No. 780,382. PATENTED JAN. 17, 1905.

D. A. REAVILL.

PANORAMIC CAMERA.

APPLICATION FILED SEPT. 12, 1904.

2 SHEETS—SHEET 1.

FIG. 1

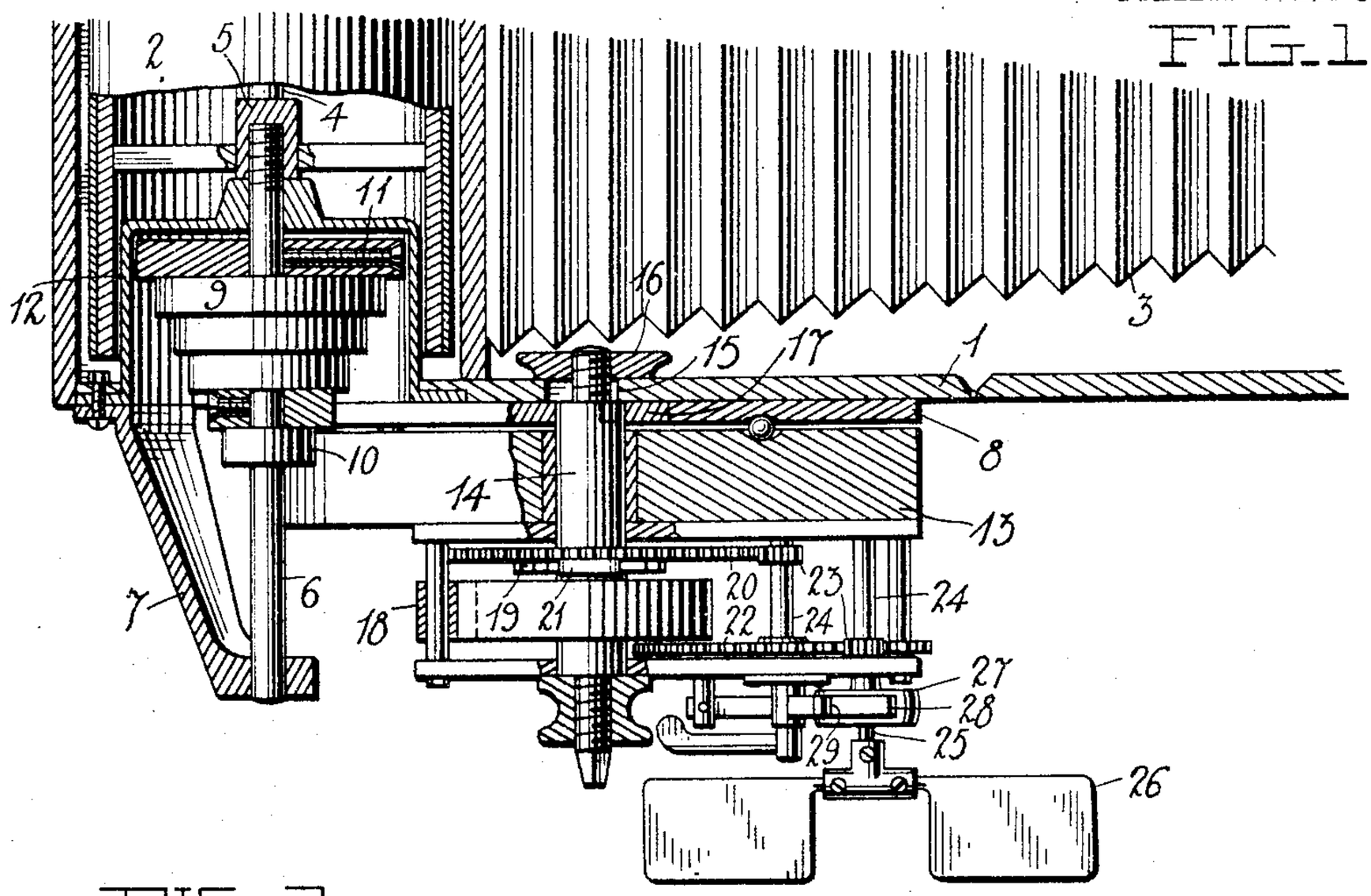
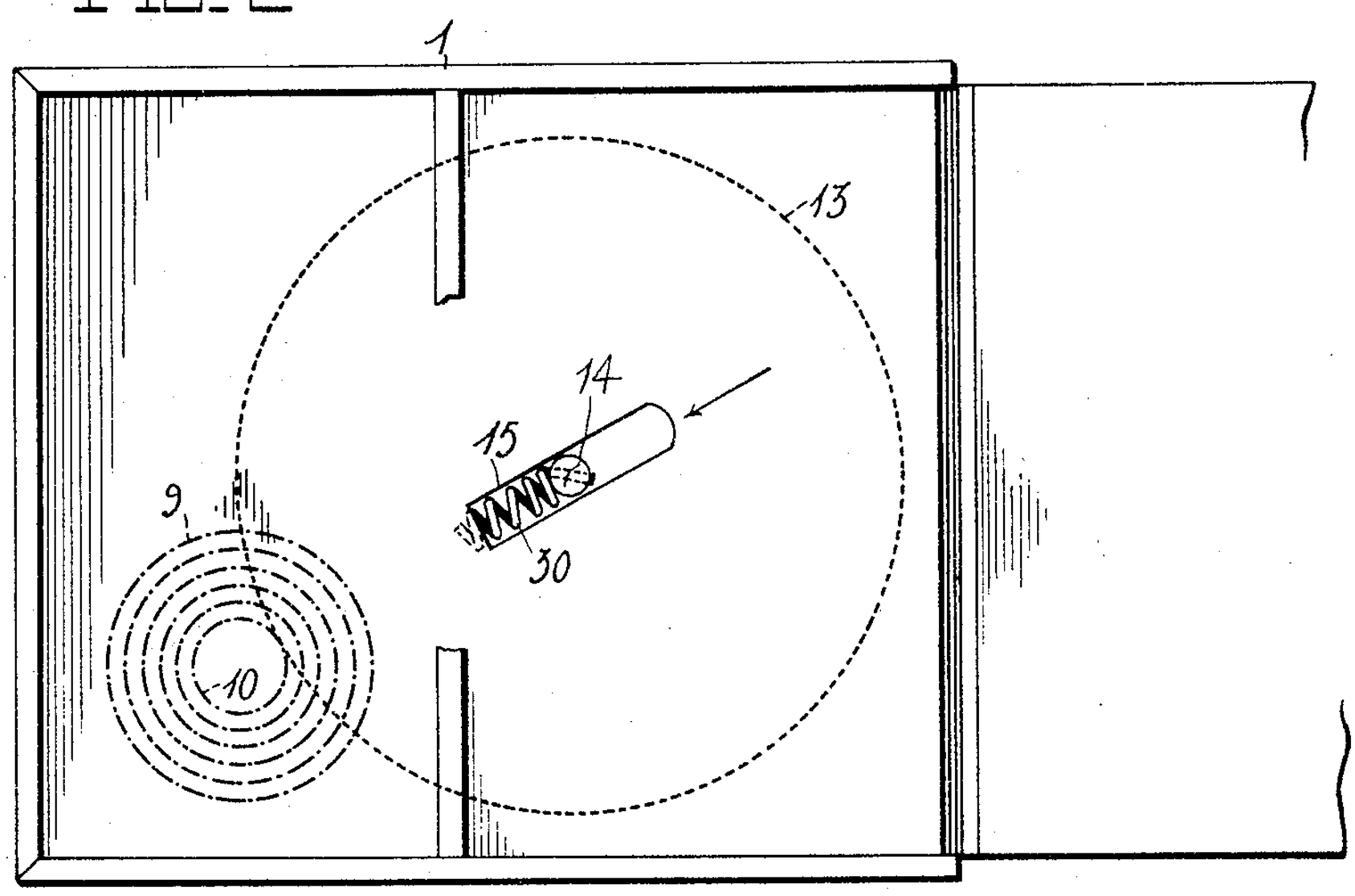


