

(No Model.)

2 Sheets—Sheet 1.

W. E. LEE.  
DARK ROOM CAMERA.

No. 547,855.

Patented Oct. 15, 1895.

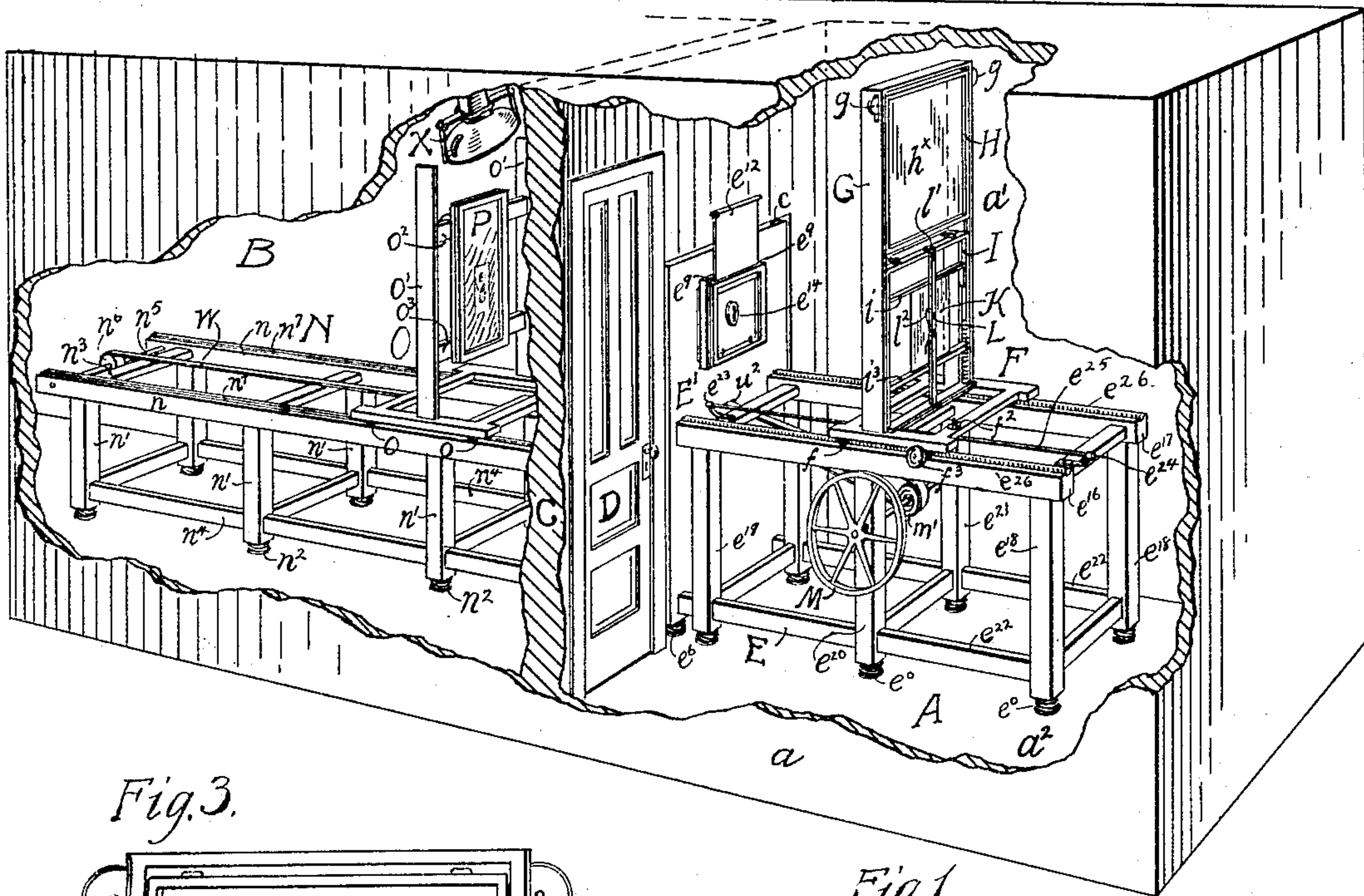


Fig. 3.

