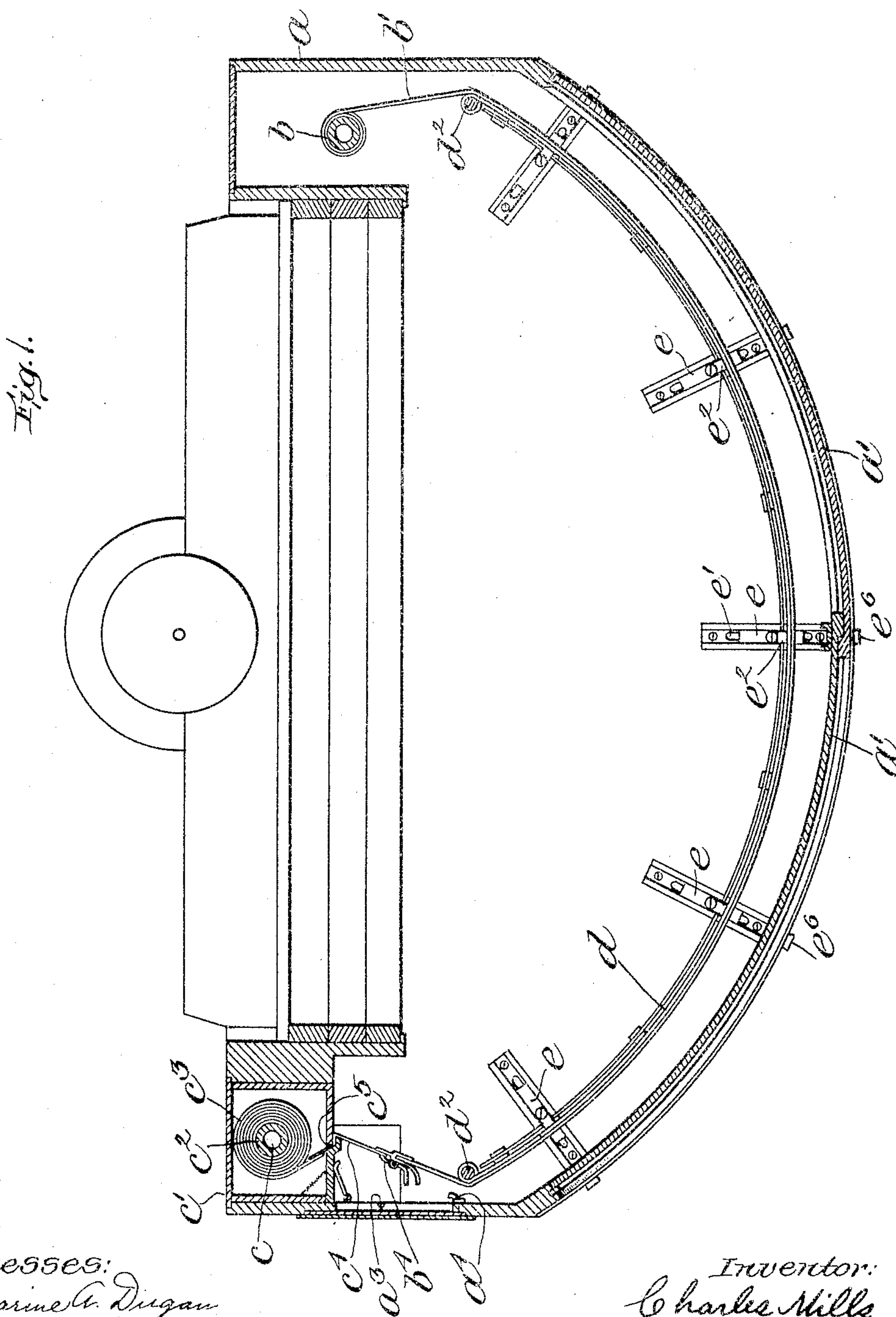


C. MILLS.

PANORAMIC CAMERA.

APPLIOATION FILED APR. 2, 1904.

4 SHEETS--SHEET 1.



Witnesses:
Katharine G. Dugan
Ira L. Fish

Inventor:
Charles Mills
by Geo. N. Fiddard
Attorney.

C. MILLS.
PANORAMIC CAMERA.
APPLICATION FILED APR. 2, 1904.

4 SHEETS—SHEET 2.

Fig. 2.

