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PROJECTING APPARATUS

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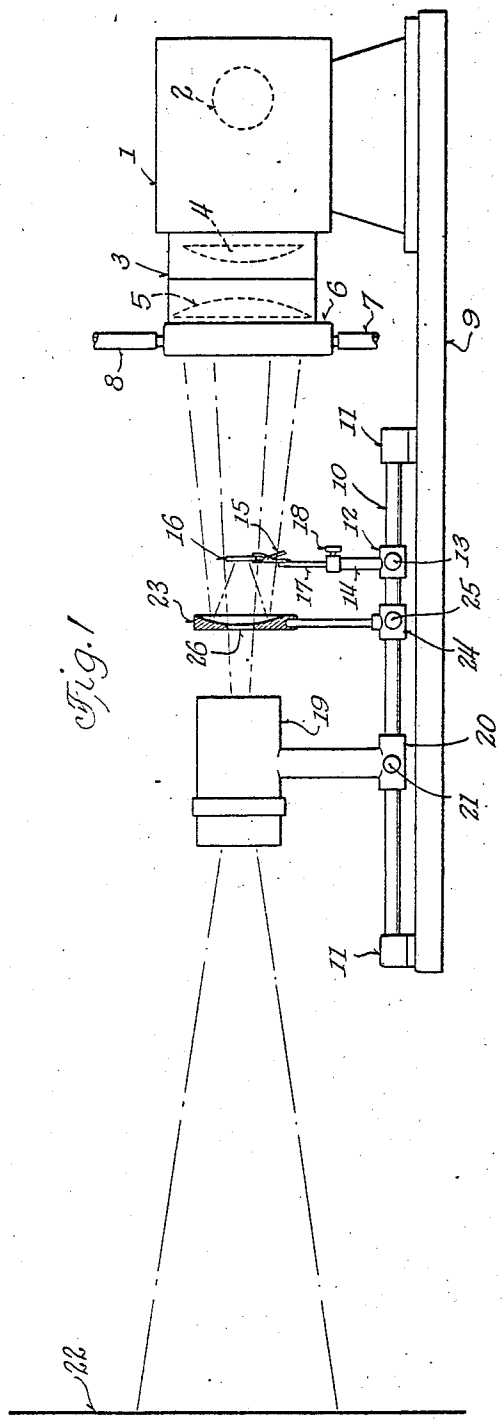


Fig. 1

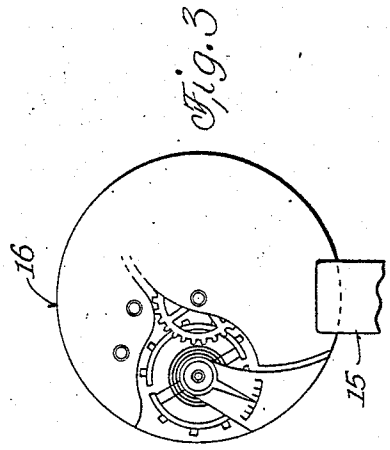


Fig. 3

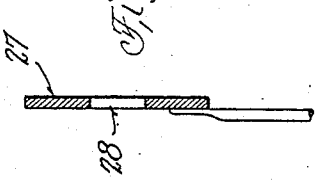


Fig. 2

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PROJECTING APPARATUS

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9 Claims. (Cl. 88—24)

This invention relates to a projecting apparatus.

Objects of this invention are to provide a novel form of projecting apparatus which is so constructed that small objects, such for example as the movement of a watch, may be projected onto a screen and may be very much enlarged while still retaining good detail and good illumination, which will project a sharp silhouette of the object and at the same time will project onto the silhouette the front face of the object, such for example as the front face of the movement of a watch, with the parts in their actual colors.