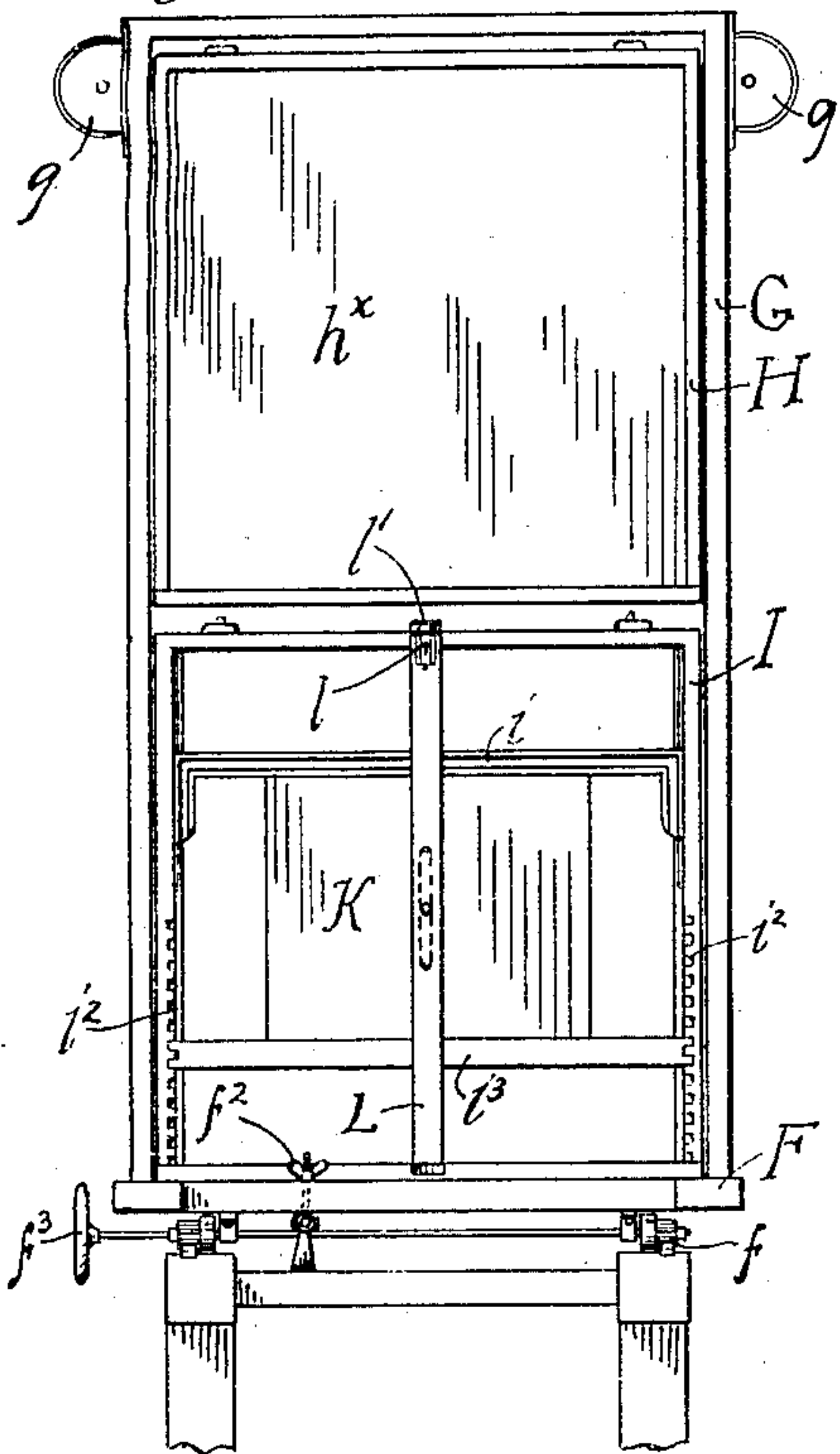