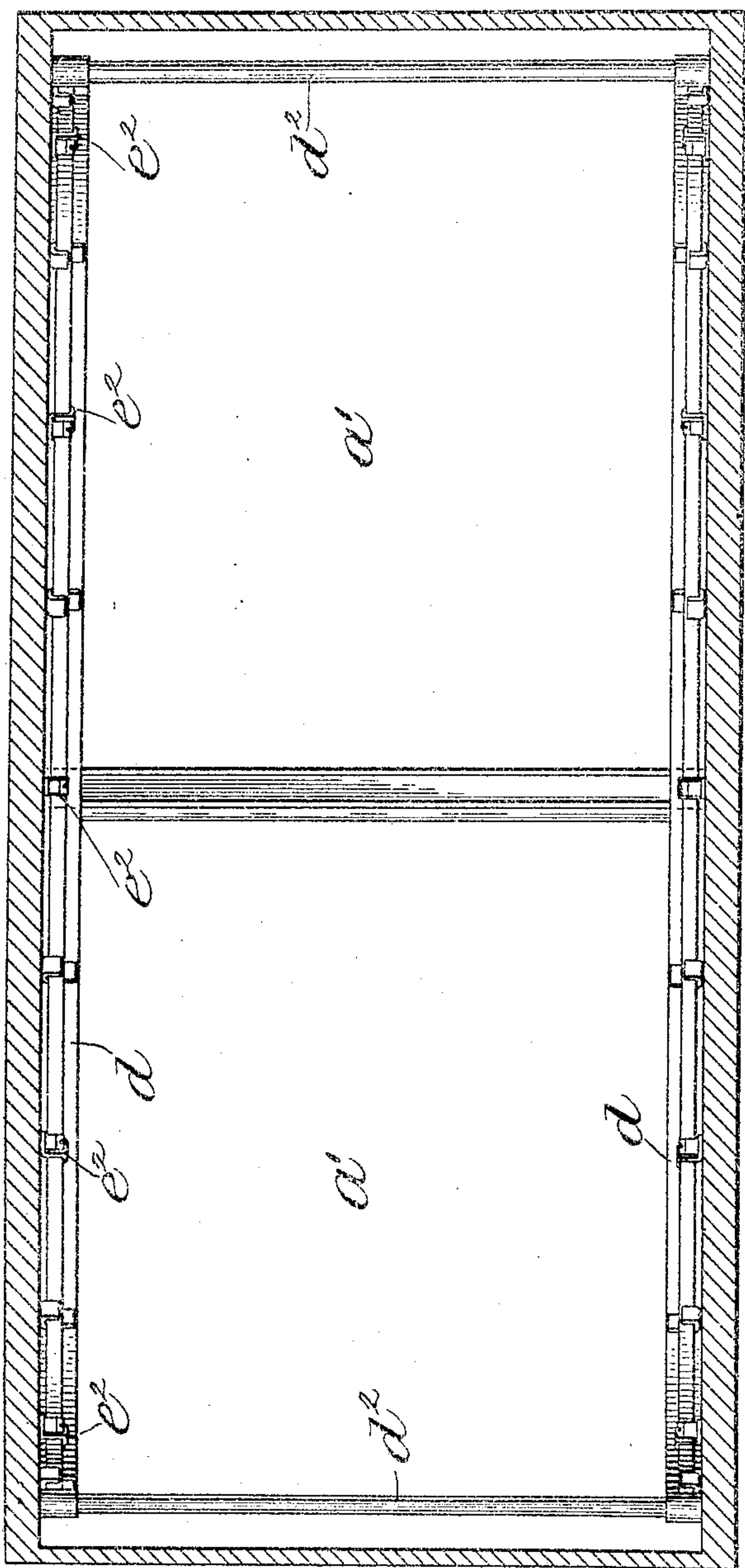


Fig. 4.

