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PROJECTION APPARATUS.

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1,392,207. **Patented Sept. 27, 1921.**

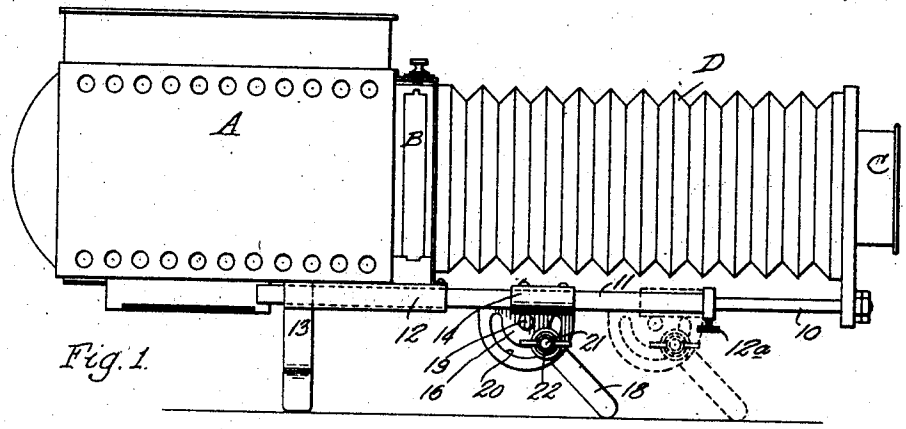


Fig. 1.

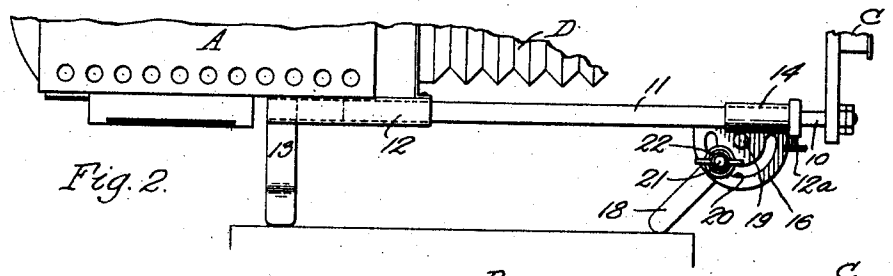


Fig. 2.

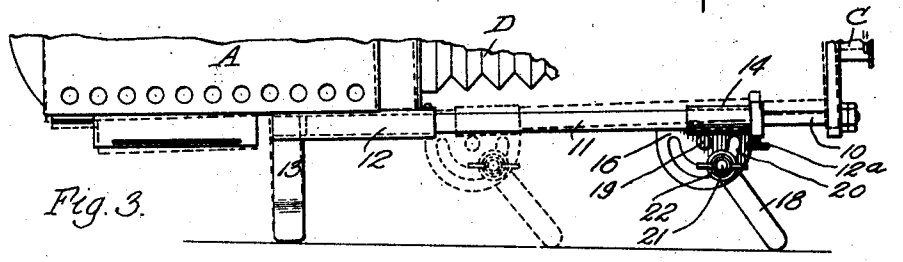


Fig. 3.

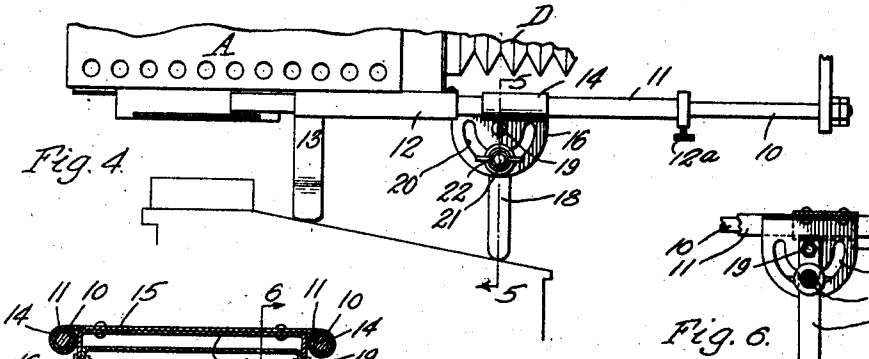


Fig. 4.

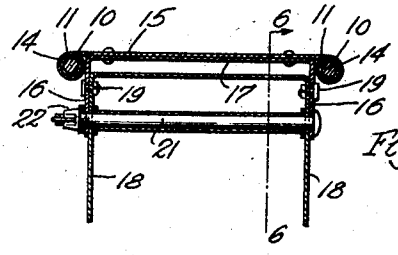


Fig. 5.

Fig. 6.

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PROJECTION APPARATUS.

1,392,207. Specification of Letters Patent. Patented Sept. 27, 1921.

Application filed August 11, 1920. Serial No. 402,850.

