounted above said support in position to project rays of light onto approximately the entire reflecting surface of said reflector.

8. A projecting device of the character described comprising a series of vertically spaced approximately horizontal strips having picture portions thereon, a stationary support having a background for the composite picture represented by said picture portions, a visible reflector mounted in a forwardly and upwardly inclined position above said strips and having its lower rear edge adjacent the rear edge of the upper strip of the series, a concealed illuminating device mounted above said support in position to project rays of light onto approximately the entire reflecting surface of said reflector, and an additional concealed illuminating device above and in position to project rays of light onto approximately the entire surface of said reflector at different angles from the rays that are projected by said first illuminating device.

9. A projecting device of the character described comprising a series of vertically spaced approximately horizontal strips having picture portions thereon, a stationary support having a background for the composite picture represented by said picture portions, a visible reflector mounted in a forwardly and upwardly inclined position above said strips and having its lower rear edge adjacent the rear edge of the upper strip of the series, a concealed illuminating device mounted above said support in position to project rays of light onto approximately the entire reflecting surface of said reflector, and mechanism for moving said strips approximately horizontally.

10. A projecting device of the character described comprising a series of vertically spaced approximately horizontal strips having picture portions thereon, a stationary support having a background for the composite picture represented by said picture portions, a visible reflector mounted in a forwardly and upwardly inclined position above said strips and having its lower rear edge adjacent the rear edge of the upper strip of the series, a concealed illuminating device mounted above said support in position to project rays of light onto approximately the entire reflecting surface of said reflector, an additional concealed illuminating device above and in position to project rays of light onto approximately the entire surface of said reflector at different angles from the rays that are projected by said first illuminating device, and mechanism for moving said strips approximately horizontally.

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