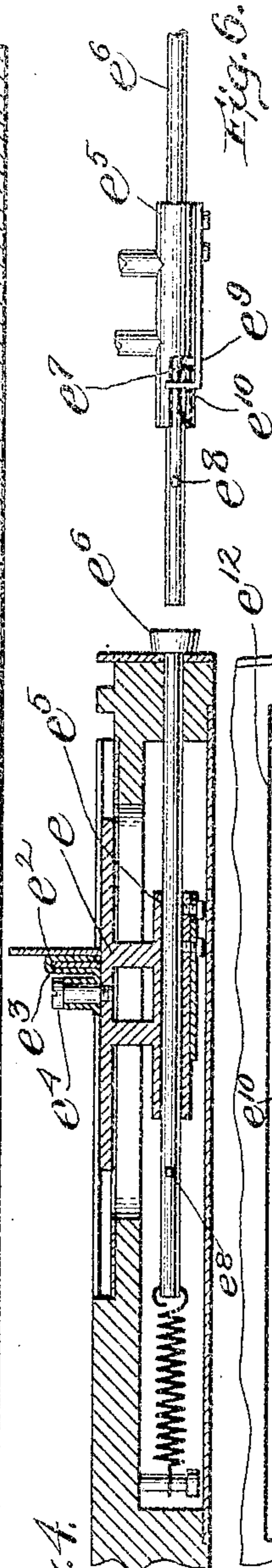
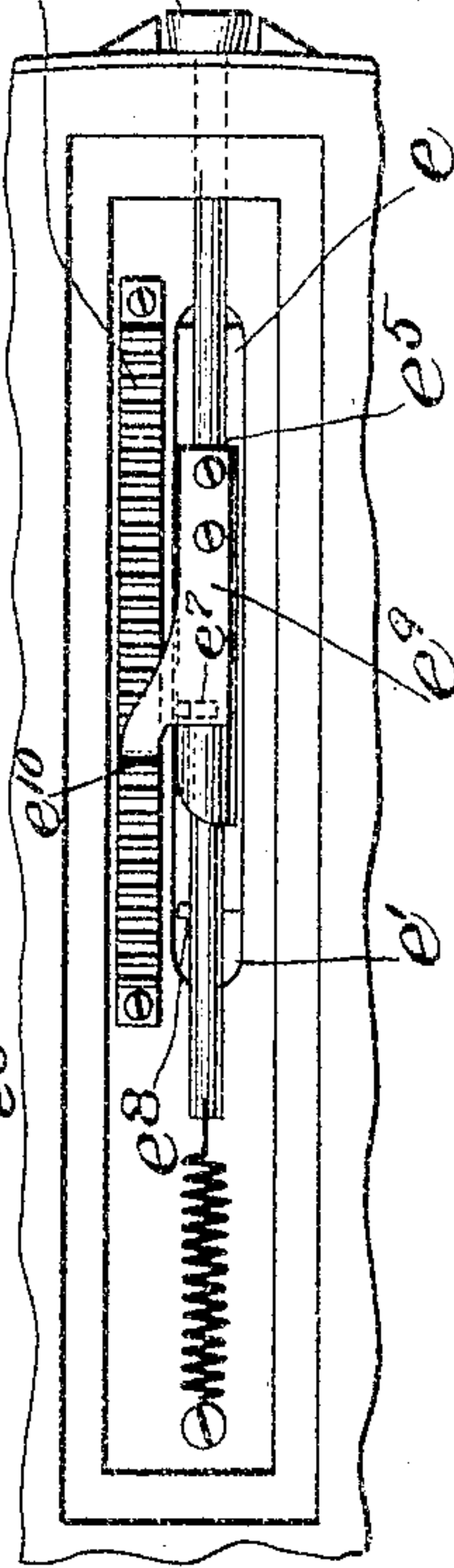


Fig. 6.

Fig. 5.



Witnesses:
Katherine A. Dugan
Lou L. Fish

Inventor:
Charles Mills
by Geo. N. Goddard
Attorney.

