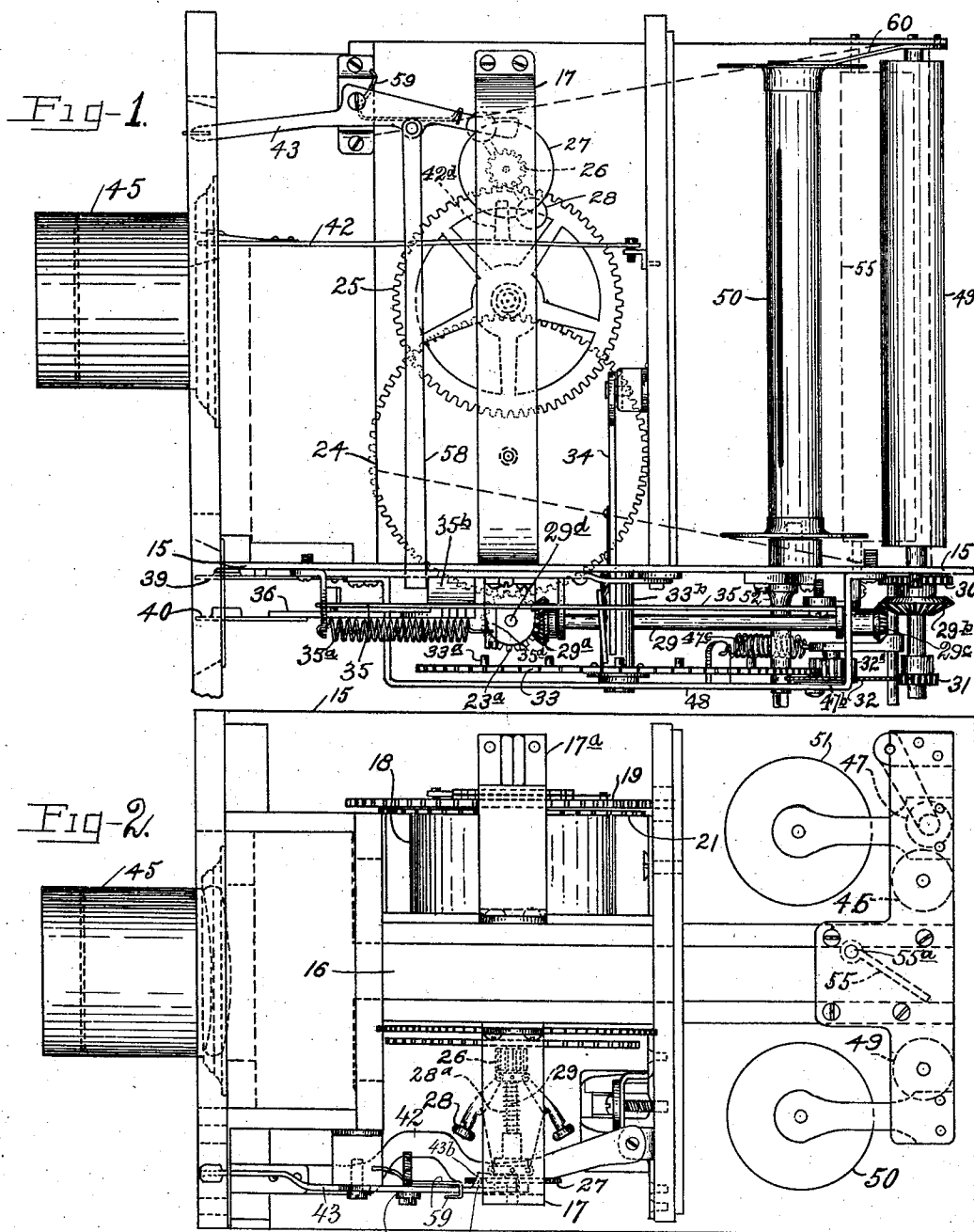


No. 893,819.

PATENTED JULY 21, 1908.

J. S. STEWART.
PANORAMIC CAMERA.
APPLICATION FILED JAN. 2, 1907.

6 SHEETS—SHEET 1.



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6 SHEETS—SHEET 2.