In greater detail, objects of this invention are to provide a projecting apparatus which may be used to project a very much enlarged silhouette and superimposed image of a small object, such for example as the movement of a watch, with the parts shown actually in motion on the screen in sharp outline and in their true colors, so that a group of people, as for instance a class in watchmaking or a prospective customer, may be shown the device in such size as to be easily examined in detail, and, on the other hand, while it is actually in operation, the apparatus also filling a heretofore unfulfilled need in that it can show a customer where the defect lies in a watch that he may bring in for repair. For example, he could be shown a cracked jewel or a broken balance staff or other parts of the watch that may be found defective, or in teaching watchmaking, the entire watch may be shown in the very much enlarged projection or else various portions may be separately shown as desired.

In general, this invention has for its object a projecting apparatus which retains all of the sharpness of the silhouette, but nevertheless does not give a black, blank silhouette but gives the silhouette with the parts filled out within the outline of the silhouette.

Further objects are to provide a projecting apparatus having the characteristics hereinabove outlined which nevertheless may be used to project an image of an object, such for example as the movement of a watch, in actual operation without requiring a dark room but in full daylight upon what may be called a daylight screen, for example, so that an entire class or a large group of people may simultaneously see the movement in actual operation and the various parts pointed out and explained to the entire class, the projecting apparatus being so constructed and arranged that the object employed for exhibition is placed in a relatively concentrated light zone, and in which the silhouette is produced and light is reflected back onto the front face of the object so as to illuminate the front face and allow it to be simultaneously projected onto the silhouette.

An embodiment of the invention is shown in the accompanying figures, in which:

Figure 1 is a side elevation of the device with a part in section and with parts broken away.

Figure 2 is a detail of a further form that the reflecting mirror may take from that shown in Figure 1.

Figure 3 is a face view of the movement of a watch showing how it is held in place by a clamp.

Referring to the drawing, it will be seen that the device comprises a projecting lantern 1 having a source of light, such as the lamp 2, and provided with an adjustable projecting cell 3, such as the condensing lenses shown at 4 and 5. It also is preferable to provide a water cell 6 for removing heat, such cell being supplied with flowing water through the pipe 7 from any suitable source and discharging from the pipe 8 in the usual manner. The condensing lenses or projecting portion of the lantern is preferably adjustable in the usual manner. The lantern is mounted upon a solid base 9 which is provided with some form of guide, such for instance as the rod 10, carried by end supports 11.

An object holder, a reflecting mirror and a projector or projecting cell are each adjustably mounted upon the guide 10. The object holder may comprise a base 12 slidably mounted on the guide 10 and provided with a thumb screw or set screw 13 so that it may be locked in place. A standard 14 may project upwardly therefrom and may carry a clamp 15 of any suitable type adapted to receive the object, such as the movement 16 of a watch. This clamp 15 is adjustable as it is carried by a rod 17 slidably mounted in the standard 14 and locked in place by the set screw or thumb screw 18.

The projecting cell or projector is indicated at 19 and is provided with a base member 20 slidably mounted on the guide 10 and locked in place by the thumb screw or set screw 21. This projector is adjustable and has the usual series of lenses. It may be of a standard type and is adapted to project onto a screen 22.

Between the projector 19 and the object 16 a reflecting mirror 23 is provided and is carried by a base member 24 slidable upon the guide 10 and provided with a thumb screw or set screw 25. This mirror is provided with a central aperture 26

through which the light may pass from adjacent the outside margins of the object 16, but nevertheless the silhouette of the object is not interfered with, the mirror serving the purpose of illuminating the front face of the object. However, the mirror 23 reflects light back onto the face of the object and consequently the image of the object is superimposed on the silhouette and in the actual colors of the object. If, for instance, the object is the movement of a watch as indicated in Figure 3, the silhouette of the movement is thrown upon the screen 22 and superimposed on the silhouette is an actual image in colors of the different portions of the movement due to the illumination produced by the reflected light from the mirror 23.

In displaying the movement of a watch, it is possible to show the full movement at once and in operation and a very vivid picture is produced. This picture may be made as large as desired, for example many feet in diameter if it is so desired. The screen 22 may be either an opaque screen especially designed for daylight projecting, or it may be a translucent screen so that it can be viewed from the opposite side.