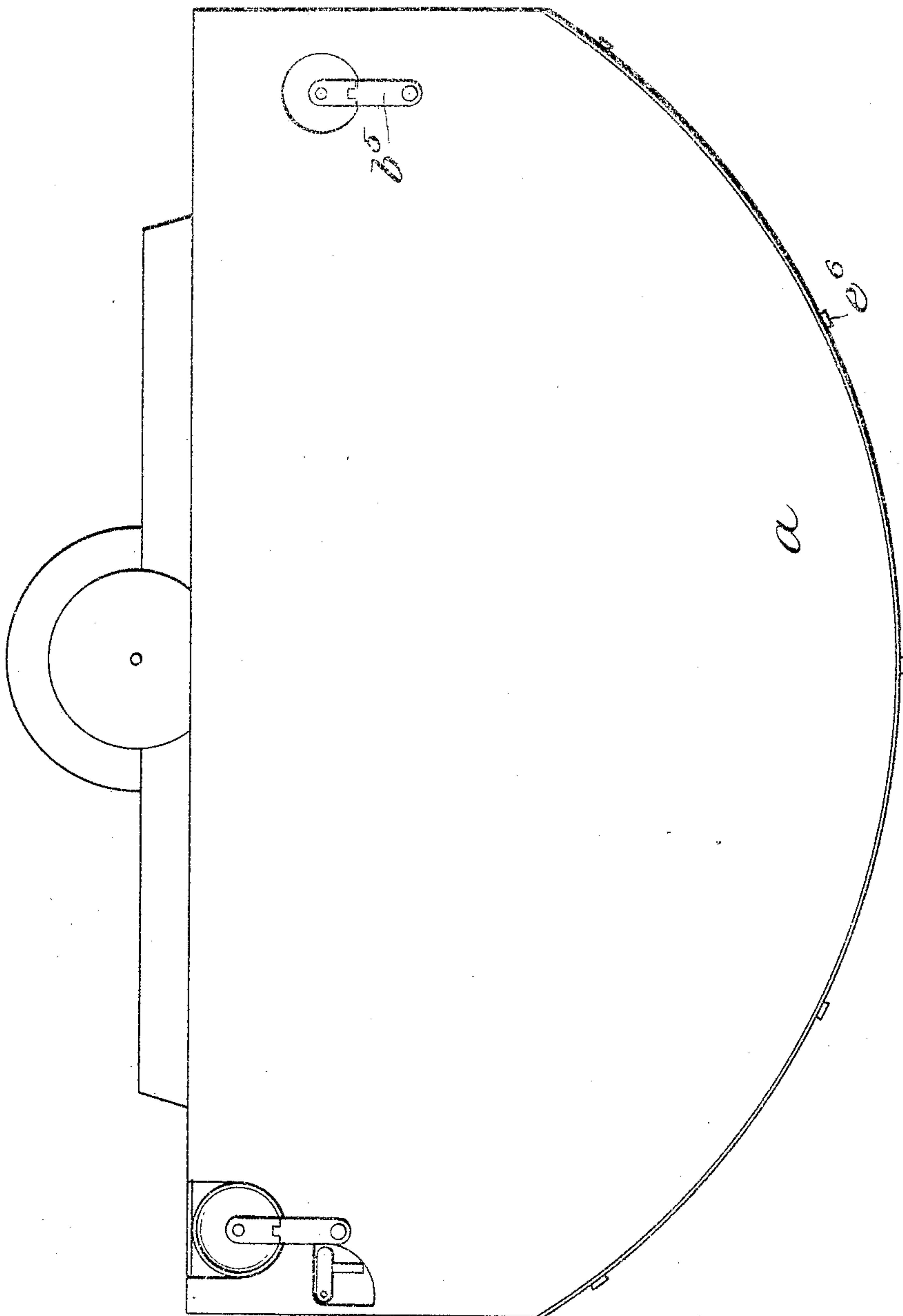
No. 779,956.

PATENTED JAN. 10, 1905.

C. MILLS.
PANORAMIC CAMERA.
APPLICATION FILED APR. 2, 1904.

4 SHEETS—SHEET 3.

Fig. 3.



Witnesses:

Nathaniel A. Dugan
John L. Fisher

Inventor:
Charles Mills
by Geo. N. Goddard
Attorney.

C. MILLS.
PANORAMIC CAMERA.
APPLICATION FILED APR. 2, 1904.

4 SHEETS—SHEET 4.

Fig. 7.

