April 1, 1958 H. G. FITZ GERALD 2,828,666

OVERHEAD PROJECTOR APPARATUS

Filed Jan. 9, 1956

FIG. 1.

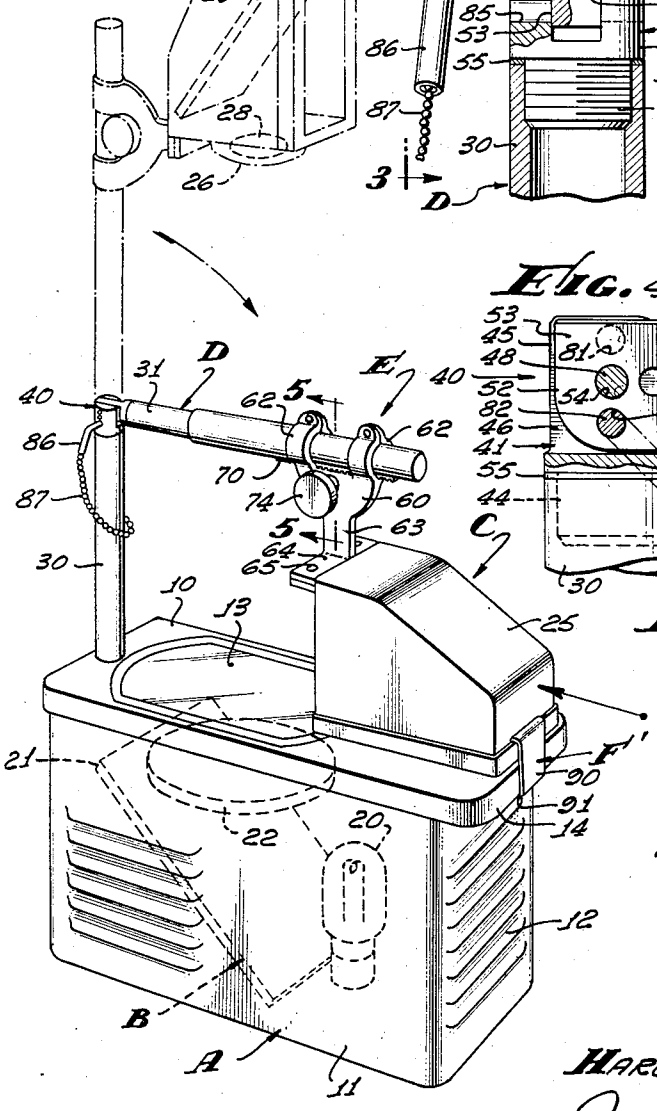


FIG. 2.

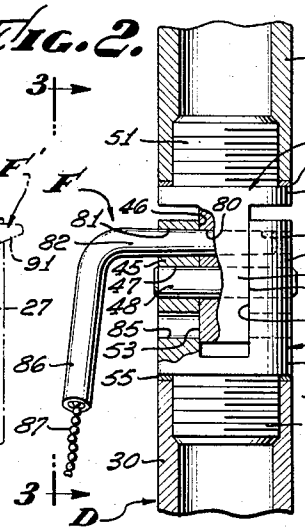


FIG. 3.

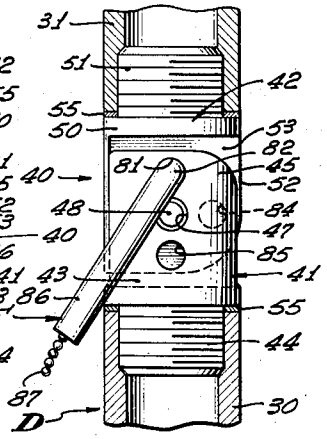


FIG. 4.

