

(No Model.)

J. MACHAFFIE & E. F. G. H. FAURE.  
CONTROLLING MECHANISM FOR PROJECTORS.

No. 576,683.

Patented Feb. 9, 1897.

FIG. 1.

FIG. 2.

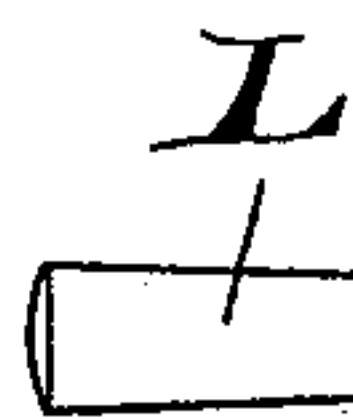
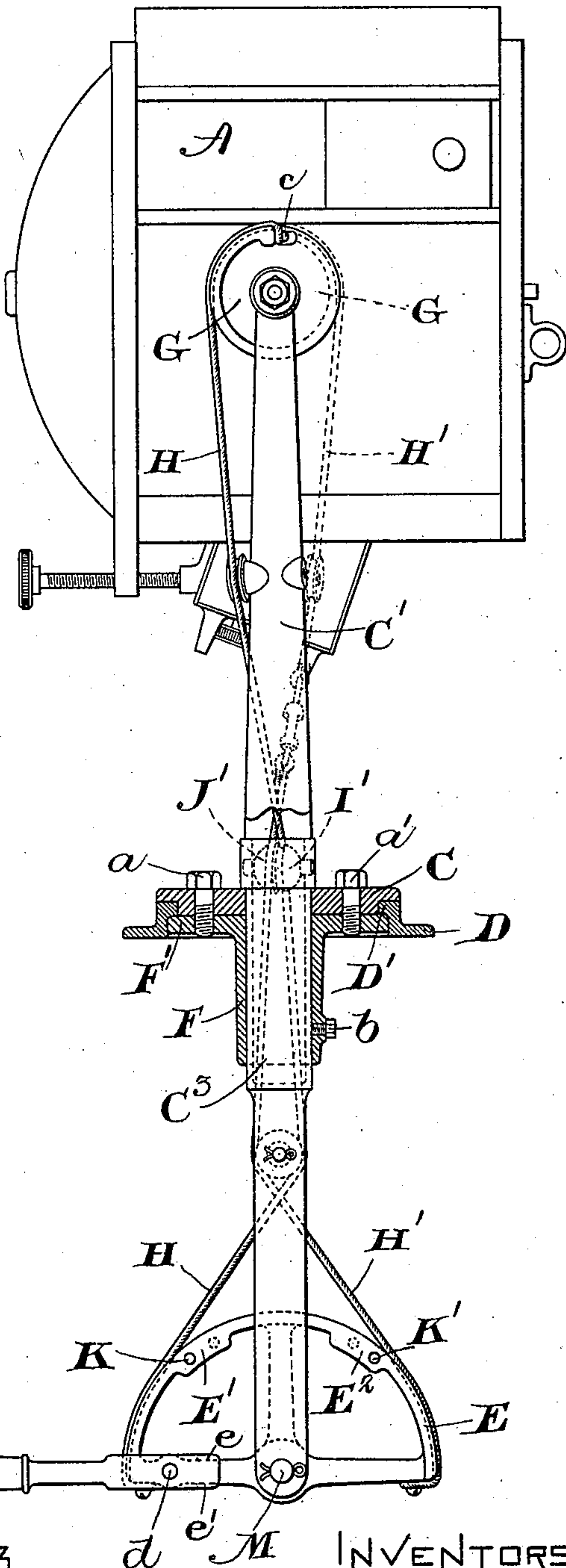
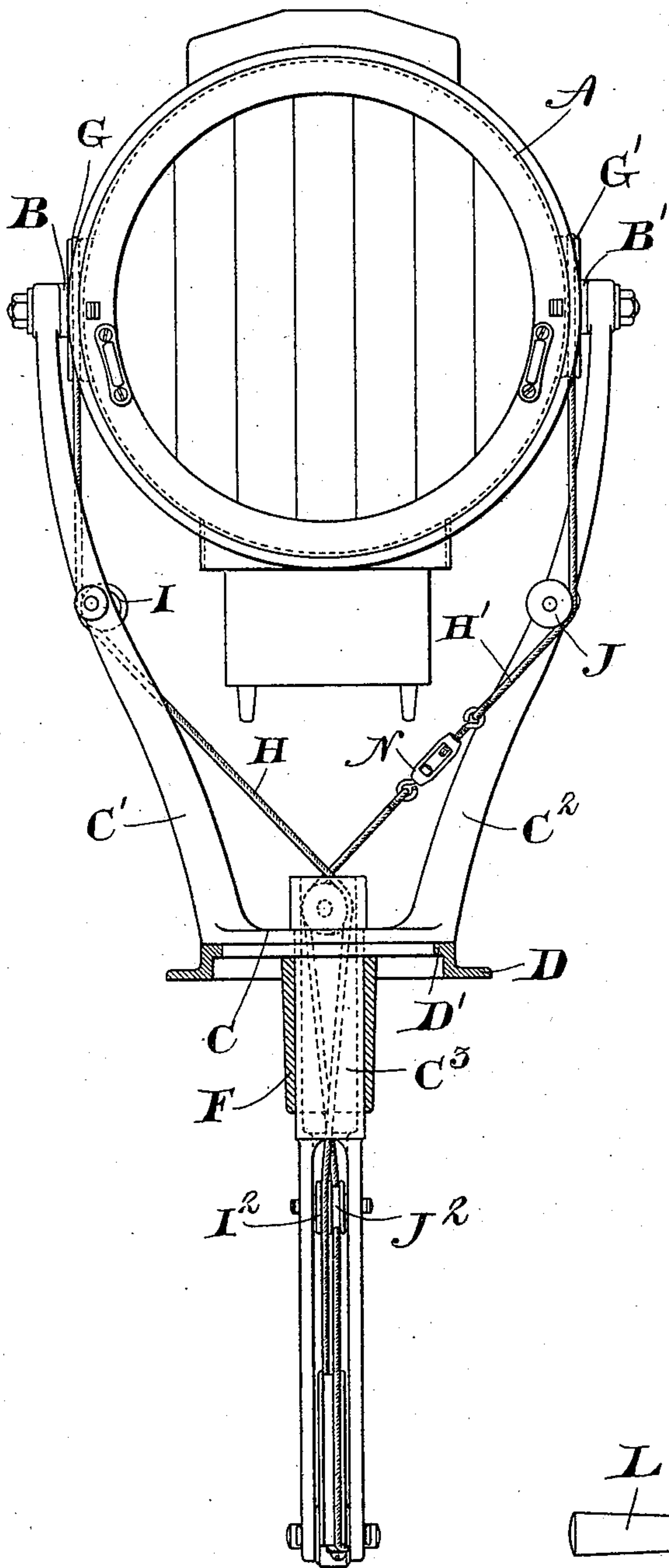