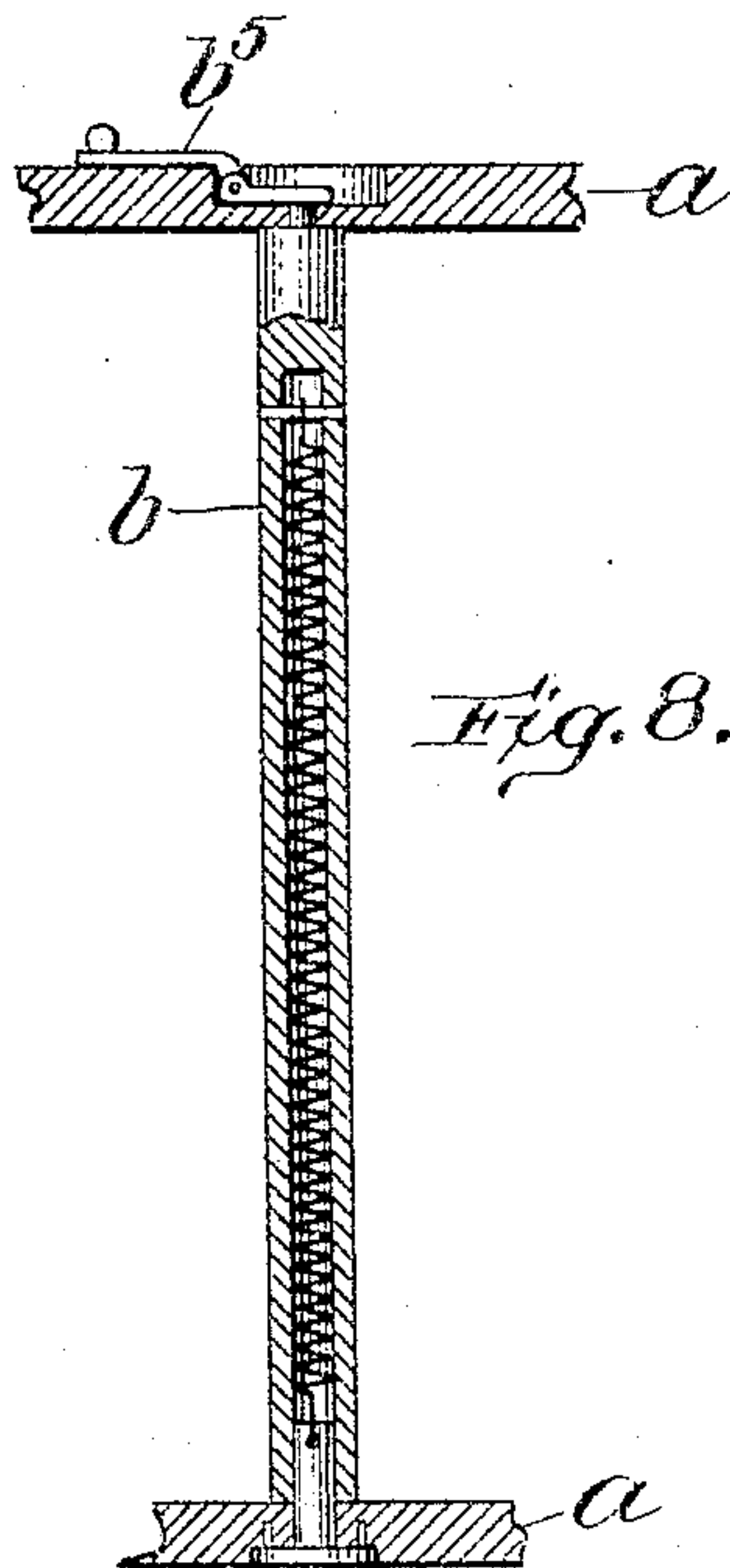
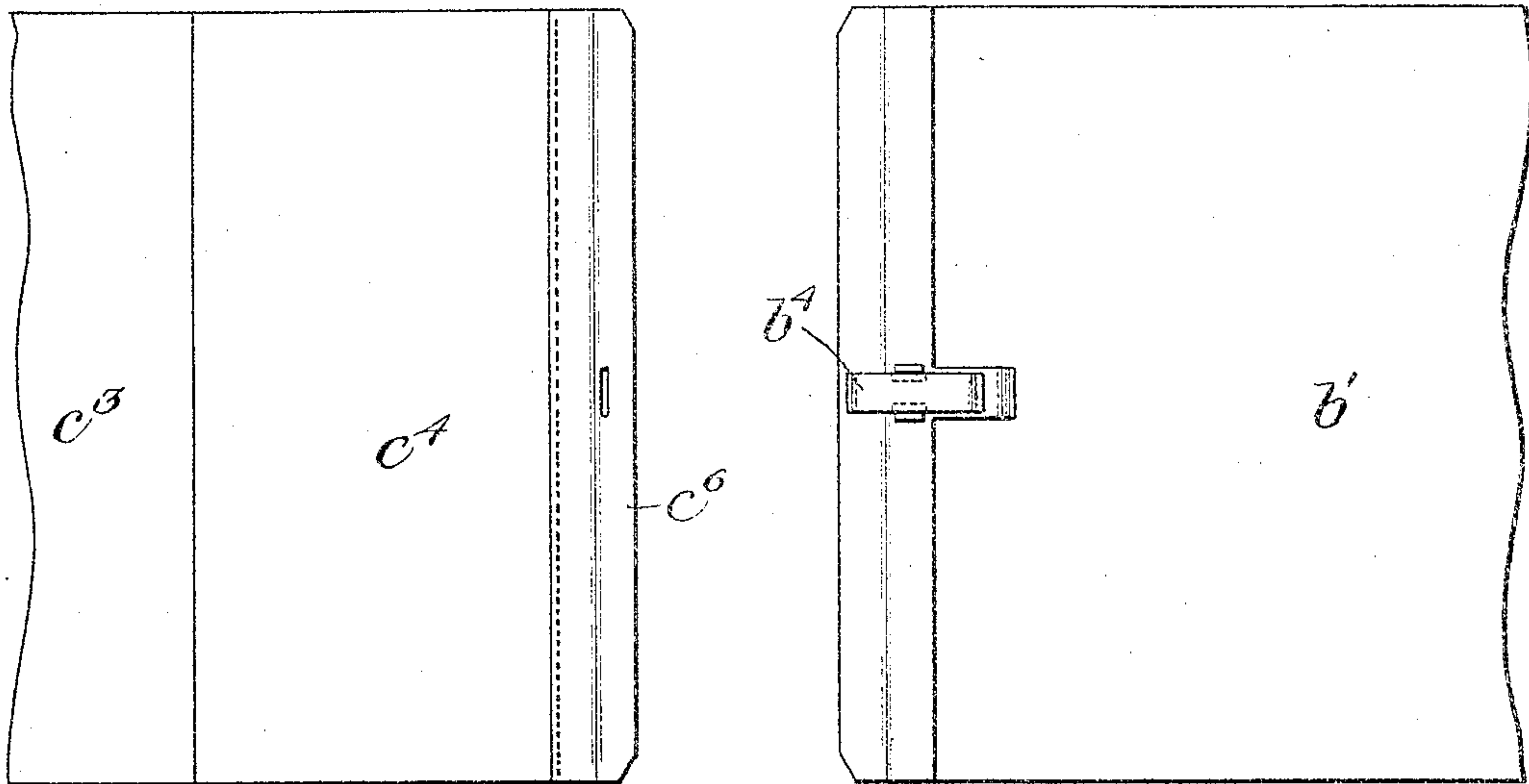