It is preferable to have the light rays converge, as indicated in Figure 1, so that a relatively concentrated light beam is cast on the watch and a ring of light is also concentrated on the reflecting mirror 23, such light being reflected back onto the face of the object.

The mirror may be concave, as shown in Figure 1, if desired or it may take other shapes. For example, as shown in Figure 2, a flat mirror 27 may be employed and is provided with an aperture 28 in the same manner as the mirror 23.

These different types of mirrors are merely illustrative of different types that may be employed. If desired, a segmental mirror could be used, though it is preferable to have a full mirror.

The object producing the silhouette is placed at a point of light concentration instead of being placed closely adjacent the projecting lantern, and additionally that part of the converging beam surrounding the object which passes by the object is not wasted but is caught by the reflecting mirror and thrown back upon the face of the object. In this manner a brilliantly illuminated picture is formed with the silhouette giving it a sharp, precise outline.

In teaching a class in watchmaking this apparatus revolutionizes the teaching practice inasmuch as heretofore it was possible for only one student at a time to examine through a magnifying glass the particular portion of a watch under discussion, and students had to successively have that portion of the watch explained to them. With this invention the enlarged silhouette and the image projected thereon is shown to the entire class at once and the particular part may be pointed out with ease to the entire class. Also it is possible, as described hereinabove, to see the watch in actual operation.

On the other hand, a jeweler selling a watch to a customer can mount the movement of the watch in the apparatus and project it on the screen and explain its parts or particular features to the prospective customer. On the other hand, if a repairman has a watch brought to him, he may mount the movement, project the silhouette with the image thereon, and point out to the customer the particular jewel or portion that is broken and that needs repair.

This invention, therefore, for the first time places in the hands of a jeweler an apparatus by which he can remove any doubt in the mind of the patron by actually showing him the defective portion and showing him what repairs are actually needed in the watch.

It is to be understood, of course, that parts of the watch may be singly mounted and their silhouette with the image superimposed projected on the screen.

Further it is to be understood that although the invention is admirably adapted to the display of watches, nevertheless it is applicable to many other objects.

It will be seen that a novel projecting apparatus has been provided which has the advantages not only of opaque projection, that is, from the face of the object, but also has the advantage of a silhouette projection which gives extreme sharpness. This invention, therefore, provides a device which will project a sharp silhouette of an object and will superimpose on this silhouette the image of the object.

Although this invention has been described in considerable detail, it is to be understood that such description is intended as illustrative rather than limiting, as the invention may be variously embodied and is to be interpreted as claimed.

I claim:

1. A projecting apparatus comprising a screen, a projector, a source of light located on the other side of said projector from said screen, an object holder located between said projector and said source of light and adapted to hold an object, said object directly obstructing a portion of the beam of light from said source, whereby a silhouette of said object will be produced upon said screen, and a mirror located between said object holder and said projector for reflecting light from said source of light upon the front face of said object, said mirror having a cut away portion so that the silhouette of said object will not be obstructed by the mirror, said projector superimposing an image of said object upon the silhouette.

2. A projecting apparatus comprising a screen, a projector, a source of light located on the other side of said projector from said screen, an object holder located between said projector and said source of light and adapted to hold an object, said object directly obstructing a portion of the beam of light from said source, whereby a silhouette of said object will be produced upon said screen, said object holder being adjustable towards and from said projector, and a mirror located forwardly of said object holder with reference to said screen for reflecting light from said source of light upon the forward face of said object, said mirror having a clear central portion to allow the silhouette of the object to pass therethrough without obstruction by the edges of the mirror, whereby an image of said object will be superimposed upon the silhouette.

3. A projecting apparatus comprising a screen, a projector, a source of light located on the other side of said projector from said screen, an object holder located between said projector and said source of light and adapted to hold an object, said source of light projecting a solid beam of light against the back of said object and around said object, said object directly obstructing a portion of the beam of light from said source, whereby a silhouette of said object will be produced upon said screen, said object holder being horizontally and vertically adjustable, and a mirror located forwardly of said object holder with reference to said screen for reflecting light from said source

of light upon the forward face of said object, said mirror having a clear central portion to allow the silhouette of the object to pass therethrough without obstruction by the edges of the mirror, whereby an image of said object will be superimposed upon the silhouette.