FIG. 2



Witnesses

J. Thornburg

S. Olivia Moore

Inventor

David Allen Reavill,

By Edwin Guthrie.

Attorney

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2 SHEETS—SHEET 2.

FIG. 3

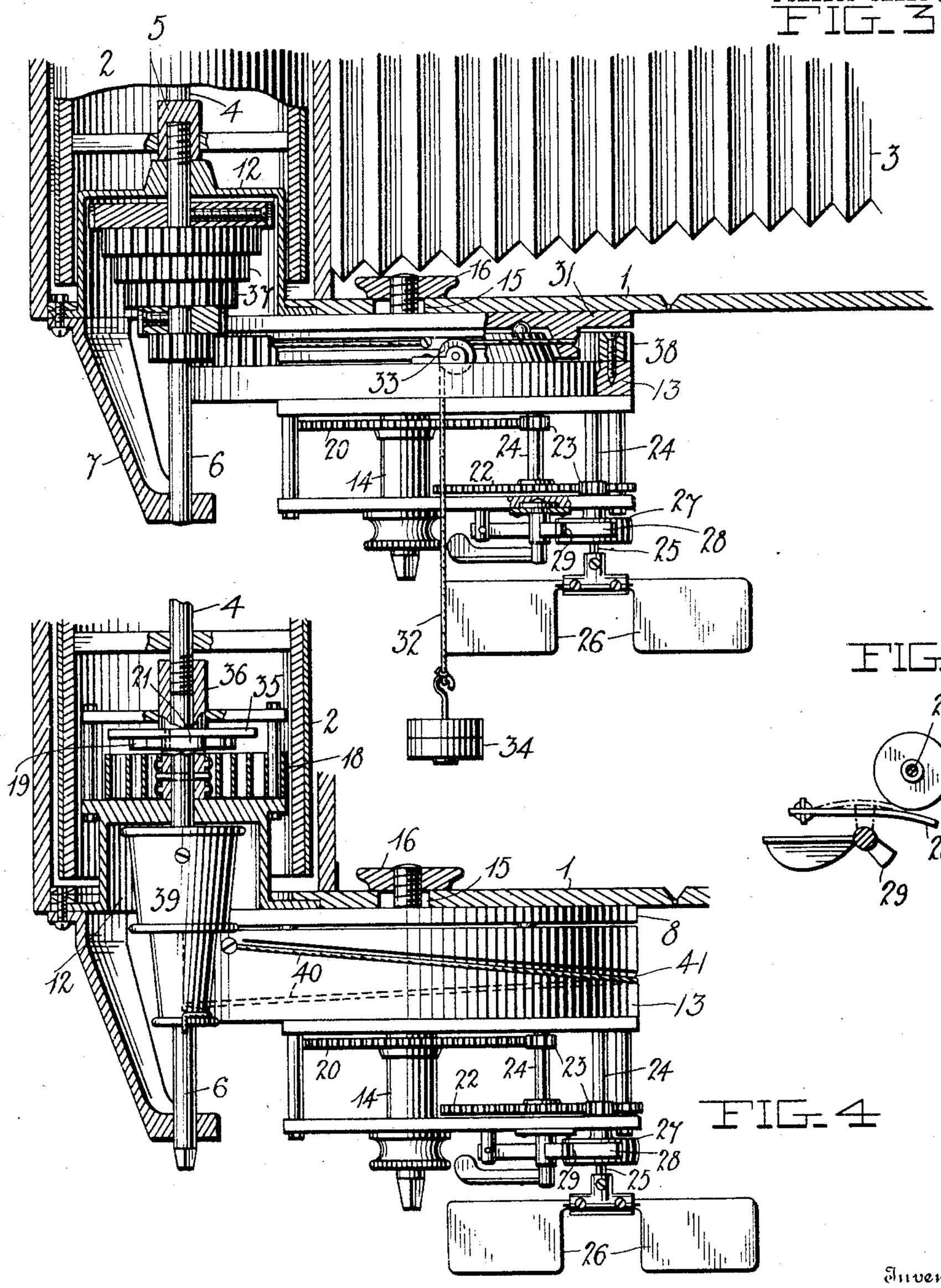

FIG. 4

FIG. 5

Witnesses
D. Bonsano
L. Olivia Moore

Inventor
David Allen Reavill
By Edwin Guthrie
Attorney

No. 780,382. Patented January 17, 1905.

UNITED STATES PATENT OFFICE.

DAVID ALLEN REAVILL, OF ROCHESTER, NEW YORK, ASSIGNOR TO THE ROCHESTER PANORAMIC CAMERA COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF WYOMING.

PANORAMIC CAMERA.

SPECIFICATION forming part of Letters Patent No. 780,382, dated January 17, 1905.

Application filed September 12, 1904. Serial No. 224,110.

To all whom it may concern:

Be it known that I, DAVID ALLEN REAVILL, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Panoramic Cameras, of which the following is a specification.

My invention relates to panoramic cameras, and is immediately concerned with the mechanism through which the camera-box is revolved horizontally and by which the film is moved within the box in the requisite direction and at proper speed, taking into consideration the focal length of the lens used during any particular operation.

To produce the best photographic representation by means of revolving cameras, it is found desirable that a longitudinal extent of film exposed during a single revolution or any part thereof shall equal the circumference of a circle or traversed arc of it described with the radius having the length of the focal distance of the lens used. It is often expedient, owing to peculiar conditions of light, proximity, and arrangement of objects sought to be included in a picture, to employ different lenses each having its own focal length, in correspondence with which the film must be moved. Heretofore this has been accomplished by changing the pinion on the feed-roll shaft that engages the fixed circular gear upon the support or tripod, the pinion and fixed gear being elements possessed in common by numerous forms of these instruments. Such practice necessitates several separate pinions and demands a certain amount of time and care in removing and replacing them, in addition to the liability of loss during constant carrying of the camera about.