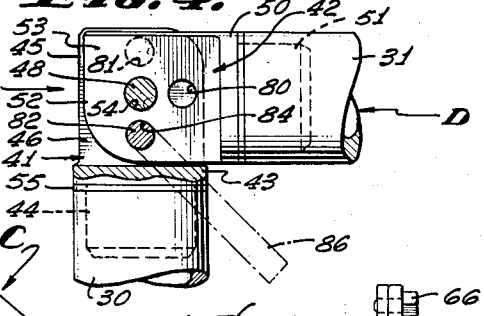
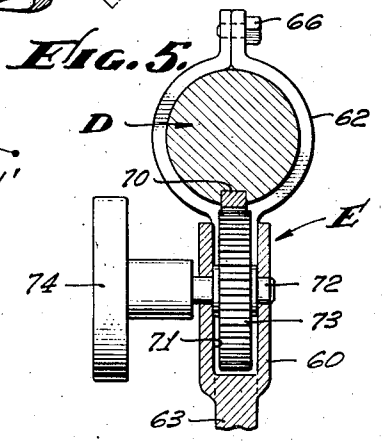


FIG. 5.



INVENTOR.
HAROLD G. FITZ GERALD
BY
Maxwell & Maxwell
AGENTS.

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OVERHEAD PROJECTOR APPARATUS

Harold G. Fitz Gerald, Los Angeles, Calif., assignor to Victorlite Industries, Inc., Los Angeles, Calif., a corporation of California

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5 Claims. (Cl. 88—24)

This invention has to do with an overhead projector of the type wherein a projecting head is supported on a column or the like, to occur above a body in which suitable light generating means is housed, and is more particularly concerned with a projector of the character referred to wherein the column adapted to support the projecting head can be broken or folded in a manner to establish a carrying handle for the projector.

Ordinary or conventional overhead projectors having projecting heads spaced vertically above the body in which the light generating means is housed, are generally of considerable size and weight and are consequently difficult and awkward to handle, ship and store.

It is an object of my invention to provide an overhead projector of the general character referred to having an articulate column or post supporting and carrying the projecting head above the body and adapted to fold down to establish a carrying handle for the projector.

Another object of the present invention is to provide an articulate projecting head post of the nature referred to above, having a knuckle joint permitting the section of the column occurring at opposite ends of the joint to pivot or swing from a position where they are in axial alignment to a position where they are at right angles to each other.

It is another object of the present invention to provide a simple, highly effective and dependable lock means in the knuckle joint and between the projecting head and body which positively sets and locks the column and the projecting head in predetermined positions relative to the body.

A further object of the present invention is to provide an articulate post adapted to support a projecting head above a body which is both easy and economical of manufacture and which is highly effective and dependable in operation.

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of my invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a perspective view of a projector embodying the present invention, the post being shown broken or folded to establish a carrying handle for the projector. In Fig. 1, the post is shown extended, or in operating position in phantom lines. Fig. 2 is a view of knuckle joint that I provide, with portions broken away and showing the joint in an open or extended position. Fig. 3 is an elevational view of the knuckle joint and taken substantially as indicated by line 3—3 on Fig. 2. Fig. 4 is a view of the knuckle joint that I provide with a portion thereof broken away and showing the joint in a broken or folded position. Fig. 5 is a sectional view showing the mounting means securing the projecting head to the post and taken as indicated by line 5—5 on Fig. 1.

The overhead projector provided by the present invention includes generally, a cabinet A adapted to house a suitable light generating and directing means B, a projecting head C adapted to receive and project a beam of light projecting from the body, an articulate post D projecting from the body and adapted to support the head and to shift between an open position where the projecting head receives and projects the beam of light issuing from the body and a closed position where the head occurs adjacent the body and the post establishes a carrying handle for the projector. The structure that I provide further includes a mounting means E for the projector head and shiftably engaged on the post, and lock means F and F' related to the post and the head and adapted to hold and maintain the post in an open or closed position.

The cabinet A of the projector that I provide is shown as an elongate box-like body having a flat horizontally disposed top wall **10**, flat vertically disposed side walls **11** and flat vertically disposed front and rear walls **12**.