To all whom it may concern:

Be it known that I, HARVEY N. OTT, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Projection Apparatus, of which the following is a specification.

This invention relates to projection apparatus of the kind adapted to project images upon a suitable screen, and more particularly to means for supporting apparatus of this type on a supporting surface, such as tables, boxes or chairs.

Usually, apparatus of this type are portable, being carried from place to place whenever the pictures are to be exhibited and are set up on the most convenient object to be obtained for that purpose, usually a table, box or chair. The dimensions of the upper or supporting surfaces of these objects are, of course, different and heretofore with an apparatus of this type considerable difficulty has attended the proper placement of the apparatus whereby a stable mounting may be attained. In some projectors the base of the lamp box is provided with supporting legs at its corners. The disadvantage attending this type of structure is that a supporting surface of as large area as the bottom of the lamp box is required. In other apparatus the lamp box is provided with a supporting member or pair of legs and the projection objective casing, which is slidable to and from the lamp box for focusing the image on the screen, is provided with a second supporting member or pair of legs. The disadvantages of this latter type are that the supporting surface required varies as the objective is moved out and it is not always possible to provide a supporting surface of such length as to permit full extension of the objective. Further, in this type of apparatus, when operating upon a surface of restricted area, in moving the objective for focusing, the supporting legs are liable to be shoved over the edge of the supporting surface, thus permitting the apparatus to fall and be damaged. Furthermore, with the apparatus commonly in use, quick and convenient adjustment as to the elevation of the axis of projection is not possible.

One object of the present invention is to provide desirable supporting means for the apparatus which may be placed and operated upon a relatively small supporting surface.

Other objects are to permit full movement of the projection objective without requiring any increase in the size of the supporting surface or without liability of moving the supporting member for the objective off of the supporting surface; also to provide an apparatus wherein adjustments of elevation of the axis of projection may be made easily and quickly without disturbing the focus of the instrument; also to improve projection apparatus in the other respects hereinafter described and set forth in the claims.

For the purpose of illustration, I have shown an embodiment of the invention as applied to a type of projection apparatus in which transparent slides or objects are used, but it will be understood that the invention is susceptible of use with other forms of projection apparatus.

In the accompanying drawings:—

Figure 1 is a side elevation of a projection apparatus embodying the invention.

Figs. 2, 3 and 4 are fragmentary side elevations thereof showing the adjustable supporting members in different supporting positions.

Fig. 5 is a section thereof on line 5—5, Fig. 4.

Fig. 6 is a longitudinal vertical section on line 6—6, Fig. 5.

Referring to the drawings:

A designates the lamp box of a projection apparatus, B the slide or object holder, C the projection objective and D the usual bellows.

The projection objective is movable toward and from the object holder, being connected to an extensible support, preferably comprising slide rods 10 secured to the objective casing and which telescope into tubes 11 slidable in suitable guides 12 on the bottom of the lamp box. 12^a designates set screws for screwing the tubes 11 in different positions on the rods 10.

The apparatus is provided with a relatively fixed support, which in the embodiment illustrated assumes the form of a pair of legs 13 secured to the bottom of the lamp box, and with a movable and adjustable supporting member for the front end of the apparatus adapted to coöperate with the legs 13 to provide a firm and stable base for the apparatus, and which is a readily ad-

justable to regulate the elevation of the axis of projection. Preferably, this adjustable support is mounted for sliding movement on the tubes 11, and as illustrated, comprises tube-encircling sleeves 14 connected by a horizontal spacing plate 15 and is provided with downwardly projecting side flanges 16. As shown, these flanges are formed on a separate plate 17 secured to the spacing plate 15. A pair of connected supporting legs 18 are suitably pivoted at 19 to the flanges 16 for angular movement relative to the plate. In order to secure the legs in the different angular positions the flanges are formed with arcuate slots 20 therethrough which receive the ends of a bolt 21 passing through the legs 18 below their pivot points. One end of the bolt is provided with suitable means, such as a thumb screw 22 for securing the bolt in different positions in the slots. As illustrated in the drawings, the adjustable supporting legs are of greater length than the fixed legs on the lamp box whereby, as shown in Fig. 4, the apparatus may be leveled on a sloping supporting surface such as a school-room desk, or may be tilted to secure a required inclination of the axis of projection. As illustrated in Figs. 1 and 3, the adjustable supporting member may be moved on the tubes 11 longitudinally of the apparatus to adapt itself to supporting surfaces of different area, without affecting the focus of the apparatus. Since the front legs 18 are pivoted, they can be set in either an upright position or at different inclinations, thereby tilting the apparatus so as to elevate the axis of projection as may be necessary, or to level the apparatus on a horizontal or sloping supporting surface. The legs can also be set in either a forwardly or rearwardly inclined position to place their lower ends farther from or nearer to the rear legs 13, to adapt the legs to different, supporting surfaces, either with or without changing the inclination of the axis of projection. This angular adjustment of the front legs supplemented by their sliding adjustment toward and from the rear legs makes possible a great variety of different relations of the legs, such as to enable the apparatus to be readily supported and properly adjusted on various, different sorts of supporting surfaces. If the front legs are set so as to tilt the apparatus, the inclination of the axis of projection can be readily altered somewhat, simply by sliding the front legs forwardly or rearwardly, thus enabling a very accurate adjustment of the elevation of the axis of projection. This is illustrated by the full and broken line positions shown in Fig. 3. An adjustment wherein a most stable support is effected is illustrated in Fig. 2, where the adjustable legs are moved forwardly a considerable distance from the rear legs and secured in a position to project rearwardly, thereby securing the advantages of a larger supporting surface. It will be apparent, that by the provision of an angularly adjustable supporting member of greater length than the fixed supporting member and slidable with and relatively to the objective that a stable mounting is provided on a rather small-supporting surface, even though that surface be uneven or sloping.