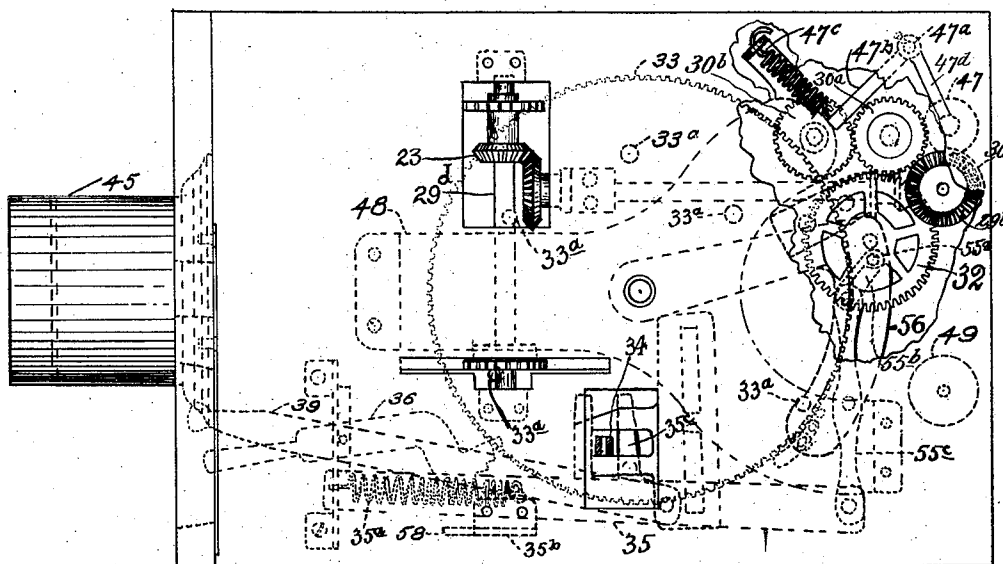


FIG-3

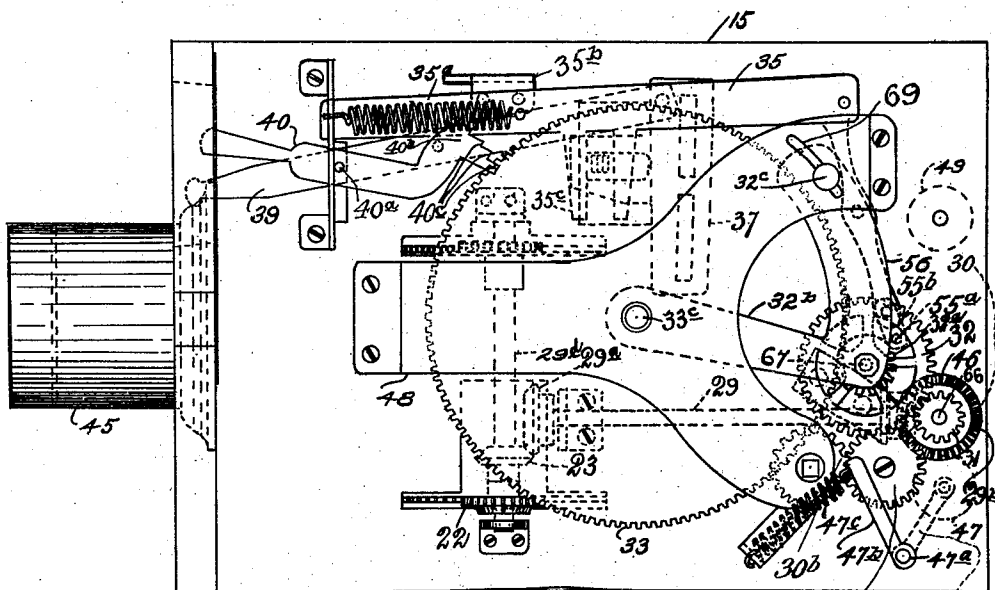


FIG-4

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6 SHEETS—SHEET 3.

FIG 7

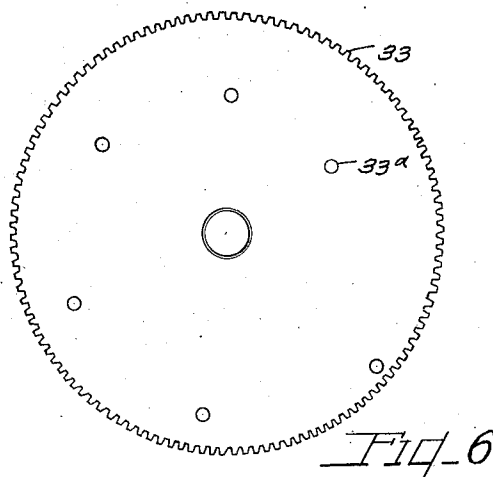
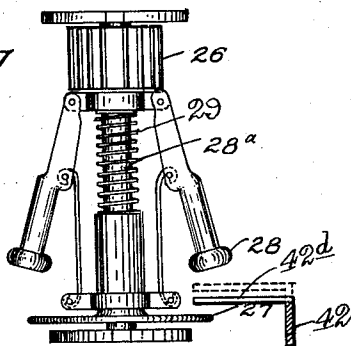


FIG 6

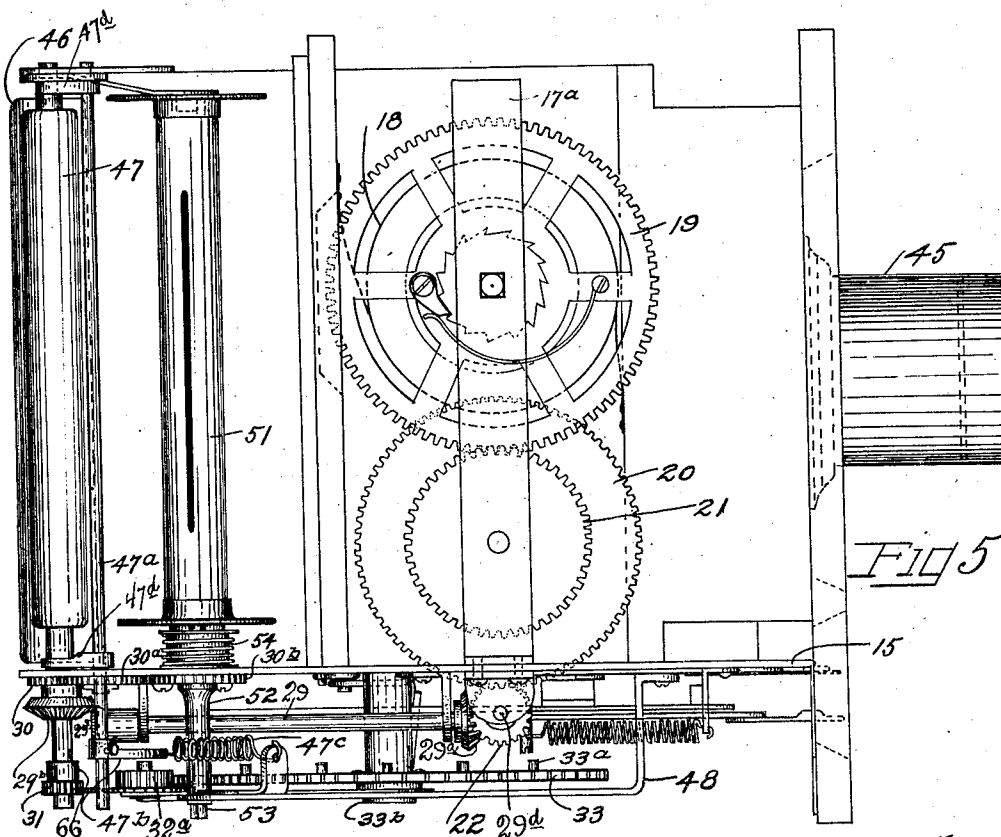


FIG 5

Witnesses

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6 SHEETS—SHEET 4.

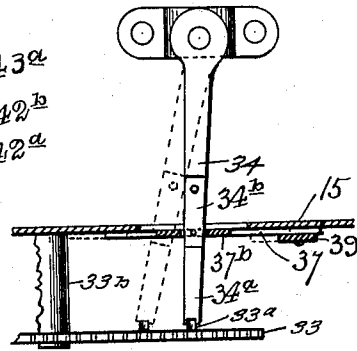
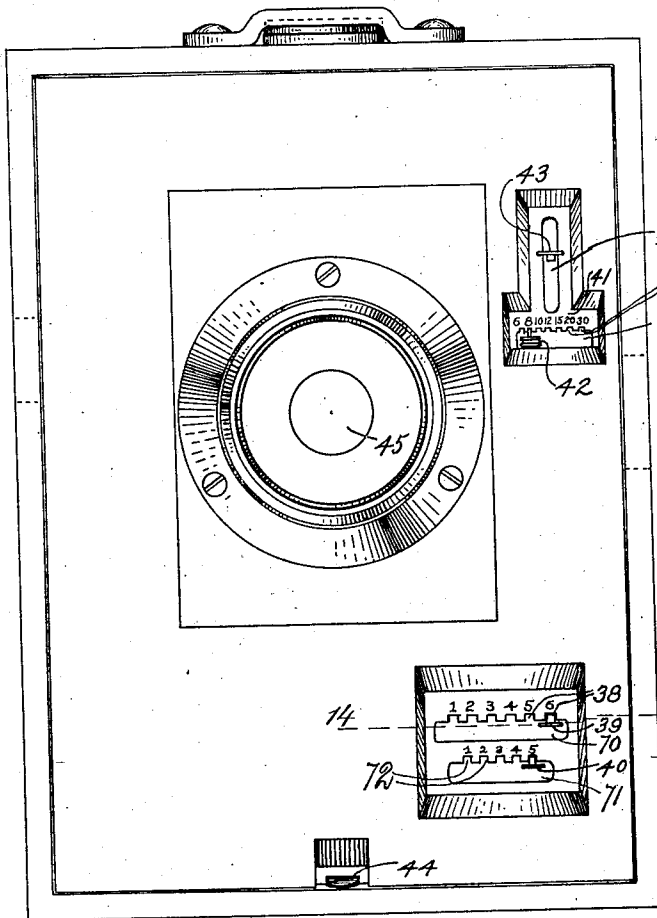