The top wall of the body establishes a work supporting surface and has a window **13** therein adapted to pass a vertical beam of light from within the body.

In the case illustrated the front or forward end of the top wall **11** has an extension **14** which projects beyond the front wall of the body to provide additional working surface and also to cooperate with and form a part of the lock means F', which means will be more fully described hereinafter.

The illuminating and light directing means B housed in the body A includes, an electric lamp **20** in the forward portion of the body, a reflector **21** in the body and adapted to direct the light produced by the lamp upwardly through the window **13** in the top wall of the body, and a condenser lense **22** adjacent to and below the window **13** in the top wall **10** of the body and adapted to direct the light in an upwardly convergent vertical beam, as it leaves the body.

The projector head C is adapted to be positioned above the body A to occur above the window **13** in the top wall **10** thereof and to receive and project the vertical beam of light issuing from the body. The projector head C is shown as including a housing **25** having a bottom opening **26**, a front opening **27**, a projecting lense **28** arranged in the bottom opening and adapted to receive and project the beam of light issuing from the body of the projector and a mirror reflector **29** in the housing and adapted to direct the light beam passed by the projecting lense horizontally through the front opening of the housing and forward relative to the body of the projector.

The structure thus far described can, in practice, vary widely in form and in details of construction and does not materially affect the invention herein provided. For the above reasons, further detailed description of the projector body A, light generating and projecting means B and projecting head C will be dispensed with.

The articulate post D that I provide is an elongate sectional structure adapted to normally support the projector head C in a vertical spaced position above the window opening **13** in the top wall **10** of the body, so that it is in axial alignment with and receives the vertical beam of light issuing from the body, through the window.

The post D that I provide, has an elongate tubular bottom section **30** fixed to and projecting upwardly from the body A, an elongate tubular top section **31** pivotally connected with the upper terminal end of the bottom section by means of a suitable knuckle joint **40** and adapted to support the projector head C thereon through and by means of the mounting means E. In the case illustrated, the post is shown projecting upwardly from the top wall **10** of the body adjacent the rear end thereof and inter-

mediate the side walls thereof. The lower section **30** of the post is rigid with the projector body A and, in practice, can be anchored or fixed to the body in any desired manner.

The knuckle joint **40** connecting the upper and lower sections **30** and **31** of the post is shown as including a bottom part **41** carried by the lower post section **30** and a top part **42** pivotally carried by the bottom part and secured to and carrying the upper post section **31**. The bottom part **41** of the knuckle joint is shown as including a body **43** engageable on the end of the post section **30**, an elongate stud **44** projecting downwardly from the body and threadedly engaged in the post section from the upper end thereof, and a pair of laterally spaced plate-like ears **45** projecting upwardly from the body and provided with flat parallel inner opposed faces **46**. The ears are further provided with axially aligned openings **47** adapted to receive and hold a suitable pivot pin **48**.

The top part of the knuckle joint **46** is shown as including a body **50** engageable with the bottom end of the upper section **31** of the post D, a stud **51** projecting upwardly from the body and threadedly engaged in the upper post section, and a flat plate-like, centrally located tongue **52** with flat parallel sides **53** depending from the body and adapted to be engaged between the ears **45** on the bottom part of the knuckle joint, with the side **53** of the pin establishing flat sliding engagement with the faces **46** and having an opening **54** extending therethrough and adapted to slidably receive the pivot pin **48**.

The knuckle joint **40** is engaged on the lower section of the post so that the flat plate-like ears and the tongue, **45** and **52**, thereof, occur in planes parallel with the longitudinal axis of the body, with the result that the upper section of the post extends parallel with and is spaced above the top **10** of the body when it is folded down, as clearly illustrated in Fig. 1 of the drawings. To assure proper orientation of the knuckle joint with the upper and lower sections of the post, I provide suitable washers or spacers **55** between the ends of the post sections and the bodies **41** and **50** of the upper and lower parts of the joint, which washers serve to limit relative rotation of the joint parts with the post sections as or when they are threaded together.