Fig. 8.

Witnesses:
Katharine A. Dugan
Ira L. Fish

Inventor:
Charles Mills
by Geo. N. Goddard
Attorney.

UNITED STATES PATENT OFFICE.

CHARLES MILLS, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO ELMER CHICKERING, OF BOSTON, MASSACHUSETTS.

PANORAMIC CAMERA.

SPECIFICATION forming part of Letters Patent No. 779,956, dated January 10, 1905.

Application filed April 2, 1904. Serial No. 201,237.

To all whom it may concern:

Be it known that I, CHARLES MILLS, a British subject, and a resident of Boston, county of Suffolk, Massachusetts, have invented certain
5 new and useful Improvements in Panoramic Cameras, of which the following is a specification.

This invention relates to cameras, and is in the nature of an improvement upon the in-
10 vention in cameras patented to me by Letters Patent of the United States, No. 744,928, dated November 24, 1903.

The present invention is intended to provide improved means for securing a convenient and rapid adjustment in order to vary the
15 focal distance of various parts of the focusing-screen back or of the film.

The present improvements dispense with any necessity for the operator to insert his
20 hands into the interior of the casing or chamber to adjust the focusing-screen or the film or to bring the film into position after the guides constituting the adjusting-frame have been properly adjusted by the aid of the focusing-
25 screen and after the focusing-screen has been removed.

These and other features constituting my invention will be particularly described in this specification and will be precisely defined in
30 the claims forming part hereof.

In the accompanying drawings I have shown one mode of embodying the principles of the present invention; but it will be understood that the details of the mechanism may be
35 varied without departing from the spirit of the invention.

Figure 1 of the drawings is a horizontal section taken through the middle plane of the camera and showing the lower adjustable
40 guide and the adjustable holders or carriers thereof. Fig. 2 is a vertical longitudinal section showing the guide-frames in the interior of the camera, the casing being in section. Fig. 3 is a plan view of the casing,
45 showing the ends of the spring-rollers upon which the film and the focusing-screen, respectively, are wound. Fig. 4 is a vertical central section through one of the adjustable slides or holders which carry the flexible

guide-pieces. Fig. 5 is a bottom plan view
50 thereof. Fig. 6 is a detail side elevation of one of these holders. Fig. 7 is an elevation showing how the end of the film is secured to the focusing-screen so that the film may be brought into position for exposure through
55 the lens. Fig. 8 is a detail view of one of the spring-rollers upon which the film and the focusing-screen, respectively, are wound.