FIG. 8.

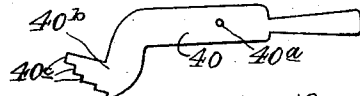


FIG. 10.

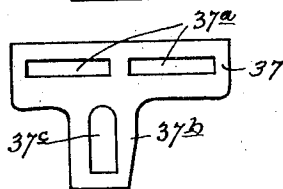


FIG. 11.

FIG. 12.

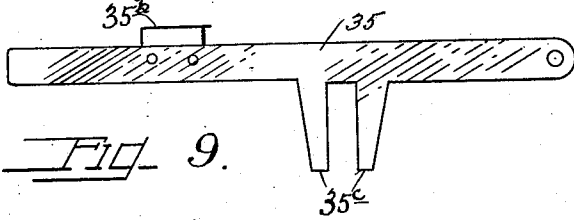


FIG. 9.

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APPLICATION FILED JAN. 2, 1907.

6 SHEETS—SHEET 5.

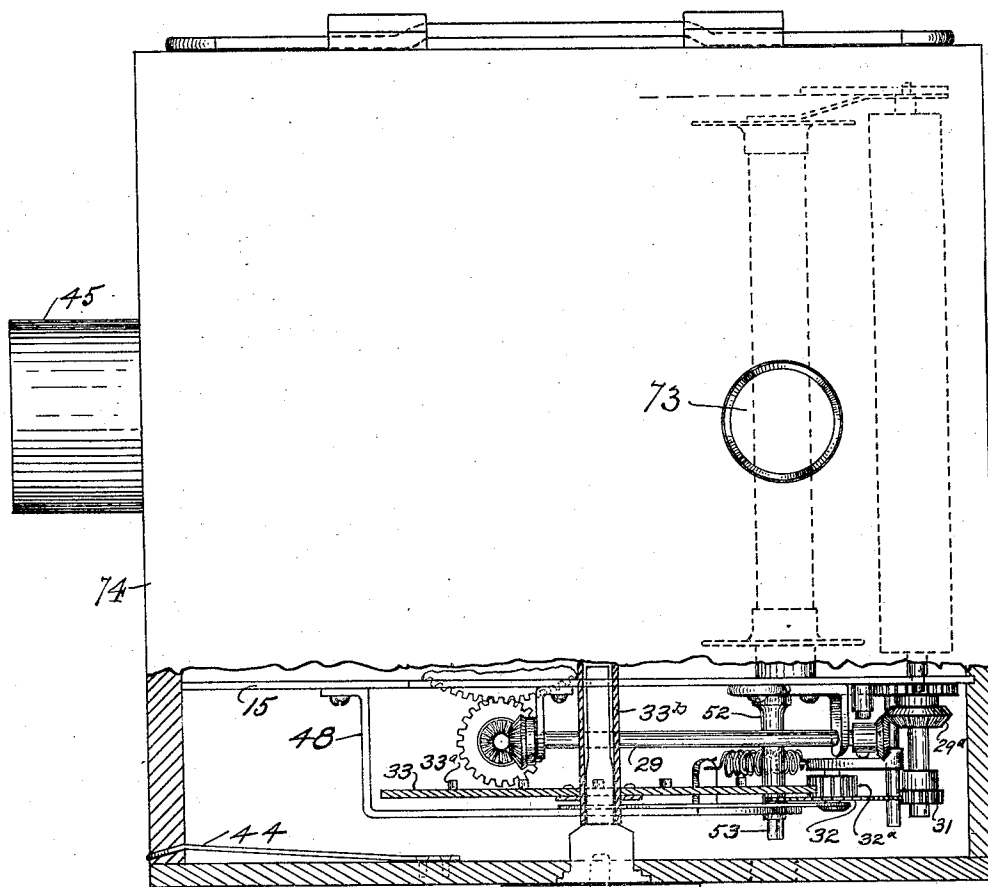


FIG. 13.

Witnesses

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APPLICATION FILED JAN. 2, 1907.

6 SHEETS—SHEET 6.

Fig. 14.

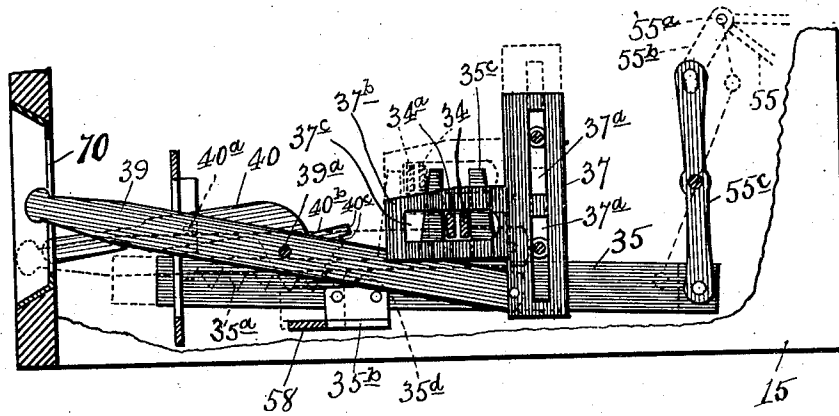
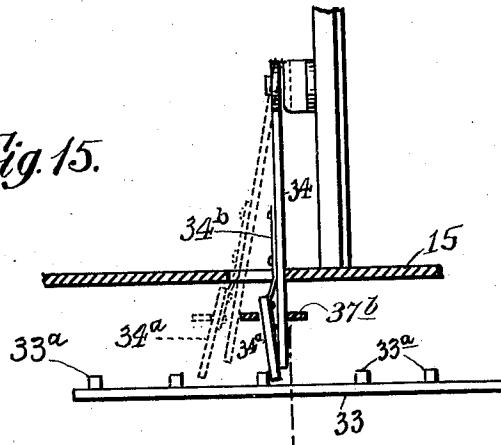


Fig. 15.