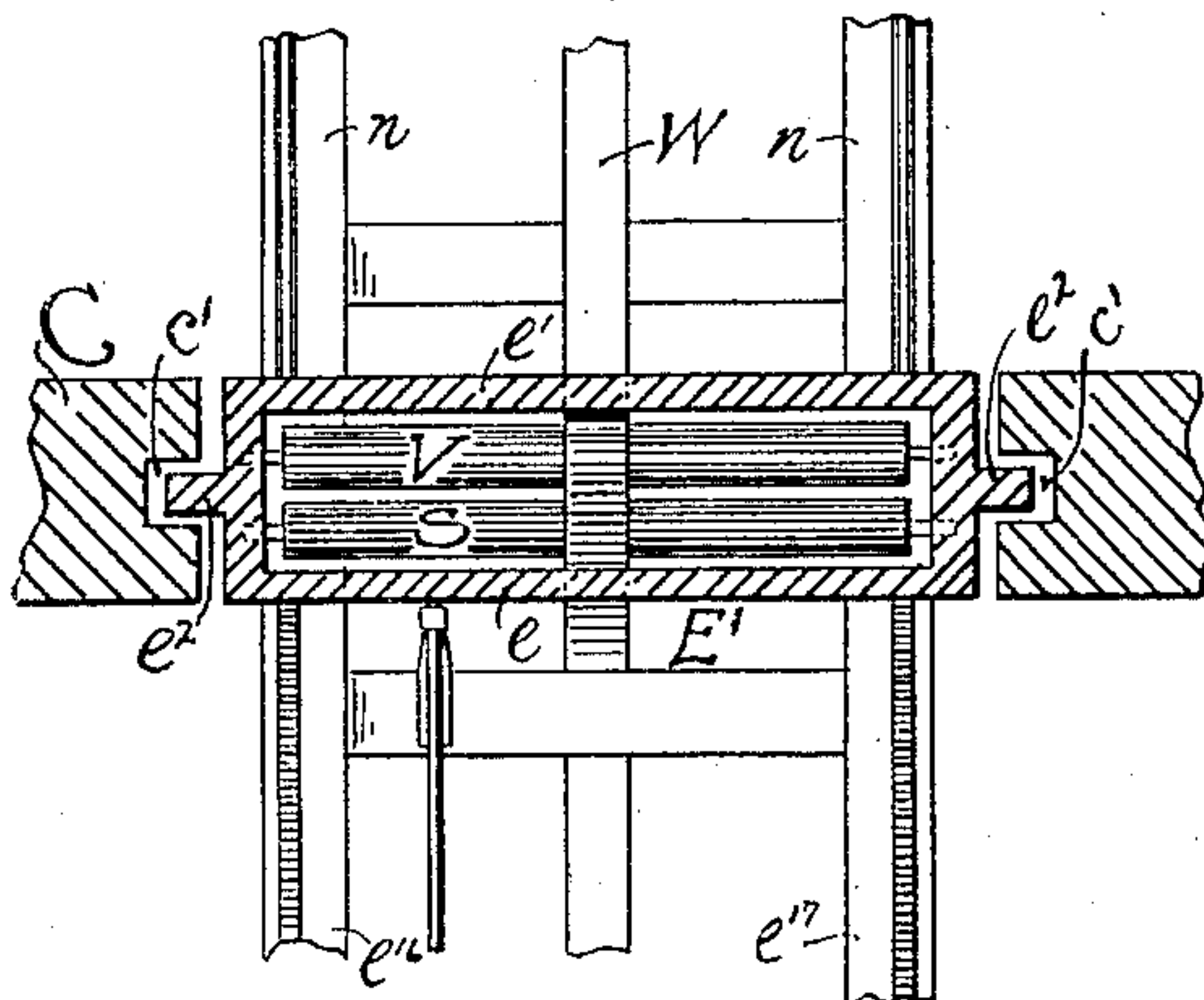