The casing *a* is open at its rear side, said opening being closed by two sliding doors *a'*,
60 so as to give free vision and access to the interior. At one end of the camera is mounted a vertical spring-actuated roller *b*, upon which the focusing-screen *b'* is rolled up. In a corresponding position at the other end of the
65 camera is placed a roll-holder *c* of any suitable construction, which embraces a light-tight casing *c'* and a spring-roller *c''*, on which is wound the film *c'''*, the outer end of the film being provided with a flap *c''''*, having a metallic lip or straight edge *c'''''*. The flap projects through the vertical aperture or slot *c''''''*,
70 through which the film is drawn for exposure. In constructing the flexible frame for positioning or guiding the film in this case I may
75 omit the intermediate horizontal strips shown in my earlier patent and use simply top and bottom flexible guide-strips *d*, which are preferably made of flexible bands or ribbons of spring metal. These flexible guides *d* are
80 held in place by a series of holders constructed to be operated from the outside of the camera, said holders in this instance being shown as having a radial arrangement around
85 the rear of the camera.

Enlarged detail views of the form of holders herein described will be found in Figs. 4, 5, and 6. As there shown, each holder comprises a sliding member *e*, working in a slotted guideway *e'* and having pivotally secured
90 to its inside face, so as to project above the floor or below the top of the camera, as the case may be, a clip *e''*, formed with a vertical slot *e'''* and pivotally held to the slide *e* by means of a fastening-screw *e''''* or the like.
95 The slide *e* is also provided with a longitudinal bore or bearing portion *e'''''*, through which passes a spring-actuated plunger-rod *e''''''*. The

tension of the spring tends to keep the plunger-rod e^6 normally at its inmost position. The part e^5 of the sliding bracket e is provided with an open bayonet-slot. (Best shown at e^7 in Fig. 6.) The plunger-rod e^6 is provided with a projecting pin e^8 , arranged so that it may enter said slot and be locked in the transverse or bottom portion of the slot by a slight rotary movement. In other words, between the plunger e^6 and the sliding bracket e there is formed a simple bayonet-joint to provide a detachable engagement between the two. To the under side of the bracket e is secured a spring clip or detent e^9 , which has an upturned lip e^{10} , adapted to engage a rack-bar e^{12} . It will be noticed that when the projecting pin e^7 of the bayonet-joint is in locking engagement with the transverse slot of the bayonet-joint the longitudinal movement of the rod will be communicated to the slide e . However, the slide itself will be locked against longitudinal movement so long as the spring-clip e^{10} engages the rack-bar e^{12} . In order, then, to adjust the slide longitudinally, it is necessary to turn the plunger e^6 until the projecting pin e^7 depresses the spring-clip e^9 so that its projecting clip e^{10} is released from engagement with the rack-bar e^{12} . Obviously as soon as the spring-clip is released from the rack-bar the plunger-rod can then be slid backward and forward to give the proper longitudinal adjustment to the sliding bracket or holder e . The details of construction may be greatly varied so long as provision is made for longitudinally adjusting the sliding holder without admitting light to the interior of the camera, provision being also made for locking or securing the holder in its various positions of adjustment. Any desired number of these adjustable holders may be provided for giving independent adjustment to various parts of the guide-strips d . The two guide-strips are preferably connected at their ends by vertical rods d^2 , which form guiding support for securing the travel of the end of the film and the end of the focusing-screen, respectively, back of the adjustable guide-frames. In my aforesaid patent the adjustable frame was first focused and then the film was laid by the hands of the operator on the inside of the guides, the ends of the film being secured and the middle portions being pressed back against the concave side of the frame. In this case, however, both the film and the focusing-screen are positioned behind or outside of the adjustable guide-frame instead of inside or in front of it, and they are held snugly against the convex faces of the guide-frame by the tension of the rollers.

The operation of the device is substantially as follows: When preparation is being made for making a panoramic picture, the light-tight roll-holder c is inserted in the recess formed to receive it. The focusing-screen b'

is then drawn back of the adjustable frames d , its front end being provided with a spring-clip b^1 , which is locked into the projecting straight edge c^6 of the flap of the film. This manipulation can be accomplished through the opening at the rear of the camera normally closed by the doors a' or through an opening normally closed by a small hand-door a^3 . By adjustment of the various sliding brackets or holders e the various parts of the focusing-screen may be brought into different focal distances relative to the lens. As soon as this is done the focusing-screen is then drawn back on its roller by winding the roller, which is accomplished by an external handle, (shown at b^5), and as the flap of the film is connected to the last end of the focusing-screen it will necessarily be drawn out from the roll-holder and pass behind the adjustable frames, so as to occupy precisely the position that the focusing-screen previously occupied. When this is done, everything is in readiness for the snapping of the shutter to make the exposure. After the exposure the film is rolled up on its roller inside of the roll-holder, the door a^3 is opened, the end of the film is unhooked or disconnected from the screen, and may be caught upon a hook a^4 , conveniently arranged to hold it. The roll-holder carrying the exposed film may then be removed to be replaced by another roll-holder carrying a similar film.