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UNITED STATES PATENT OFFICE.

JAMES S. STEWART, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF, AND THOMAS OLIVER AND J. C. YEAGER, BOTH OF CHICAGO, ILLINOIS, AND T. M. BUTLER, OF NOBLESVILLE, INDIANA.

PANORAMIC CAMERA.

No. 893,819.

Specification of Letters Patent.

Patented July 21, 1908.

Application filed January 2, 1907. Serial No. 350,451.

To all whom it may concern:

Be it known that I, JAMES S. STEWART, citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Panoramic Cameras; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a novel construction in a panoramic camera, the object being to provide an efficient and very compact device of this character in which the operating mechanism is entirely inclosed and is disposed in what would constitute waste space on the instrument and in which the area of exposure, and the time and strength thereof may be readily and easily adjusted, and consists in the features of construction and combinations of parts hereinafter fully described and claimed.

In the accompanying drawings illustrating my invention: Figure 1 is a side elevation of a panoramic camera constructed in accordance with my invention, the outer casing being removed. Fig. 2 is a top plan view of the same, the casing being removed. Fig. 3 is a top plan view of the same, the casing being removed and part of the top and bottom plates being broken away. Fig. 4 is a bottom plan view of the same, the casing being removed. Fig. 5 is an elevation of the same on the side opposite to that illustrated in Fig. 1, the casing being removed. Fig. 6 is a detail view of a turn table forming part of the operating mechanism. Fig. 7 is a detail view of a governor employed. Fig. 8 is a fragmentary detail view in elevation showing means employed for determining the area of exposure of the film. Fig. 9 is a bottom plan view of a plunger employed. Fig. 10 is a detail view in elevation of a lever employed same being shown in bottom plan and in reverse of its actual position. Fig. 11 is a top plan view of a plate forming part of the regulating means employed. Fig. 12 is a front elevation of the camera in its casing. Fig. 13 is a view in side elevation of the camera in its casing, the latter being partly broken away. Fig. 14 is a detail fragmentary plan section on the line 14—14 of Fig. 12 the bottom plate being broken away and all operating mechanism except certain levers and

parts connected with and operated thereby being omitted. Fig. 15 is a fragmentary detail vertical longitudinal section showing a stop lever employed.

One object of my invention is to provide a panoramic camera which occupies no more space than is occupied by the ordinary box or fixed focus camera so that the same may be easily carried and handled, and in which the operating mechanism is entirely inclosed in the box or casing, such mechanism being disposed within spaces within the box or casing rendered available by the employment of traveling film.

A further object of my invention is to provide simple and efficient means whereby the length or area of each exposure, the time of such exposure, and the strength thereof may be readily adjusted and controlled by means accessible from the exterior of the casing.

A further and important object of my invention is to provide simple and efficient means for causing the film to travel at a speed exactly proportioned to the speed of travel of the lens in order to produce a clear continuous picture all parts of which are uniformly exposed and in which no breaks or blurs are produced by reason of variations in relative speed of travel of the film and lens.

Owing to the fact that in panoramic cameras, the film travels relatively to the lens or vice versa, and that only a very narrow vertical strip thereof is exposed at a time, the camera body proper may obviously be made very narrow so that for example, in a 4x5 fixed focus camera the body of the camera need be only an inch or less in width, thus leaving spaces on each side thereof within the casing to receive the operating mechanism. Cameras of this character are employed only for landscape and similar work so that the fixed focus type answers best all the requirements thereof. These facts I have taken advantage of in the embodiment of my invention, and, as shown in Fig. 2, contract the camera body at its rear end portion to form a narrow light shaft 16 in alignment with the lens and over the rear end of which the film travels, the latter leaving the reel or spool 50 and being wound upon the reel or spool 51 as will be hereinafter described.

The camera body is revolvably mounted upon the shaft of a turn-table 33 consisting of a relatively large spur-gear which is provided in the center of its lower face with a

threaded opening 33^c which is adapted to receive the thumb-screw of the supporting tripod to maintain said turntable rigid with the latter. The shaft 33^b of said spur-gear is rigid therewith and is loose relatively to the camera body which is suitably pivotally mounted thereon. Meshing with said spur-gear is a spur-pinion 32^a which is rigid with a spur gear 32 revolubly mounted on a stud 67 disposed in the end of an arm 32^b pivotally mounted on the shaft of the spur gear 33, said arm having a segmental projection 56 at its free end extending to one side thereof. On the bottom wall of the camera is a Y-shaped metal frame 48 having legs at two of its free ends by means of which it is secured thereto, one arm thereof being provided with a segmental slot 69 concentric with said shaft of said spur-gear 33 and through which a set-screw 32^c entering a threaded opening in the free end of said segmental projection 56 passes, said set-screw serving to hold said arm 32^b in any desired position relatively to said frame 48. The said spur-gear 32 meshes with the spur pinion 31 disposed on the lower end of a vertical shaft 66, said spur gear being removable and being adapted to be replaced by spur-gears of varying diameters for reasons hereinafter set forth. The said arm 32^b enables the position of the spur-gear 32 to be adjusted to accord with different sizes of said spur pinions 31. Said shaft 66 carries a bevel-gear 29^b which meshes with the bevel pinion 29^c on the horizontal shaft 29 suitably journaled in bearings on the base-plate 15 of the camera. At the other end of said shaft is a bevel pinion 29^a which meshes with a bevel pinion 23 on a second horizontal shaft 29^d, the latter carrying a spur pinion 22 by means of which said shaft is geared to the spring motor 18 through the intermediacy of the spur gears 20, 21 and 19, the shafts of said gears 20 and 21 and the drive-shaft of the motor being journaled at one end in the frame 17^a. The said motor 18 is thus geared to said shaft 66 and said turntable 33, and by reason of the rigid relation of the latter to the supporting tripod, the motor, when in operation will revolve the camera thereon. On said shaft 66 above the bottom plate 15 of the camera, is a drum 46 between which and a spring pressed idler 47 the film is engaged and fed. The said film is taken from the spool 50, passed over an idler 49 and between the drum 46 and idler 47 and wound upon the spool 51, the latter being disposed upon the shaft of a friction clutch 54 of suitable construction which is geared to said shaft 66 through the intermediacy of the gears 30, 30^a and 30^b, said clutch being adapted to exert only sufficient friction on said spool 51 to revolve the same and the shaft 52 but not sufficient to draw or stretch the film, being merely intended to take up the film as rapidly as the same is fed by said drum 46. Said spool 51 is, however, held against rotation relatively to said shaft 52. The shaft of the idler 47 is journaled at its ends in the free ends of arms 47^d of the vertical shaft 47^a, the latter carrying an arm 47^b below the bottom plate 15 which is connected at its free end with one end of a tension spring 47^c connected at its other end with a rigid part of the framework. The motor 18 is disposed upon one side of the light-shaft 16 and is geared to a horizontally disposed ball-governor on the opposite side of said light-shaft through the intermediacy of said shaft 29^d, the pinion 23^a and gears 24, 25 and 26 and interposed pinions. The said governor is of well-known construction comprising the two pivoted arms carrying the balls or weights 28 and connected between their ends by means of suitable links with a cross head on a collar 27 longitudinally movable on the shaft 28^a on which is a spiral compression spring 29 against the action of which the said collar is moved as the balls are spread by centrifugal force. The shaft 28^a is journaled at one end in the frame 17.