4. A projecting apparatus comprising a screen, a source of light, a projector between said screen and said source of light, an object holder between said projector and said source of light, an object held by said object holder and having a rear face directly illuminated by said source of light, said source of light projecting a beam of light against the back of said object and around said object, a mirror between said projector and said source of light for reflecting that portion of the beam of light which passes outside of the outline of said object back upon the front face of the object, said mirror having an aperture therethrough in line with the axis of said projector, and means between said source of light and said object for causing convergence of the light from said source.

5. A projecting apparatus comprising a screen, a source of light, a projector between said screen and said source of light, an object holder between said projector and said source of light, an object held by said object holder and having its rear face directly illuminated by said source of light, said source of light projecting a beam of light against the back of said object and around said object, a mirror between said projector and said object holder, said mirror reflecting that portion of the beam of light which passes outside of the outline of said object back upon the front face of said object, said mirror having an aperture therethrough in line with the axis of said projector, and means between said source of light and said object holder for causing convergence of the light from said source, said means being adjustable whereby the degree of convergence may be adjusted.

6. A projecting apparatus comprising a base, a light source carried by said base, a projector adjustable on said base towards and from said light source, an object holder adjustably carried by said base and located between said source of light and said projector, an object held by said object holder and having its rear face directly illuminated by said source of light, said source of light projecting a beam of light against the back of said object and around said object, and a mirror adjustably carried by said base and having an aperture therethrough and located between said object holder and said projector, said mirror reflecting that portion of the beam of light which passes outside of the outline of said object back upon the front face of said object, the aperture of said mirror being in line with the axis of said projector.

7. A projecting apparatus comprising a light source, a projector adjustable towards and from said light source, an object holder adjustable towards and from said light source and located between said source of light and said projector, an object held by said object holder and having its rear face directly illuminated by said source of light, said source of light projecting a beam of light against the back of said object and around said object, a mirror having an aperture therethrough and located between said object holder and said projector, said mirror reflecting that portion of the beam of light which passes outside of the outline of said object back upon the front face of said object, the aperture of said mirror being in line with the axis of said projector, and means between said object holder and said source of light for causing convergence of the light from said source of light.

8. A projecting apparatus for projecting a silhouette of an object upon a screen and for projecting an illuminated face view of the object upon the silhouette, said projecting apparatus comprising a screen, a source of light, means for projecting a beam of light from said source, a projector between said source of light and said screen, an object holder between said projector and said source of light, an object held by said object holder and having its rear face directed towards said source of light and having its margins located within the beam of light from said source of light, said object obstructing a portion of the beam of light, said beam of light extending beyond the marginal portion of said object, and a mirror located between said projector and said object for reflecting that portion of the beam of light which passes beyond the object back upon the front face of the object, said mirror having a clear central portion to allow the silhouette of said object to pass therethrough without obstruction by the edges of the mirror, said projector projecting both the silhouette and the illuminated face thereof in superimposed relation upon said screen.

9. A projecting apparatus for projecting a silhouette of an object upon a screen and for projecting an illuminated face view of the object upon the silhouette, said projecting apparatus comprising a screen, a source of light, means for projecting a beam of light from said source, a projector between said source of light and said screen, an object holder between said projector and said source of light, an object held by said object holder and having its rear face directed towards said source of light and having its margins located within the beam of light from said source of light, said object obstructing a portion of the beam of light, said beam of light extending beyond the marginal portion of said object, and a mirror located between said projector and said object for reflecting that portion of the beam of light which passes beyond the object back upon the front face of the object, said mirror having an aperture therethrough for allowing the silhouette of the object to be projected through said aperture, said projector projecting both the silhouette and the illuminated face thereof in superimposed relation upon said screen.

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