The mounting means E provided for carrying the projector head C, supports the head for longitudinal movement along the upper section **31** of the post D, and is adapted to shift the head for vertcial adjustment relative to the body and focusing of the image projected thereby. The means E is characterized by a bracket **60** provided with spaced arms **62** which are slidably engaged on the post section **31**, and it has a laterally projecting lug **63** with a mounting plate **64** thereon and to which the head C is secured, it being preferred to releasably fasten the head to the plate by suitable screw fasteners **65**, as shown in Fig. 1 of the drawings. The post D is held against rotation and the parts establishing means E are arranged and related to the post so that the head carried thereby is in register with the window **13** in the body A and with the vertical beam of light projecting upwardly therefrom. In the form of the invention illustrated, the arms **62** of the bracket are split or divided and are provided with clamp screws **66** so that the bracket **60** can be set in any desired vertical position on the upper section of the post.

In practice, the mounting means E further includes means for operating the bracket vertically on the post when the clamp screws **66** are released and this means may, in practice, involve sufficient friction so that it is not necessary to set the screws **66** in order to have the bracket and head remain in place, or in the desired adjusted position.

The particular operating means illustrated in the drawings, involves a rack **70** fixed to the upper section **31** of the post D to occur along the forward sides thereof,

a recess **71** in the bracket and opening towards the rock, a shaft **71** rotatably carried by the bracket to extend through the recess and project outwardly from one side of the bracket, and a pinion gear **73** carried by the shaft in fixed position thereon and engaging the rack. An operating knob **74** is provided on the end of the shaft projecting from the bracket so that by rotating the shaft the bracket is operated vertically on the post and relative to the body.

In the preferred construction, the side walls of the recess **71** engage the sides of the rack **70** on the post and prevent the mounting bracket and the head, from rotating relative to the post.

The lock means F adapted to maintain the post D in an open or extended position as shown in phantom lines in Fig. 1 of the drawings, or in a broken or folded position as shown in dotted lines in Fig. 1 of the drawings, includes a tapered opening **80** in the tongue **52** of the knuckle joint, to occur above and extend parallel with the pivot pin **47**, a pair of axially aligned tapered openings **81** in the ears **45** on the lower section of the knuckle joint and adapted to register with opening **80** when the knuckle joint is in an open position and the upper end lower sections **30** and **31** of the post are in axial alignment, and a taper pin **82** adapted to be releasably engaged in the openings **80** and **81**, to wedge tightly therein and hold the knuckle locked in said position. The lock means F further includes a second tapered opening **84** in the tongue **52**, to occur below and extend parallel with the pivot pin **47**, and a pair of axially aligned tapered openings **85** in the ears **45** of the knuckle joint and adapted to register with the opening **84** in the tongue, when the post is broken or folded down, that is, when the upper section **31** is at right angle to the lower section **30** and overlies the body A. The taper pin **82** is adapted to be inserted into the openings **84** and **85** when the said openings are in register and to tightly hold the post in said folded position.

The taper pin **82** is a straight elongate tapered member and in the particular case illustrated, has a laterally turned end establishing a suitable handle **86**. A suitable elongate cord or chain **87** is provided for the pin to secure it to the projector so that it cannot be lost. The chain **87** is shown as having an end fixed to the handle **86** of the pin and the other end looped around the lower section **30** of the post D.

The lock means F' that I provide, is adapted to supplement the lock means F and includes a plate **90** secured to and projecting forwardly from the top of the projector head C and having a downwardly projecting hook portion **91**. When the post D is folded down and so that the front of the projector head C rests on the top **10** of the body A, the plate **90** overlies the front side of the forwardly projecting extension **14** of the top **10** and the hook portion **91** thereof engages under the extension. It will be apparent that the lock means F' is related to the mounting means E for the projector head C, that is, engagement on the plate **90** and the hook portion **91** thereof with the extension **14** of the top **10** of the body A is accomplished by operation of the means E and shifting of the projecting head longitudinally along the top portion **31** of the post, after the post is folded.