Before proceeding further with the description of the operating mechanism I desire to call attention to the fact that the lens 45 of the camera is always open, while adjacent the rear end of the light-shaft 16 is disposed a leaf 55 of greater width than said light-shaft and mounted at one end on a shaft 55^a the axis of which is practically flush with one side wall of said light-shaft. The said leaf 55 serves simultaneously as shutter and diaphragm the term "diaphragm", being herein used in the sense that said shutter serves to determine the number of light rays concentrated upon the film when exposed by controlling the width of the opening through which the light penetrates to the film, although said shutter does not perform all of the functions of the diaphragm as ordinarily understood in photography. At its lower end said shaft 55^a carries an arm 55^b having a projection at its free end which enters a longitudinal slot in one end of a lever 55^c, pivotally mounted between its ends on the framework and at its other end connected with a link 35 engaged and normally held at one limit of its movement by a spiral spring 35^a the latter serving to maintain the shutter 55 normally open. On said link 35 is a projection 35^b at one side which is adapted to engage the free end of a depending arm 58 pivotally connected at its other end with the starting lever 43, said free end of said arm passing through a slot in the bottom wall of the camera and being disposed in the path of and adapted to hold said link 35 at the rearward limit of its movement against the action of said spring 35^a, to maintain the shutter 55 closed. Said starting lever 43 is pivotally mounted between its ends on a part of the framework, the forward end thereof pro-

jecting through a slot 43^a in the front wall of the camera and its other end being provided with a projection 43^b bearing on the periphery of said disk 27 of the governor, being maintained in peripheral contact with the latter by means of a spring 59 and acting as a brake to prevent operation of the motor. The said arm 58 is pivotally secured to said last-named end portion of the lever 43 between the ends thereof so that by depressing the forward end of said lever said arm 58 will be raised out of the path of said projection 35^b and the link 35 will thus be moved forward by the spring thus opening the shutter 55 and throwing said projection 35^b into the path of the lower end of the arm 58 to maintain said lever 43 out of contact with the disk 27, and thus permitting the motor to start.

Attention is now directed to Fig. 12, illustrating the front elevation of the camera. It will be seen that below said slot 43^a is a lateral slot 42^a the upper wall of which is provided with recesses 42^b above which consecutively appear numerals "6, 8, 10, 12, 15, 20 and 30" respectively and through said slot the end of a lever 42 projects by means of which the speed of the motor is governed so as to cause the same to completely revolve the camera in substantially the number of seconds represented by the aforesaid numerals impressed above said recesses 42^b. For example, if the light is such as to require the longest possible exposure the lever 42 is turned to register with the recess "30" whereupon the motor is retarded as subsequently explained to require substantially thirty seconds to completely revolve the camera, and proportionately long time for any fraction of a revolution.

In the lower right hand corner of the front plate of the camera is a lateral slot 70 through which the end of a lever 39 projects, said slot being provided in its upper wall with recesses 38 above which consecutively appear the numerals "1" to "6" inclusive, the said lever 39 controlling the number of film surfaces of given area each to be exposed or, in other words, determining the length of the picture. For example if a film five inches wide is used and each exposure is four inches in length, then if said lever 39 registers with recess "1", the film will travel until four inches thereof has been exposed, and if set to register with recess "3", the film will be caused to travel until twelve inches thereof have been exposed. Below said slot 70 is a slot 71 through which one end of a lever 40 projects, the upper wall of said slot being provided with recesses 72 above which consecutively appear the numerals "1" to "5" inclusive, the said lever 40 serving to control the "diaphragm" opening of the camera, that is, it controls the arc through which the shutter 55 is swung when opened so as to regulate the

width of the slot through which the light penetrates to the film from one-eighth to five eighths of an inch, for example, each of said numerals "1" to "5" representing the smallest and multiples of the smallest opening through which exposure is effected.

The manner in which the respective levers 42, 39 and 40 control the operating mechanism I will now describe in detail.

The lever 42 is pivotally secured to a part of the frame work at its innermost end and is provided between its ends with an arm 42^d which at its free end is disposed in the path of the disk 27 of the governor in the latter's movement against the action of the spring 28^a the position of said arm 42^d being determined by the position of said lever 42 and in its turn determining the degree of opening of the governor and consequently its speed of rotation. That is to say that if said arm 42^d is disposed so far inwardly of the normal position of said disk 27 as to enable the weights 28 to spread almost to their limit, then the motor (and governor) will have attained and will maintain a relatively high speed, but if said arm is so disposed relatively to said disk 27 as to prevent the said weights 28 from spreading to any considerable degree, then the speed of the motor will obviously be retarded by reason of the friction to which the said disk is subjected when forced into contact with the said projection by the spreading of said weights.