Fig. 1.

Fig. 4.



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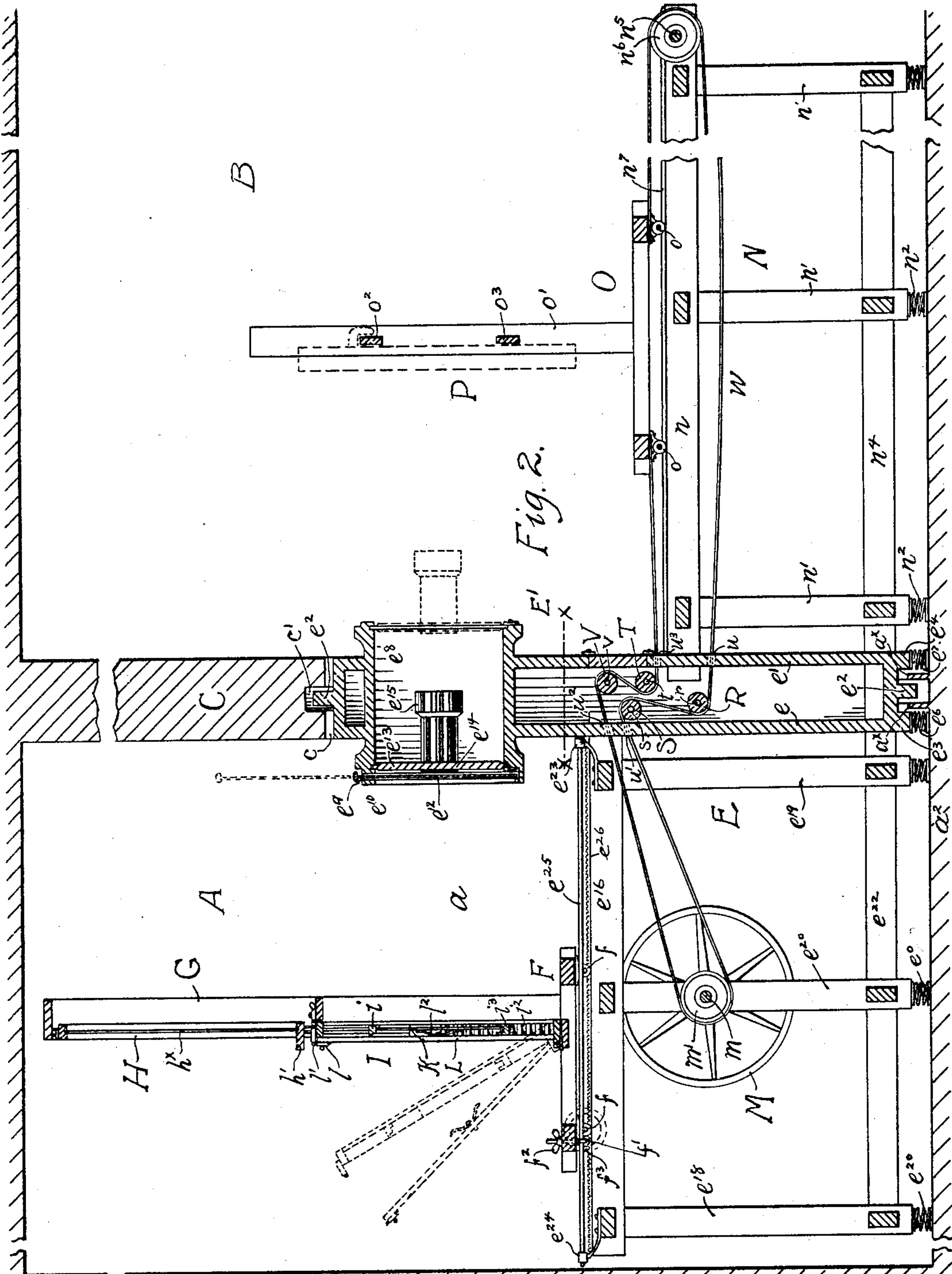
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2 Sheets—Sheet 2.

W. E. LEE.  
DARK ROOM CAMERA.

No. 547,855.

Patented Oct. 15, 1895.



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Inventor  
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# UNITED STATES PATENT OFFICE.

WILLIAM E. LEE, OF KANSAS CITY, MISSOURI, ASSIGNOR OF ONE-HALF TO  
WILLIAM L. SHEPPARD, OF SAME PLACE.

## DARK-ROOM CAMERA.

SPECIFICATION forming part of Letters Patent No. 547,855, dated October 15, 1895.

Application filed December 31, 1894. Serial No. 533,427. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM E. LEE, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented a new and useful Dark-Room Camera; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification.