I claim as my invention:

1. In projection apparatus, the combination with a lamp box and a projection objective movable toward and from said lamp box for focusing, of an angularly adjustable support for the front end of the apparatus, said support being longitudinally movable relatively to said lamp box and said objective, whereby the apparatus may be adjusted to regulate the elevation of the projection and longitudinal movement of the objective relatively to the apparatus may be effected without moving said adjustable support.

2. In projection apparatus, the combination with a lamp box, a projection objective, and an extensible member connecting said lamp box and said objective whereby said objective may be moved toward and from said lamp box, of an angularly adjustable supporting member for the apparatus mounted for sliding longitudinal adjustment on and relatively to said extensible member.

3. In projection apparatus, the combination with a lamp box, a projection objective, and an extensible member connecting said lamp box and said objective whereby said objective may be moved toward and from said lamp box, of an angularly adjustable support for the objective end of the apparatus, said support being movable with and relatively to and adjustable relatively to said extensible member.

4. In projection apparatus, the combination with a lamp box, a projection objective, and extensible members connecting said projection objective and said lamp box, of a support for one end of the apparatus, said support comprising sleeves surrounding said extensible members and supporting legs angularly adjustable relatively thereto.

5. In projection apparatus, the combination with a lamp box, a projection objective and extensible members connecting said projection objective and said lamp box, of a support for one end of the apparatus, said support comprising a part mounted for sliding movement on said extensible members, a downwardly projecting flange on said sliding part and a supporting leg pivoted to said flange.

6. In projection apparatus, the combination with a lamp box, a projection objective, and extensible members connecting said objective and said lamp box, of a support for

one end of said apparatus, said support comprising a part mounted for sliding movement on said extensible members, downwardly projecting flanges on said sliding part, supporting legs pivoted to said flanges and movable angularly relatively to said extensible members, and means for releasably holding said legs in different angular positions relatively to said extensible members.

7. In projection apparatus, the combination with a lamp box, a projection objective, and extensible members connecting said projection apparatus and said lamp box, of a support for one end of said apparatus, said support comprising a part mounted for sliding movement on said extensible members, said part having downwardly projecting side flanges formed with arcuate slots therethrough, a pair of legs pivoted to said flanges for angular movement relative to said extensible members, a bolt extending through said legs and through the slots in said flanges, and means coöperating with said bolt and slotted flanges for securing said legs in different angular positions relatively to said extensible members.

8. In projection apparatus, the combination with a lamp box and a projection objective movable toward and from said lamp box for focusing, of a relatively fixed supporting rest for one end of the apparatus, and an angularly adjustable support for the other end of the apparatus, said support being longitudinally movable relatively to said lamp box and said objective, whereby the apparatus may be adjusted to regulate the elevation of the projection and longitudinal movement of the objective relatively to the apparatus may be effected without moving said adjustable support.

9. In projection apparatus, the combination with a lamp box, a projection objective, and an extensible member connecting said lamp box and said objective whereby said objective may be moved toward and from said lamp box for focusing, of an angularly adjustable support mounted on said extensible member, said support being longitudinally movable with said extensible member relatively to said lamp box and longitudinally movable relatively to said extensible member and said projection objective.

10. In projection apparatus, the combination with a lamp box, and a projection objective movable toward and from said lamp box for focusing, of a pair of relatively horizontal tubes slidably connected to said lamp box and movable to project more or less therefrom, a pair of slide rods telescoping with said tubes and connected at one end to said projection objective, and an adjustable supporting member slidably mounted on said tubes whereby said supporting member may be moved longitudinally of said apparatus with or relatively to said projection objective and with or relatively to said tubes and said projection objective may be moved longitudinally relatively to said tubes and said support.

Witness my hand this 9th day of August, 1920.

HARVEY N. OTT.

Witnesses:
LOUIS M. POTTER,
ARTHUR A. HAHN.