The lever 39 controls the length of film exposed in the following manner. Referring to Figs. 1 and 3, it will be noted that said turntable or spur-gear 33 is provided on its upper face with a plurality of pins 33^a disposed spirally with reference to the axis of said turntable, said pins serving as stops to determine the arc through which the camera travels. On the frame work of the latter a depending arm 34 is pivotally mounted which at its free end passes through a slot in the bottom wall of the camera disposed substantially radially relatively to the axis of rotation of said camera and in which said arm 34 swings substantially radially relatively to the said axis. The said arm terminates at a point above the plane of the upper ends of said pins 33^a and carries a small depending plate 34^a hung on the lower end of a flat spring 34^b secured to said arm 34 between the ends thereof and serving to normally maintain said plate 34^a out of contact with said arm 34 and spaced from the latter a distance greater than the diameter of said pins 33^a. The free end of said plate 34^a projects below the plane of the upper ends of said pins and accordingly into the paths of the latter, being disposed in the path of any particular pin by adjusting said arm 34 either toward or away from the axis of rotation of the camera. The lever 39 is pivotally mounted between its ends at 39^a on a part of the frame work and at its inner end

is pivotally secured to a longitudinally slot-
 ted sliding plate 37, through the slots 37^a of
 which screws pass into the bottom wall of the
 camera, said screws serving as guides for said
 5 plate. The latter is movable in a direction
 parallel with the plane in which said arm 34
 swings, and is provided with a projection 37^b
 having a slot 37^c disposed transversely to the
 slots 37^a and through which the lower ends
 10 of the arm 34 and plate 34^a project, so that
 by turning said lever 39 and throwing said
 plate 37 in either direction the said arm 34
 will be swung into the paths of the different
 pins 33^a. The said arm 34 is also free to
 15 swing forward of the position shown in Fig. 1
 and projects into the recess between two
 arms 35^c on the link 35 the rearmost arm 35^c
 serving to carry the free end of said arm 34
 and the plate 34^a forward with said link 35.
 20 On the latter is a pin 35^d to which one end of
 the spring 35^a is secured, said pin serving
 also to coact with the lever 40 to control the
 "diaphragm" opening of the camera. The
 said lever 40 is pivotally secured between its
 25 ends at 40^a to a part of the framework and
 at its inner end is provided with a projection
 40^b the extreme free end of which is stepped
 to provide five shoulders 40^c which are adapt-
 ed to be disposed in the path of said pin 35^d
 30 to limit the forward movement of said link
 35, the latter being adapted to travel its full
 limit when said stepped end of said lever 40
 is turned entirely out of the path of said pin
 35^d and to travel only a fraction of its limit
 35 in accordance with the degree to which said
 lever 40 is turned in a direction to throw said
 stepped end thereof into the path of said pin.

The operation of my camera is as follows:
 The camera proper is telescopically inserted
 40 into the casing 74, the latter being open at
 its forward end and said camera being held
 in place therein by means of a suitable spring
 catch 44. Before inserting the same, how-
 ever, the film spool 50 is mounted on the piv-
 45 ots provided therefor, one of said pivots be-
 ing disposed on the free end portion of a flat
 spring 60 in the usual manner. The web on
 which the film is mounted is then trained
 over the idler 49 and drum 46 against which
 50 it is pressed by the idler 47 and secured in the
 usual manner to the spool 51. After insert-
 ing the camera proper into its casing, the film
 is advanced by revolving the spool 51 by
 means of a key adapted to engage the square
 55 shank 53 of the shaft 52 which is loose with
 relation to the spur-gear 30^b and clutch 54
 until the number "1" appears opposite the
 opening 73 in the casing, said opening having
 red glass disposed therein. At this time the
 60 front edge of the film will be disposed op-
 posite the rear end of the light shaft 16.

The motor having been wound up by
 means of a key in the usual manner, and the
 instrument mounted on the tripod, all is in
 65 readiness to take a picture. Assuming that

the day is very bright and sunny and a
 view found which the operator desires to
 photograph, the next steps consist in ad-
 justing the time and intensity of exposure
 and the length of the picture. The day 70
 being bright, the duration of exposure must
 be minimum. Accordingly the lever 42 is
 set to register with the recess 42^b of the slot
 42^a numbered "6" thereby so positioning
 the arm 42^d thereof as to permit the gov- 75
 ernor to open fully and thus allow the motor
 to run at maximum speed. Next the lever
 40 is set to register with the recess 72 of the
 slot 71 numbered "1" thereby throwing the
 lug or projection of the stepped inner end 80
 thereof which is farthest removed from the
 pivot of said lever 40 into the path of the
 pin 35^d of the link 35 and thus limiting the
 forward movement of the latter and conse-
 quently the opening of the shutter 55 to 85
 the minimum. Next the lever 39 is set to
 register with one of the recesses 38 of the
 slot 70 according with the multiple of ex-
 posure areas which the photograph is de-
 sired to cover. Assuming that the operator 90
 desires to photograph the view through an
 arc of about 180 degrees the said lever is set
 to register with recess 38 numbered "3" the
 picture thus covering a film area equal to
 three 4x5 exposures, or a total of 5x12 95
 inches. All being now in readiness, the
 starting lever 43 is depressed, thus releas-
 ing the brake from the motor and throwing
 the arm 58 out of the path of the projec-
 tion 35^b of the link 35 which instantly springs 100
 forward and opens the shutter 55. At
 the same time, the projection 35^c of the
 link 35 throws the arm 34 the plate 34^a of
 which is now disposed in the path of one
 of the pins 33^a of the turn-table 33, forward, 105
 the said arm 34 having been previously
 moved laterally into the path of the proper
 pin by adjustment of the lever 39. The
 camera now revolves at a uniform speed,
 the lens traveling in one direction and the 110
 film traveling with equal speed in the oppo-
 site direction so that in effect the film re-
 mains fixed with relation to the tripod
 while the lens travels. Each part of the
 surface of the film is thus progressively ex- 115
 posed in exact ratio to the speed of travel
 of the lens and thus each part of the view
 being photographed is recorded on the
 film, no part being repeated or omitted.
 The film must travel through as great a 120
 distance in the same length of time as the
 lens. During this time the arm 58 rests
 upon the projection 35^b and maintains the
 brake released from the motor. As the
 camera approaches the other end of the 125
 arc of travel to which it has been limited by
 adjustment of the lever 39, the pin 33^a which
 is in reality disposed in the path of the
 plate 34^a of the arm 34 strikes the latter
 and throws said plate against said arm 34 130

thus stopping the latter. The camera continues to revolve, however, against the action of the spring 35^a thus throwing said arm 34 and said link 35 back to the rearward limits of their movement, thereby closing the shutter 55 and throwing the projection 35^b of the link 35 out of the path of the arm 58 which by the action of the spring 59 drops and thus also throws the brake on the motor, although the latter is stopped as soon as said arm 34 reaches the rearward limit of its movement. Should the operator now desire to take another picture, he must, after placing his tripod in proper position, move the lever 39 to another position depending upon the desired length of his next picture. If he desires the latter to cover only a single 4x5 area, he moves said lever to register with recess "4". If he desires to take a picture covering three 4x5 areas, he moves said lever to register with the recess "6". If he desires his next picture to cover six 4x5 areas, he must move said lever to either of the recesses "2" or "4" and then back to recess "3". This is necessary in order to permit the plate 34^a to be sprung to the forward limit of its movement and be brought behind and out of the path of the pin 33^a with which it was in engagement. During this time the motor is held fast by the brake but by now again depressing the lever 43 the motor is started and causes the camera to make a complete revolution, thus producing a picture extending through an arc of three hundred and sixty degrees.