The objects of my invention are, first, to enable the operator to complete the making of the negative without leaving the dark-room in photoengraving without the employment of the ordinary camera; second, to control the position of the object outside the dark-room in photographic copying from a position within the dark-chamber; third, to adjust the position of the focusing-plate; fourth, to reduce the aberrations of the object in a minimum degree and secure a clear correspondence between the external object and the object reproduced.

My invention consists in the novel construction and combination of parts such as will first be fully described, and specifically pointed out in the claims.

Referring to the drawings, Figure 1 is a view of the respective light and dark chambers for negative making with the side walls broken away, showing the interior of the separate rooms and the improved apparatus in perspective. Fig. 2 is a longitudinal vertical sectional view of the chambers and apparatus as viewed from the opposite side of the rooms in Fig. 1. Fig. 3 is a detail broken end view of the carriage, showing the camera-extension frame, the sliding focusing-window, and sensitive-plate-holding frames. Fig. 4 is a sectional view taken on the line  $xx$  of Fig. 2.

Similar letters of reference indicate corresponding parts in all the figures.

Referring to the drawings, A represents the dark-room in which the various processes employed in sensitizing and developing a plate are conducted.

B is an adjoining room in which the light is freely admitted and which is separated from the chamber A by the transverse solid partition or wall C.

D represents a door in the portion of wall C adjacent to the side wall  $a$  of the chamber A, which when opened affords a passage between the separate chambers. In the wall C, between the door D and the side wall  $a'$ , is arranged the upright portion  $E'$  of a yielding lens-supporting stand E. Said portion  $E'$  consists of a hollow case, the sides  $e e'$  of which are comparatively narrow in width and extend in an upward direction the required height to give a proper field for the object and downwardly nearly to the floor of chamber A for the purpose hereinafter described. The sides  $e e'$  of the case  $E'$  are in a vertical line with the respective outer and inner surfaces of the wall C. Attached rigidly and extending around the outer portion of the sides and end of the case E at a point equidistant from the lines of the sides  $e e'$  is a narrow strip  $e^2$ . On the lower end of the case  $E'$ , in line with the outer surfaces of the respective sides  $e e'$  and on each side of the strip  $e^2$ , are attached the strips  $e^3 e^4$ . Beneath the strips  $e^3 e^4$  and at one end of case  $E'$  are spiral springs  $e^6 e^7$ . At the other end of the case  $e'$  and beneath the strips  $e^3 e^4$  are arranged springs which are similar to the springs  $e^6 e^7$ . In the inner surface of the top and respective sides of the opening  $c$  and at a point equidistant from the inner and outer surfaces of the wall C is a groove or depression  $C'$ , which receives the strip  $e^2$ , so as to permit a free movement of the case and at the same time exclude the light. In the upper portion of case  $E'$  and extending through each portion  $e e'$  is a rectangular-shaped opening  $e^8$ , the sides of which extend a short distance outwardly from the outer side of case  $E'$  in one direction and the corresponding distance from the side  $e$  in the other direction. The opposite sides of the extended portions of the sides of opening  $e^8$ , which are within the chamber A, are grooved, as at  $e^9 e^9$ . In the upper portion of said extended portion is a slide-opening  $e^{10}$ , in which and grooves  $e^9 e^9$  is a darkening-slide  $e^{12}$ . In the same extended portion of the sides  $e^8$  and in rear of the grooves holding the slide  $e^{12}$  is a slide  $e^{13}$ , in which is an opening  $e^{14}$ , in which is fitted an end of the ordinary photographic-lens cylinder  $e^{15}$ . In



the extended end portion of the sides of the opening in the direction of the chamber B are grooves for the reception of the slide  $e^{13}$ , in like manner as described on the portion in the chamber A.

Attached rigidly to the floor  $a^2$  of chamber A and extending upwardly on each side of the strip  $e^2$  are guides  $a^x a^x$ , which extend parallel with the said strip and retain the lower end of the case  $E'$  in position upon the spring. The other portion of the lens-supporting stand E in the chamber A consists of the horizontally-extended bars  $e^{16} e^{17}$ , which are connected with the side  $e$  of case  $E'$  at a point about one-half the described distance upwardly from the floor  $a^2$ , and extend rearwardly a considerable distance. These bars  $e^{16} e^{17}$  are supported at the rear end by the standards  $e^{18} e^{18}$ .