It will be apparent from the foregoing, that the articulate post and lock means therefor, as provided by the present invention, serves to suitably support the projector head C above the window W in the body A when the structure is in operation and that the upper section **31** of the post D establishes a suitable carrying handle for the structure, when it is not in use and when the post is folded down.

With the structure provided by the present invention, special carrying cases, harnesses and the like, need not be provided to carry the structure, and the structure need not be dismantled for the purpose of transporting or storage.

Having described only a typical preferred form and

application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claims.

Having described my invention, I claim:

1. A projector of the character referred to including, a body with an upwardly opening window therein, light generating and directing means in the body and adapted to direct a beam of light upwardly through the window, an articulate post fixed to projecting upwardly from the body, and a projector head carried by the post to be operatively positioned above the window and adapted to receive and project said beam of light, the said articulate post having upper and lower portions pivotally connected together at the inner end of each portion, and lock means carried by said projector head and said body to releasably retain said upper portion in a horizontal position above said body to establish a carrying handle for the projector.

2. A projector of the character referred to including, a body with an upwardly opening window therein, light generating and directing means in the body and adapted to direct a beam of light upwardly through the window, an articulate post fixed to the body adjacent the window to project upwardly therefrom, a projector head adapted to receive and project said beam of light, mounting means securing the head to the post for longitudinal movement therealong, the said articulate post having upper and lower portions and a knuckle joint pivotally connecting the said sections together so the upper section can be shifted from a vertical position where the head is spaced above the window to a horizontal position to establish a carrying handle for the projector and where the head occurs adjacent the body, and lock means adapted to hold the head adjacent the body including, a plate fixed to the head and having a hook thereon engagable with the body.

3. A projector of the character referred to including, a body with a flat horizontally disposed top, an upwardly opening window in the top, light generating and directing means in the body adapted to direct a beam of light vertically through the window, a projector head spaced above the body to normally receive and project said beam of light, an articulate post having upper and lower elongate sections, a knuckle joint pivotally connecting said sections together, the lower section being fixed to and projecting upwardly from the body, the upper section being shiftable from a normal working position where it is in axial alignment with the lower section to a position where it is at right angles to the lower section and overlies the body to establish a handle, mounting means on the projector head and engageable with the upper section of the post, and lock means adapted to selectively maintain said post in said two positions and including a lock pin engageable in aligned openings in the knuckle joint.

4. A projector of the character referred to including, a body with a flat horizontally disposed top, an upwardly opening window in the top, light generating and directing means in the body adapted to direct a beam of light vertically through the window, a projector head spaced above the window in the body to receive and project said beam of light, an articulate post having upper and lower elongate sections, a knuckle joint pivotally connecting said sections together and including, a top section fixed to one end of the upper post section and having a pair of laterally spaced depending ears, a bottom section fixed to the upper end of the lower post section and having an upwardly projecting tongue engageable between the ears, and a pivot pin extending through the ears and the tongue, the lower post section being fixed to and projecting upwardly from the body, the upper post section being shiftable from a position where it is in axial alignment with the the lower section to a position where it is at right angles to the lower section and overlies the body to establish a handle, mounting means on the projector head and engageable with the upper section of the post, and lock means adapted to maintain said post in said two positions and including a lock pin engageable in registering openings in the ears and tongue of the knuckle joint.

5. A projector of the character referred to including, a body with an upwardly opening window therein, light generating and directing means in the body and adapted to direct a beam of light upwardly through the window, an articulate post fixed to the body to project upwardly therefrom, a projector head adapted to receive and project said beam of light, mounting means securing the head to the post, the said articulate post having upper and lower portions, and pivot means pivotally connecting the said sections together so the upper section can be shifted from a vertical position where the head is spaced above the window to a substantially horizontal position to establish a carrying handle for the projector and where the head is positioned adjacent the body, and lock means adapted to hold the head in contact with the body.

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