The speed of travel of the film is controlled entirely by the drum 46 the surface speed of which is equal to the speed of travel of the lens, this being determined by the size of pinion 31 employed. The use of compensating gears usually employed in cameras of this character is consequently entirely avoided and the troubles due thereto are obviated. The said pinion 31 is rendered interchangeable so that lenses of different focal lengths may be employed. If for example a lens having a focal length of seven inches is substituted for a lens having a focal length of six inches, such lens must be set one inch farther from the plane of travel of the film than the six inch lens. Hence, the substituted lens travels farther through a given angle and consequently the gearing controlling the movement of the film must be changed so that the latter will travel the additional distance in the same time as it is covered by the new lens, a smaller pinion 31 being, therefore, substituted.

I claim as my invention:

1. In a panoramic camera, a camera body revoluble on its support and equipped with film feeding means, a motor common to said camera body and said film feeding means to actuate the same in unison, a governor con-

trolling said motor, hand-lever actuated means controlling said governor to regulate the speed of said motor, and means maintaining said hand-lever at predetermined points between the limits of its movement, whereby the period of exposure of the film is regulated.

2. In a panoramic camera, a camera body revolubly mounted on its support, a motor actuating the same, speed regulating means disposed in operative relation to said motor, a brake controlling said speed regulating means, a hand-lever controlling said brake, said hand-lever and said camera body being equipped with coacting means for maintaining said lever at different points between the limits of its movement to maintain said motor at different predetermined speeds to regulate the period of exposure of the film, film feeding means disposed on said camera body and variable gearing between the latter and said motor whereby a length of film corresponding to the distance of travel of the camera lens is fed during the same interval.

3. In a panoramic camera, a camera body revolubly mounted on its support, a motor actuating the same, speed regulating means disposed in operative relation to said motor, a brake controlling the same, a hand-lever controlling said brake, said hand-lever and said camera body being equipped with coacting means for maintaining said lever at different points between the limits of its movement to maintain said motor at different predetermined speeds to regulate the period of exposure of the film, film feeding means disposed on said camera body, and gearing between the latter and said motor.

4. In a panoramic camera, a camera body revolubly mounted on its support, film feeding means disposed thereon, a motor common to said camera body and said film feeding means to actuate the same in unison, speed regulating means disposed in operative relation to said motor, and a hand-lever actuated brake controlling said speed regulating means, said hand-lever and said camera body being equipped with coacting means for maintaining said lever at different points between the limits of its movement to maintain said motor at different predetermined speeds to regulate the period of exposure of the film.

5. In a panoramic camera, a camera body revolubly mounted on its support, film feeding means disposed thereon, a motor common to said camera body and said film feeding means to actuate the same in unison, speed regulating means disposed in operative relation to said motor, a hand-lever actuated brake controlling said speed regulating means, said hand-lever and said camera body being equipped with coacting means for maintaining said lever at different points between the limits of its movement to main-

tain said motor at different predetermined speeds to regulate the period of exposure of the film, and stopping and starting means disposed in operative relation to said motor.

5 6. In a panoramic camera, a camera body revolvably mounted on its support, a motor actuating the same, speed regulating means disposed in operative relation to said motor, and including a revoluble member actuated
10 through the intermediacy of centrifugal force to move longitudinally on its support, an adjustable stop disposed in the path of said revoluble member, and a hand-lever controlling said stop, said hand-lever and
15 said camera body being equipped with coacting means for maintaining said lever at different points between the limits of its movement to maintain said motor at different predetermined speeds to regulate the
20 period of exposure of the film.

7. In a panoramic camera, a camera body revolvably mounted on its support, a motor actuating the same, speed regulating means disposed in operative relation to said motor
25 and comprising a ball governor, a disk actuated thereby and adapted to be moved longitudinally on its support as the arms of said governor diverge, an adjustable stop disposed in the path of said disk, and a hand-lever
30 controlling said stop, said hand-lever and said camera body being equipped with coacting means for maintaining said lever at different points between the limits of its movement to maintain said motor at different
35 predetermined speeds to regulate the period of exposure of the film.

8. In a panoramic camera, a camera body revoluble on a support, a spur-gear rigid on said support and disposed concentric with
40 the axis of rotation of said camera body, a motor carried by the latter, a vertical shaft actuated thereby and carrying a pinion at its lower end, said pinion being interchangeable, an idle spur-gear meshing with said
45 pinion, an adjustable member carrying said idle gear, and a pinion rigid with said idle gear and meshing with said first named spur-gear to impart motion to said camera body.

9. In a camera, a single member comprising simultaneously the diaphragm and shutter
50 disposed behind the lens, regulating means disposed in operative relation to said member to limit the opening movement thereof, a hand-lever controlling said regulating
55 means, a spring actuating said member to move the same in one direction, and means actuating said member to move the same in the other direction against the action of said spring.

10. In a camera, a single member comprising simultaneously the diaphragm and shutter
60 disposed behind the lens, regulating means disposed in operative relation to said member to limit the opening movement thereof, a hand-lever controlling said regu-

lating means, a spring actuating said member to move the same in one direction, and power actuated means actuating said member to move the same in the other direction against the action of said spring.

11. In a camera, a single member comprising simultaneously the diaphragm and shutter
70 disposed behind the lens, regulating means disposed in operative relation to said member to limit the opening movement thereof, a hand-lever controlling said regulating
75 means, a spring actuating said member to move the same in one direction, and power actuated means actuating said member to move the same in the other direction against
80 the action of said spring, said last named means being hand-controlled.

12. In a panoramic camera, a camera body revolvably mounted on its support, said body
85 having a narrow light-shaft in alinement with the lens, film feeding means disposed on said camera body, a shutter disposed in said light-shaft and controlling the penetration of rays to said film, regulating means disposed
90 in operative relation to said shutter to control the opening movement thereof, a motor common to and actuating said camera body and said film feeding means, actuating
95 means disposed in operative relation to said shutter to open and close the same, said last-named means including said motor, and hand-actuated means common to said motor and said shutter-actuating means to control the movements thereof.

13. In a panoramic camera, a camera body
100 revolvably mounted on its support, film feeding means carried thereby, a light-shaft disposed in alinement with the lens and laterally past the rear end of which the film travels, a shutter in said light-shaft controlling
105 the exposure of said film, a motor common to and actuating said camera body and said film feeding means, actuating means including said motor disposed in operative relation to said shutter, and hand-controlled controlling
110 means common to and disposed in operative relation to said motor and said shutter, and serving when actuated to simultaneously start the motor and open said shutter.