Near the case  $E'$ , and connected with the bars  $e^{16} e^{17}$ , are the supporting-standards  $e^{19} e^{19}$ . At a point on the bars  $e^{16} e^{17}$  equidistant from the standards  $e^{18} e^{18} e^{19} e^{19}$  are attached standards  $e^{20} e^{21}$ , all of which standards extend to within a short distance of the floor  $a^2$  of the chamber A, and beneath each standard is placed a spiral spring of the same description and in the same manner as beneath the case  $E'$ . Beneath the respective bars  $e^{16} e^{17}$  are the bars  $e^{22} e^{22}$ , which are connected with each of the standards and the case  $E'$  in the same manner as the bars  $e^{16} e^{17}$ . Upon the upper side of the bar  $e^{17}$  and extending from the case  $E'$  to the end of the said bar is a guide-rod  $e^{25}$ , which is supported at each end in the upwardly-extended lugs  $e^{23} e^{24}$ . Upon the upper side of the other bar is a guide rod, which is attached to the said bar in precisely the same manner as the rod  $e^{25}$ . Upon the track-rails  $e^{26} e^{26}$  is mounted an adjustable sliding carriage F, which consists of a rectangular-shaped frame. Upon the under side portion and at one end of the frame F are the rollers  $f f$ , which rollers travel on a track-rail on the upper side of the bar  $e^{16}$  on the inner side of the rod  $e^{25}$ . Upon the other side of the frame F are rollers which travel on the track-rail on the upper side of the bar  $e^{17}$ . On the rod  $e^{25}$  is a sliding eyebolt  $f'$ , the screw-threaded end of which extends through an opening in the side of the frame F, and is provided with a thumb-screw  $f^2$ . The journal of one of the rollers  $f$  beneath frame F is extended a short distance and provided with a hand-wheel  $f^3$ . Upon the upper side of the carriage F is mounted a frame G, which extends in an upward direction from the sides of frame F nearly to the ceiling of the chamber A. Within the frame G is fitted a focusing-frame H, which is usually provided with a ground glass  $h^x$ . In the upper part of the frame G are spring sash-balances  $g g$  of the usual construction, the recoiling-spring actuating the chain attached to the frame G, so as to retain the said frame in an elevated po-

sition. Upon the lower rail of the frame H is a lateral extension  $h'$ .

The plate-holder for the sensitive plate consists of a frame I, which is hinged at its lower end to the upper side of the sliding carriage F and between the sides of the frame G. Said frame I extends in an upward direction to a point a slight distance beneath the extension  $h'$  on the lower rail of the frame H when in a vertical position. The frame I' is provided with a slide  $i$ , which is retained by spring-pressure on its sides which come into contact with the inner sides of the frame I'. On the inner surface of the vertical portions of the frame I' is a rack  $i^2$  and on the other side is a similar rack  $i^2$ , which supports a movable grooved bar  $i^3$ . The under portion of the slide  $i$  is also grooved, and in the grooves of the said slide and bar is placed the sensitive plate K. To prevent any movement of the sensitive plate a bar L is hinged at its lower end to the lower rail of the frame I and in rear of the sensitive plate K.

The upper end of bar L is provided with a spring-bolt  $l$ , which engages with a keeper  $l'$  extending from the upper rail of the frame I. On the inner side of the bar L is a curved spring  $l^2$ , which bears against the sensitive plate K.

Through the standard  $e^{20}$ , a short distance beneath the bar  $e^{16}$ , extends a shaft  $m$ . On the end of shaft  $m$ , which extends outwardly from the bar, is mounted rigidly a hand-wheel M, and on the other end of the shaft, on the inner side of the standard, is mounted a band-pulley  $m'$ , for the purpose hereinafter described. In the chamber B, on the other side of the lens-stand, is a frame N, which consists of horizontal bars  $n n$ , supported upon up-rights or standards  $n'$  placed at proper distances apart. These standards are supported upon springs  $n^2$  of the same description as the springs  $e^6 e^7$ . The height of the standards  $n$  is less than that of the lens-stand  $E'$ , so that the position of the bars  $n n$  is a considerable distance below the horizontal lens-stand. The ends of the bars  $n n$ , extending toward the case  $E'$  of the lens-supporting stand, are attached rigidly thereto and extend rearwardly the requisite distance, the rear ends being connected by a transverse bar  $n^3$ . The connecting-bars  $n^4 n^4$  in the frame N are connected with the case  $E'$  and also extend to and are connected with the bars  $e^{22} e^{22}$  of the lens-supporting stand, thus making a rigid connection when employed with the lens-supporting stand. Upon the extreme outer ends of the bars  $n n$ , and near the connecting bar  $n^3$  is journaled a transverse shaft  $n^5$ , upon which is a band-pulley  $n^6$ . Upon the upper surface of each of the bars  $n n$  is a track-rail  $n^7$ . Upon track-rails  $n^7 n^7$  is a sliding carriage O, which is provided with grooved wheels  $o$ . On the opposite sides of the carriage O are fixed standards  $o' o'$ , which extend upwardly