The object of my invention is to produce a camera equipped with an adjustable multiple pinion or roller and auxiliary devices enabling the photographer to substitute for another any lens called for by the circumstances and to move his film with appropriate velocity.

I accomplish the object stated by constructing and associating the parts illustrated in the accompanying drawings, of which—

Figure 1 represents a portion of the rear end of a camera-box upon a tripod-table with my invention applied. This is a side view partly in vertical section. In Fig. 1 the multiple friction-roller is illustrated. Fig. 2 is a top plan view of a camera-box with its cover and internal parts removed to exhibit the slotted bottom, whereby the box may be adjusted with reference to its support and different diameters of the multiple pinion or roller caused to meet its stationary companion gear or disk. Fig. 3 is a similar view to Fig. 1, with a weight-motor shown instead of a spring-motor; and Fig. 4 is a like section of the rear of a camera-box, illustrating the application of my inventon to a camera wherein the motor-spring is contained and carried by the camera-box. A multiple spool and cord gear is shown in this view. Fig. 5 is a plan view of the brake mechanism.

Like numbers are used to designate the same parts throughout the drawings.

Numeral 1 marks the camera-box, and 2 refers to the vertical feed-roll or "winding-on" roll within the box. The usual bellows is designated by numeral 3. Numeral 4 refers to the axis of the feed-roll, and the threaded head 5 of that axis receives the end of the vertical extension-shaft 6, the lower extremity of which is suitably restrained in the bearing-bracket 7, secured to the under surface of the revoluble plate 8, upon which the box 1 is removably held.

Numeral 9 designates the multiple roller, a conical arrangement of cylindrical surfaces, of which the lowest and smallest is marked 10. The multiple roller is secured by set-screws 11 upon an extension-shaft 6, and it is believed to be apparent that it may be adjusted up or down thereon. As I customarily construct my invention, the multiple roller is located almost wholly within the box for sake of compactness and covered by the light-excluding inverted cup 12, the flange of which

is secured flush with the lower surface of the camera-box.

The tripod-top 13 has the form of a circular disk, against the periphery of which the lowest portion 10 of the multiple roller is shown to be bearing in Fig. 1. Through the tripod-top and plate 8 passes the arbor 14, and its threaded end extends through a diagonal slot 15 in the bottom of box 1 and engages the thumb-nut 16, that holds the box in place upon the revoluble plate. The arbor turns the plate directly by means of a removable key 17. A motor-spring 18 rotates the arbor, and by way of ratchet-wheel 19, loose gear 20, and pawl 21, pivoted to the gear and engaging the ratchet-wheel, the train-gears 22 and pinions 23, in any desired number and upon suitable pivots 24, actuate a fan-shaft 25 and fan 26, that operates as a speed-governor in the manner usual in panoramic cameras. Upon the fan-shaft is secured the brake-wheel 27, against which the spring-brake 28 presses unless such pressure is relieved and the brake withdrawn by the agency of the rocking cam 29 and its attachments, as shown. I do not limit myself to the particular speed-controlling and brake contrivance shown, and I do not wish to be understood as meaning that the multiple roller must essentially be located within the camera-box, as those are structural features that may be readily altered and accomplish the purpose. The above statement should be applied also to the ball-bearings indicated in Fig. 1 as used between the revoluble plate 8 and the disk to reduce friction. The balls are not absolutely necessary, although desirable.

Considering now also Fig. 2, it will be noted that when it is required that one of the larger divisions of the multiple roll should be brought into operative contact with the disk 13 the camera-box must be moved slightly upon the plate 8 to increase the distance between the axis of the arbor and of the extension-shaft 6. It is advantageous, moreover, that when rollers and disk are used there should be some means for preserving constant and adequate frictional contact between them. This I effect by placing the coil-spring 30 in the diagonal slot 15 and attaching one end to the bottom of the camera-box and passing the other end through the threaded upper end of the arbor 14. It will now seem that when the box is moved upon the plate 8 in the direction of the arrow to admit the larger divisions of the multiple roller the spring is stretched and the roller and disk are drawn together with a certain tension, insuring superior operation.

In the modification illustrated by Fig. 3 the revoluble plate 8 is eliminated and for it is substituted a turn-table 31, having a grooved periphery, and a cord 32, with one end attached in the groove. The cord is passed over a pulley 33 and thence downwardly through the tripod-top, and a weight 34 is suspended from its lower extremity. The operation of the weight-motor is in all respects the same as the spring-motor, the only structural change in addition to the substitution of the turn-table being that gear 20, formerly loose, is now fixed upon arbor 14.