14. In a panoramic camera, a camera body
115 revolvably mounted on its support, film feeding means carried thereby, a light-shaft disposed in alinement with the lens and laterally past the rear end of which the film travels, a shutter in said light-shaft controlling
120 the exposure of said film, a motor common to and actuating said camera body and said film feeding means, actuating means including said motor disposed in operative relation to said shutter, and hand-controlled controlling
125 means common to and disposed in operative relation to said motor and said shutter, and serving when actuated to simultaneously start the motor and open said shutter, speed regulating means disposed in opera-
130

tive relation to said motor, and a hand-lever controlling the same.

15. In a panoramic camera, a turn-table, a camera body revolubly disposed thereon, a motor carried by said camera body, film feeding means disposed on said camera body, gearing between said motor and said turn-table through the intermediacy of said film feeding means, stops disposed on said turn-table at varying distances from the axis of rotation of said camera body, a stop-lever disposed on the latter, a hand-lever controlling said stop-lever to throw the same into positions to bring any one of said stops into the path thereof, and hand-controlled starting means disposed in operative relation to said motor.

16. In a panoramic camera, a turn-table, a camera body revolubly mounted thereon, a motor carried by said camera body, a plurality of stops disposed on said turn-table at varying distances from the center thereof and at intervals peripherally thereof, a motor actuating said camera body, an adjustable stop-lever on the latter, and a hand-lever controlling said stop-lever to throw the same into the path of any one of said stops on said turn-table to limit the movement of said camera to any desired arc.

17. In a panoramic camera, a turn-table, a camera body revolubly mounted thereon, a motor carried by said camera body, a plurality of stops disposed on said turn-table at varying distances from the center thereof and at intervals peripherally thereof, a motor actuating said camera body, an adjustable stop-lever on the latter, and a hand-lever controlling said stop-lever to throw the same into the path of any one of said stops on said turn-table to limit the movement of said camera to any desired arc, film feeding means disposed on said camera body and actuated by said motor, a shutter disposed between the film and the lens in said camera, a spring maintaining said shutter normally open, and operative connection between said shutter and said motor whereby the former is operated against the action of said spring.

18. In a panoramic camera, a turn-table, a camera body revolubly mounted thereon, a motor carried by said camera body, a plurality of stops disposed on said turn-table at varying distances from the center thereof and at intervals peripherally thereof, a motor actuating said camera body, an adjustable stop-lever on the latter, and a hand-lever controlling said stop-lever to throw the same into the path of any one of said stops on said turn-table to limit the movement of said camera to any desired arc, film feeding means disposed on said camera body and actuated by said motor, a shutter disposed between the film and lens in said camera, a spring maintaining said shutter normally

open, and operative connection between said shutter and said motor whereby the former is operated against the action of said spring, said last named connection including said stop-lever.

19. In a panoramic camera, a turn-table, a camera body revolubly mounted thereon, a motor actuating the same, adjustable stopping means disposed on said camera body, stops on said turn-table coacting with said stopping means to limit the arc of movement of said camera body with relation thereto, a hand-lever controlling said stopping means, a shutter, spring actuated means holding said shutter normally open, a trip-lever holding said shutter closed against the action of said spring, a brake engaging a part driven by said motor to normally maintain the latter stopped, hand-controlled means common to said brake and said trip-lever to simultaneously release the same, and means actuated by said motor through the intermediacy of said stopping means closing said shutter against the action of said spring.

20. In a panoramic camera, a turn-table, a camera body revolubly mounted thereon, a motor actuating the same, adjustable stopping means disposed on said camera body, stops on said turn-table coacting with said stopping means to limit the arc of movement of said camera body with relation thereto, a hand-lever controlling said stopping means, a shutter, spring actuated means holding said shutter normally open, a trip-lever holding said shutter closed against the action of said spring, an adjustable stop disposed in operative relation to the shutter opening devices to limit the opening movement thereof, a brake engaging a part driven by said motor to normally maintain the latter stopped, hand controlled means common to said brake and said trip lever to simultaneously release the same, and means actuated by said motor through the intermediacy of said stopping means closing said shutter against the action of said spring.

21. In a panoramic camera, a turn-table, a camera body revolubly mounted thereon, a motor actuating the same, adjustable stopping means disposed on said camera body, stops on said turn-table coacting with said stopping means to limit the arc of movement of said camera body with relation thereto, a hand-lever controlling said stopping means, a shutter, spring actuated means holding said shutter normally open, a trip-lever holding said shutter closed against the action of said spring, an adjustable stop disposed in operative relation to the shutter opening devices to limit the opening movement thereof, a hand-lever controlling said stop, a brake engaging a part driven by said motor to normally maintain the latter stopped, hand-controlled means common to said brake and said

trip-lever to simultaneously release the same, and means actuated by said motor through the intermediacy of said stopping means closing said shutter against the action of said spring.

22. In a panoramic camera, a turn-table, a camera body revolubly mounted thereon, stopping means disposed in operative relation to said camera body and said turn-table to limit the movement of said camera body thereon, hand-controlled means controlling said stopping means, film feeding means disposed on said camera body, a motor common to said camera body and said film feeding means to simultaneously actuate the same, speed regulating means disposed in operative relation to said motor, a hand-lever controlling the same, a shutter, spring actuated means maintaining said shutter normally open, a trip-lever disposed in operative relation to and maintaining said spring actuated means normally in position to close said shutter, an adjustable stop disposed in the path of said spring actuated means to limit the opening movement of said shutter, a hand-lever controlling said stop, said motor and said stopping means being adapted to close said shutter against the action of said spring actuated means, a brake disposed in operative relation to the motor to maintain the same normally at rest, and hand controlled means common to said brake and said

trip-lever to simultaneously release the same to start the motor and open said shutter.

23. In a panoramic camera, motor actuated film feeding devices comprising a driven drum over which the film is trained, a take-up reel, and a driven spring controlled friction clutch disposed in operative relation to and actuating said take-up reel, the latter being capable of free movement relatively to said clutch.

24. In a panoramic camera, motor actuated film feeding devices comprising a driven drum over which the film is trained, a spring-pressed idler holding said film firmly in frictional contact with said drum, a take-up reel, and a driven spring actuated clutching member engaging said reel.

25. In a panoramic camera, motor actuated film feeding devices comprising a driven drum over which the film is trained, a spring-pressed idler holding said film firmly in frictional contact with said drum, a take-up reel, and a driven spring-controlled clutch disposed in operative relation to and actuating said take-up reel.

In testimony whereof I have signed my name in presence of two subscribing witnesses.

JAMES S. STEWART.

Witnesses:

T. FOSTER THOMAS,
JOSEPH MCCOY.