FIG. 3.

WITNESSES.

A. H. Abell,  
A. J. Macdonald.

INVENTORS.

John Machaffie and  
E. F. G. H. Faure, by  
Geo. R. Blodgett,  
Atty.



# UNITED STATES PATENT OFFICE.

JOHN MACHAFFIE AND ELIE F. G. H. FAURE, OF SCHENECTADY, NEW YORK,  
ASSIGNORS TO THE GENERAL ELECTRIC COMPANY, OF NEW YORK.

## CONTROLLING MECHANISM FOR PROJECTORS.

SPECIFICATION forming part of Letters Patent No. 576,683, dated February 9, 1897.

Application filed April 11, 1896. Serial No. 587,235. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN MACHAFFIE, a subject of the Queen of Great Britain, and ELIE F. G. H. FAURE, a citizen of the Republic of France, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Controlling Mechanism for Projectors, (Case No. 375,) of which the following is a specification.

The present invention relates to controlling mechanism for projectors; and one object of the invention is to provide a single-handle mechanism for controlling the beam of light in both altitude and azimuth, either separately or simultaneously, the advantages of which are pointed out in our Patent No. 539,862, dated May 28, 1895.

A further object of the invention is to provide an operating mechanism which may be readily changed to suit the various conditions met with in installing apparatus of this character. For example, it may be desirable to have the vertical angular movement of the operating-handle limited to a few degrees, on account of the lack of space, or it may be desirable to have the operating-handle move through as great or even greater angular movement than the drum. This is accomplished by mounting a sector of greater or less diameter on the horizontally-movable frame of the projector and securing thereto the operating-handle, with flexible connections extending from the sector to the drum. By changing the diameter of this sector the vertical angular movement of the handle for a given movement of the drum will be changed. By mounting sectors on the drum and frame concentric with the center of movement and arranging the flexible connections to work over them a further advantage is gained, for an even actuating force is then required at all times to move the drum, whereas in other forms of connection the force exerted would vary as the drum was moved.

The invention also has for its object to provide a projector which is light, simple in construction, not liable to get out of order, and cheap to manufacture.

In carrying out the invention a suitable

base is secured to the top of the pilot-house or other support. Upon this is mounted a frame provided with two upwardly-extending arms adapted to support the drum between them by means of trunnions which are secured to either side thereof. Secured to the base of the frame and adapted to move therewith is a projection extending into the pilot-house, and pivoted thereto is a sector provided with an operating-handle. Mounted on the drum are two sectors situated on either side of the center of the trunnions, and concentric therewith and between these sectors and the one carried by the projection are flexible connections, as wire rope, for example. These are so arranged that by moving the handle upward an upward movement of the drum is obtained, and vice versa. To prevent excessive friction between the moving and stationary parts, rollers are mounted on the frame at suitable points. The frame and the projection being secured together, (the latter forming a support for the operating-handle,) a horizontal movement of the handle in either direction will cause a similar movement of the drum. It is very desirable in projectors of this class that the operating-handle be so arranged that its movement will indicate to the operator the direction of the beam of light.

In the accompanying drawings is shown an embodiment of our invention, in which—

Figure 1 is a side elevation, partly in section. Fig. 2 is an end elevation with a part of the base in section, and Fig. 3 is a sectional detail of the sector carried by the drum.

The drum A is mounted by means of trunnions B B' in the frame C, which is provided with upwardly-extending arms C' C<sup>2</sup>. Mounted on a suitable support is a bearing D, provided with an inwardly-extending flange D'. The lower part of the frame C has a tube or cylindrical portion C<sup>3</sup>, provided at its lower end with a fork to receive the sector E, the center of which is concentric with the center of movement of the operating-handle. Surrounding the tube C<sup>3</sup> is a sleeve F, provided at its upper end with lugs F', engaging with the lower surface of the flange D' and forming half of the projector-bearing. The frame



C, extending outward, furnishes the top half of the bearing. The two halves are secured together by bolts  $a a'$ . To prevent the rotation of the tube  $C^3$  independent of the sleeve  
 5 F, a set-screw  $b$  is mounted in the sleeve F and in frictional contact with the tube  $C^3$ . Mounted on the drum A and concentric with the trunnions B B', the center of movement of the drum, are two sectors G G', having  
 10 grooves in which the wire ropes H H' are adapted to work. These sectors are shown as being mounted on opposite sides of the drum and on opposite sides of the center of movement. The sectors are so constructed that  
 15 they form the base of the trunnions, although this is not an important feature. It is desirable, however, that the surfaces over which the ropes H H' run be concentric with the center of the drum in order to maintain an  
 20 even tension on the operating-ropes H H'. The rope H is secured to the sector G by means of a screw  $c$ . The rope in passing downward runs over small grooved rollers I I' I<sup>2</sup>. These prevent undue friction between the wire rope  
 25 and the frame and at the same time furnish a bearing, so that the rope may be connected to the proper side of the sector in order that a movement of the handle may give a corresponding movement of the drum.  
 30 The rope H' is connected to the sector G', located on the opposite side of the drum A from the sector G and also on the opposite side of the center of movement. This rope runs over rollers J J' J<sup>2</sup> in a manner similar  
 35 to the rope H, and is secured to the sector E on the opposite side by suitable means, as a screw.