By Fig. 4 a modification is shown that is in some respects the equal of the preferred form in compactness, perfection of operation, and in the readiness with which it may be constructed by ordinary methods of manufacture now followed. The motor-spring 18 lies within the feed-roll. Ratchet-wheel 19 and pawl 21 preserve their former operative positions and relations to the spring. The pawl, however, is now attached to the disk 35, which forms the base and is part of head 36. Axis 4 has a threaded connection with head 36, from which it may be separated when desired to remove the feed-roll.

In Fig. 3 the cone-gear used is marked 37, and the circular gear fixed upon tripod-top 13 and meshing with the cone is referred to by number 38.

In Fig. 4 the multiple spool upon extension-shaft 6 is numbered 39. A cord 40 passes around the tripod-top 13 in groove 41. As the spring rotates the roll and spool, the cord is wound upon the spool and the camera-box revolved at a predetermined speed. When the camera is in operation, a film is taken upon winding-on roll 2 in encircling layers one outside another and its diameter increases correspondingly. If the speed of rotation of the feed-roll remained constant with respect to the movement of the box, the film would be too rapidly taken up during the latter part of the operation. In practice I give the spool a slight taper, causing the film to be taken upon the roll more rapidly at the commencement with respect to the movement of box 1 than later when the diameter of the roll has been augmented by accumulated film. In other words, the smaller the diameter of the spool the greater the number of turns made by roll 2 during one revolution of box 1, and, conversely, the greater the diameter of spool 39 the fewer turns it makes.

In Figs. 3 and 4 there is no change in the gearing and fan mechanism for regulating the speed.

I do not confine myself to either arrangement exactly as illustrated. For example, the weight-motor of Fig. 3 may obviously be employed with the cord and spool drive for the box and roll 2 by winding the cord upon the spool before starting instead of upon the tripod-top 13.

Having thus described my invention and the manner of its operation, what I claim is—

1. In a panoramic camera, the combination with a support, of an adjustable and revoluble camera-box having a film-feeding roll, roll-

rotating devices whereby said roll is rotated with respect to the said box, the said devices including a stationary element on the camera-support and a rotating element adjustably secured upon the axis of said roll, the said rotating element having portions of different diameters whereby different speeds of rotation may be given said roll, and a motor by which said box and rotating element are actuated.

2. In a panoramic camera, the combination with a support, of an adjustable and revoluble camera-box having a film-feeding roll, roll-rotating devices whereby said roll is rotated with respect to the said box, the said devices including a stationary element on the camera-support and a rotating element upon the axis of said roll, one of said elements being adjustable with respect to the other, the said rotating element having portions of different diameters whereby different speeds of rotation may be given said roll, and a motor by which said box and rotating element are actuated.

3. In a panoramic camera, the combination with a support, of an adjustable and revoluble camera-box having a film-feeding roll, roll-rotating devices whereby said roll is rotated with respect to the said box, the said devices including a stationary element on the camera-support and a rotating element upon the axis of said roll, one of said elements being adjustable with respect to the other, the said rotating element having portions of different diameters whereby different speeds of rotation may be given said roll, a speed-governor, and a motor by which said speed-governor, said box and rotating element are actuated.

4. In a panoramic camera, the combination with a support, of an adjustable and revoluble camera-box having a film-feeding roll, roll-rotating devices whereby said roll is rotated with respect to the said box, the said devices including a stationary element on the camera-support and a rotating element upon the axis of said roll, one of said elements being adjustable with respect to the other, the axis of said stationary element being the axis of revolution of said box, the said rotating element having portions of different diameters whereby different speeds of rotation may be given said roll, and a motor having a spring acting directly upon the axis of one of said elements whereby said box and rotating element are actuated.

5. In a panoramic camera, the combination with a support, of an adjustable and revoluble camera-box having a film-feeding roll, roll-rotating devices whereby said roll is rotated with respect to the said box during the revolution of the box, the said devices including a stationary cylindrical tripod-top and a rotating spool having portions of different diameters, said spool being adjustable upon the axis of said roll, a flexible connection joining said spool and tripod and adapted to be wound alternately upon them, the said connection being wound upon one of said parts before a picture is taken, and a motor whereby the said box and rotating elements are actuated.

In testimony whereof I affix my signature in presence of two witnesses.

DAVID ALLEN REAVILL.

Witnesses:
WM. CANNON,
GEO. CALLAGHAN.