a considerable distance and are provided with cross-bars  $o^2 o^3$ . To the upper cross-bar  $o^2$  is hung the object-frame P, to which the object to be reproduced is attached.

5 Within the case E' of the lens-supporting stand and journaled in the ends of said case between the sides  $e e'$  and at a point below a line horizontal with the under portion of the bars  $n n$  of the frame N is a shaft  $r$ , upon  
10 which is a belt-pulley R. Directly above the shaft R and journaled in the ends of the case E' in a line horizontal with the under side of the bar  $e^{16} e^{17}$  is a shaft  $s$ , upon which is a pulley S. Above the line of shaft  $s$  and in a di-  
15 rection toward the side  $o'$  of the said case and journaled in the ends thereof is a shaft  $t$ , upon which is a band-pulley T. Beneath the shaft  $t$  and above the line of the horizontal upper portion of the bars  $n n$  of the frame N and  
20 journaled on the ends of case E' is a shaft  $v$ , upon which is a band-pulley V.

To the rear end of carriage O is attached one end of a band W, the other end of which band is extended over pulley  $n^6$  beneath the  
25 line of the bars  $n n$  and through an opening  $u$  in the case E', thence over the pulley R and upwardly over pulley S, thence through an opening  $u'$  in the side  $e$  of case E', thence to and over the band-pulley  $m'$  on shaft  $m$ ,  
30 thence toward the case E' and through an opening  $u^2$  in the case E', thence to and over the pulley V, thence in a downward direction over pulley T and through an opening  $u^3$  in the side  $e'$  of the case E' and attached to the  
35 forward end of the carriage O, the pulleys T, R, V, and S being arranged in an alternate position in vertical series, so as to prevent the rays of light which would enter the open-  
40 ings  $u$  and  $u^3$  in the side of the case E' from gaining entrance to the dark-room through the openings  $u' u^2$ , which are above the lines of the openings  $u u^3$ .

In the preparation of the sensitive plate in photographic processes the sensitizing of the  
45 plate is performed within the dark-room A, the slide  $e^{12}$  being lowered in position so as to cover the opening to the lens  $e^{15}$ . The object to be reproduced is placed in the frame P in the sliding frame O in the light-chamber B.  
50 The operator is within the dark-room A, the door D being closed. The sensitive plate-holder frame I is then placed in a horizontal position upon carriage F and the focusing-frame H drawn downwardly in position opposite the  
55 lens  $e^{15}$ . The slide  $e^{12}$  covering the lens is then raised in position, and the object reversed in frame P is seen upon the ground glass in frame H. Without the necessity of leaving the dark-room, the operator then proceeds to  
60 diminish or enlarge the image thrown upon the glass in frame H in proportion to the required size of the picture. This is accomplished by operating the wheel M, which moves the band W, connected with the sliding  
65 frame O on the frame N, and the position of the carriage is at once changed on the track