It will be noted that the two ends of each wire rope H H' are secured to the sectors on  
 40 the same side of a vertical plane passing through the centers of the trunnions and operating-handle, although they cross one another in so doing. This permits corresponding movements between the drum and the  
 45 operating-handle.

The sector E is provided with two lugs E' E<sup>2</sup>, in which are mounted stops K K', to limit the movement of the handle L, which is secured to the sector E by means of lugs  $e e'$   
 50 and a pin  $d$ .

In assembling the operating mechanism the ropes H H' are first secured to the sectors G G', and then brought down around the rollers I I' I<sup>2</sup> and J J' J<sup>2</sup> in such a manner that when  
 55 secured to the sector E they impart movement to the drum in the proper direction. The sector E is then inserted in the fork and the ends of the ropes H H' secured thereto, after which the sector E is pulled down and  
 60 the pin M inserted in the fork, forming a bearing for the sector. For the purpose of taking up any lost motion a turnbuckle N is put in one or both of the ropes H H'. By connecting the drum with two flexible con-  
 65 nections situated as above described a positive movement both up and down is obtained,

and by securing the connections to surfaces concentric with the centers of movement an even tension in the ropes is maintained at all times.

The lamp mechanism to be used with the projector has not been described, for it does not relate to the invention. Any style of lamp, either hand or automatic feed, may be used.

What we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a projector, the combination of a flexible connector secured to the drum for moving it upward, a second flexible connector  
 80 also secured to the drum for moving it downward, and an actuating device common to both.

2. In a projector, the combination of a plurality of sectors mounted on the drum, a sector  
 85 mounted on the horizontally-rotatable frame, and flexible connectors secured to the sectors on the drum and the sector on the frame in such manner that a movement of the horizontally-rotatable frame can be made with-  
 90 out causing a movement of the flexible connectors, and vice versa.

3. In a projector, the combination of sectors secured to the drum, a sector secured to the horizontally-rotatable frame, flexible con-  
 95 nections between the sectors on the drum and the sector on the frame, and an operating-handle for imparting movement to the drum in a horizontal and vertical plane.

4. In a projector, the combination of a flexible  
 100 connection leading from a sector on the drum to a sector mounted on the horizontally-rotatable frame, a flexible connection leading from a sector on the opposite side of the drum to the sector mounted on said frame,  
 105 and a handle for operating the projector.

5. In a projector, the combination of sectors mounted on opposite sides of the drum, a sector mounted on a horizontally-rotatable  
 110 frame, wire ropes from the sectors on the drum to the sector on the frame, rollers mounted on the frame, and a tubular portion through which the wire ropes extend.

6. In a projector, the combination of sectors secured to the drum, a sector carried by  
 115 a horizontally-rotatable frame, and flexible connections between the sectors on the drum and the sector carried by the frame, the two ends of each flexible connection being secured to the sectors on the same side of a ver-  
 120 tical line.

7. In a projector, the combination of sectors carried by the drum, a sector carried by the horizontally-rotatable frame, flexible con-  
 125 nections between the sectors on the drum and the sector on the frame arranged to cross one another, the ends of each connector being secured to the sectors on the same side of a vertical plane.

8. In a projector, the combination of a plu-  
 130 rality of sectors, flexible connection between the sectors on the drum and a sector mounted

on the base, and means for taking up the lost motion between the moving parts.

9. In a projector, a plurality of sectors carried by the drum and frame, a flexible connection between one sector on the drum and a sector on the frame, for imparting motion to the drum in an upward direction, and another flexible connection between the other sector on the drum and a sector on the frame,

for imparting movement to the drum in a downward direction.

In witness whereof we have hereunto set our hands this 31st day of March, 1896.

JOHN MACHAFFIE.

ELIE F. G. H. FAURE.

Witnesses:

B. B. HULL,

A. F. MACDONALD.