By the above-described construction and arrangement I can very quickly and easily bring the film into the position occupied by the focusing-screen while getting the focal adjustment. Furthermore, in case I should suddenly desire to change the focal distance after the film is brought into its position for exposure I can instantly make this adjustment without removing the film or without exposing it to light. The individual sliding brackets or holders may be marked with focus-scales to serve as a guide for making such quick adjustment without the aid of the focusing-screen. The tension of the rollers at the two ends of the film tends to draw the film smoothly and snugly over the outside of the adjustable frames, so that no buckling or wrinkling is possible. I am therefore enabled to secure the undulatory arrangement of film which it is the object of my patented invention to secure; but in this case this result is obtained in a more rapid and convenient manner.

Without attempting to set forth all the changes in form, construction, and arrangement that may be made in the practice of my invention or all the uses to which it may be applied, what I claim is—

1. A camera embracing in its construction, the adjustable guide-strips for positioning the film, a series of sliding brackets arranged to engage said guides at intervals, and means for

adjustably securing the respective brackets in various positions of adjustment, substantially as described.

2. A camera embracing in its construction, the interior adjustable guide-pieces for positioning the film, devices for holding different portions of said guide-strips in various positions of adjustment, and means operated from the outside of the camera for controlling the adjustment of said devices, substantially as described.

3. A camera embracing in its construction, the internal adjustable guides for positioning the strip, a series of radially-arranged sliding brackets provided with means for engaging the guide-strips, each bracket being provided with a sliding plunger accessible from the outside of the casing to control the position of the bracket, substantially as described.

4. In a camera the combination of a series of sliding brackets provided with pivoted clips, a flexible guide-strip seated in the pivoted clips of said brackets, each bracket being provided with means for securing it in different positions of adjustment in order to give the guide-strip an undulatory form or position with respect to the lens, substantially as described.

5. In a camera the combination of the flexible guide-strip for positioning the film, a series of sliding brackets provided with means for engaging said guide-strip, a series of sliding plungers having detachable engagement with said sliding brackets respectively, said brackets being provided also with detents for locking them in different positions of adjustment, substantially as described.

6. A camera embracing in combination, an adjustable guide-frame for positioning the film and the focusing-screen, and tension-rollers arranged to permit the film to be turned around the outside of said guide-frame and to hold the film snugly against the outside of said guide-frame in its various positions of adjustment, substantially as described.

7. A camera embracing in its construction, a receptacle for a light-tight roll-holder formed at one end of the camera, a tension-roller

formed at the other end of the camera, a flexible focusing-screen secured to and wound upon said roller, an adjustable concavo-convex guide-frame constructed and arranged to permit the screen to be drawn around and held against the convex or outside face of said adjustable guide, substantially as described.

8. In a camera the combination of the adjustable guide-frame with an outside convex surface to hold the film in position for exposure, said camera being formed at one end to receive a roll-holder provided with a film, a tension-roller secured to the other end of said camera, a flexible apron secured to said tension-roller and provided at its outer edge with means for engaging the film whereby the winding up of the tension-roller draws the film into position behind the adjustable guide, substantially as described.

9. A camera embracing in its construction, a casing formed with an interior recess for a roll-holder, a tension-roller arranged in the interior of said casing, a flexible screen secured to and wound upon said tension-roller and having its outer end provided with a clamping-clip to engage the outer end flap of the film when in place, and an adjustable flexible guide arranged to offer a convex surface to the said screen and to the film respectively when either of them is drawn behind said guide, substantially as described.

10. In a camera the combination of the adjustable film-holder, a sliding bracket having engagement with said film-holder to vary its position, a reciprocating plunger provided with means for forming a detachable engagement with said sliding bracket to move the same, a spring-detent secured to the sliding bracket to lock it against movement and arranged to be released by a rotary movement of said plunger, substantially as described.

In witness whereof I have hereunto set my hand this 26th day of March, 1904.

CHARLES MILLS.

In presence of—

FRANK MARCHAND,
CLARENCE W. ROWLEY.