$n^7$ , so as to cause the object to be reproduced to be at a greater distance from or nearer to the lens. The proper focus being obtained, the frame H is again raised in position and  
70 the sensitive-plate holder also raised in position and held by button cross-rail above of the frame H from backward movement. The slide  $o^{12}$  is then lowered so as to cover the opening to the lens. The sensitive plate is  
75 placed immediately in the grooves in the respective slides  $i i^3$  of the frame I and the bar K raised in position, which brings the springs  $l^2$  against the back of the sensitive plate and the upper end of the bars secured by the  
80 spring-bolt and its keeper. The slide  $e^2$  is then raised to expose the sensitive plate and the copy obtained. In the adjustment of the carriage F its position is determined by the size of the image obtained and the movement  
85 of the carriage is caused by turning the wheel  $f^3$ , which moves the cog-wheels on the tracks in the direction of the movement of the hand-wheel, so that a large reproduction may be obtained in proportion as the sliding carriage  
90 is removed distant from the lens. It will be observed that the dark-chamber A with the lens and the sensitive-plate holder constitute the camera, and in which all of the necessary operations from sensitizing to developing the  
95 plate and finishing the picture are performed, and all of the advantages for the proper focusing of the object obtained within the chamber. In my apparatus for outdoor photography the chamber A may be mounted upon  
100 wheels and the best results obtained in enlargement of the objects. For the purpose of enlarging the size of the image on the frame P, the lens is placed in the dotted position, as seen in Fig. 2, nearer the object on the frame P.  
105

In indoor photography the aberrations of light are caused frequently by the vibrations of the walls and floors of a building, caused by jars from the motion of machinery, &c.  
110 In my improved apparatus all effects due to the vibrations are checked by the springs  $e' e^7 e^9 n^2$  beneath the respective stands and frames, so that the movements of the frames and stand will be prevented. The usual light admitted to the room B through the window  
115 may be excluded and an electric light X employed, if preferred, the latter affording a certain intensity which may be made constant.

The various photographic printing methods have been in enlarging from the negative.  
120 Therefore the light passing through the negative and the rear end of the lens the image is thrown on the sensitive paper within the dark-chamber.

In my invention I copy direct from the ob-  
125 ject and make the negative, thus saving much time and labor for the operator.

Having fully described my invention, what I now claim as new, and desire to secure by Letters Patent, is—

1. In a dark room camera a dark room hav-  
130 ing an opening into its wall and a lens in said



opening a sliding carriage in said dark room having an upwardly extended frame, and a suspension balance in said frame, movable frames in said upwardly extended frame containing the respective focusing and sensitive plates, one of said frames being connected with said suspension balance and the other frame hinged to said carriage and adapted to extend between the sides of said upwardly extended frame when elevated in position, and directly beneath said suspended frame as and for the purpose described.

2. In a dark room camera a dark chamber having an opening in its wall and a stand for the lens in said opening and springs for preventing vibrations between the said walls and stand as described.

3. In a dark room camera a chamber having an opening in its wall and grooved sides to said opening and a lens supporting stand having a yielding support and strips upon the said stand extending within the grooves in said wall substantially as and for the purpose described.

4. In a dark room camera a dark chamber having an opening in its walls and a lens supporting stand in said opening having yielding supports, said stand having a transverse opening and outwardly and oppositely extended grooved sides to said opening, a slide in the grooves of one of said extended sides and a lens in said slide and a darkening slide in the other extended side substantially as and for the purpose described.

5. In a dark room camera a chamber having an opening in its wall and a lens supporting stand within said chamber having a transverse opening and sides to said opening having outwardly extended grooved portions, a slide in said grooves having an opening for

the lens and a lens in said opening and a yielding support for said stand substantially as and for the purpose set forth.

6. In a dark room camera a dark room having an opening in its wall and a lens supporting case in said opening, said case having openings in its sides at different heights, a chamber in which light is freely admitted and an object support in said chamber, and a sensitive plate holder in the dark room and a band connected with and operating said object support and said sensitive plate holder and extending through the openings in the sides of said case and rollers within said case for said band arranged in alternate positions in vertical series substantially as shown and described.

7. In a dark room camera a dark chamber having an opening in its wall and a lens supporting stand within said opening, said stand having a transverse opening and outwardly and oppositely extended grooved sides to said opening a movable object supporting stand outside of said chamber opposite said lens supporting stand and a movable stand within said dark chamber having separate focusing and sensitive plate holders means for guiding the sensitive plate holder in the position occupied by the focusing plate holder, a slide in the side of said opening in said lens supporting stand without the dark chamber and a lens in said slide extending in the direction of the object and a darkening slide in the extended grooved side within said dark chamber substantially as and for the purpose described.

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