

No. 607,783.

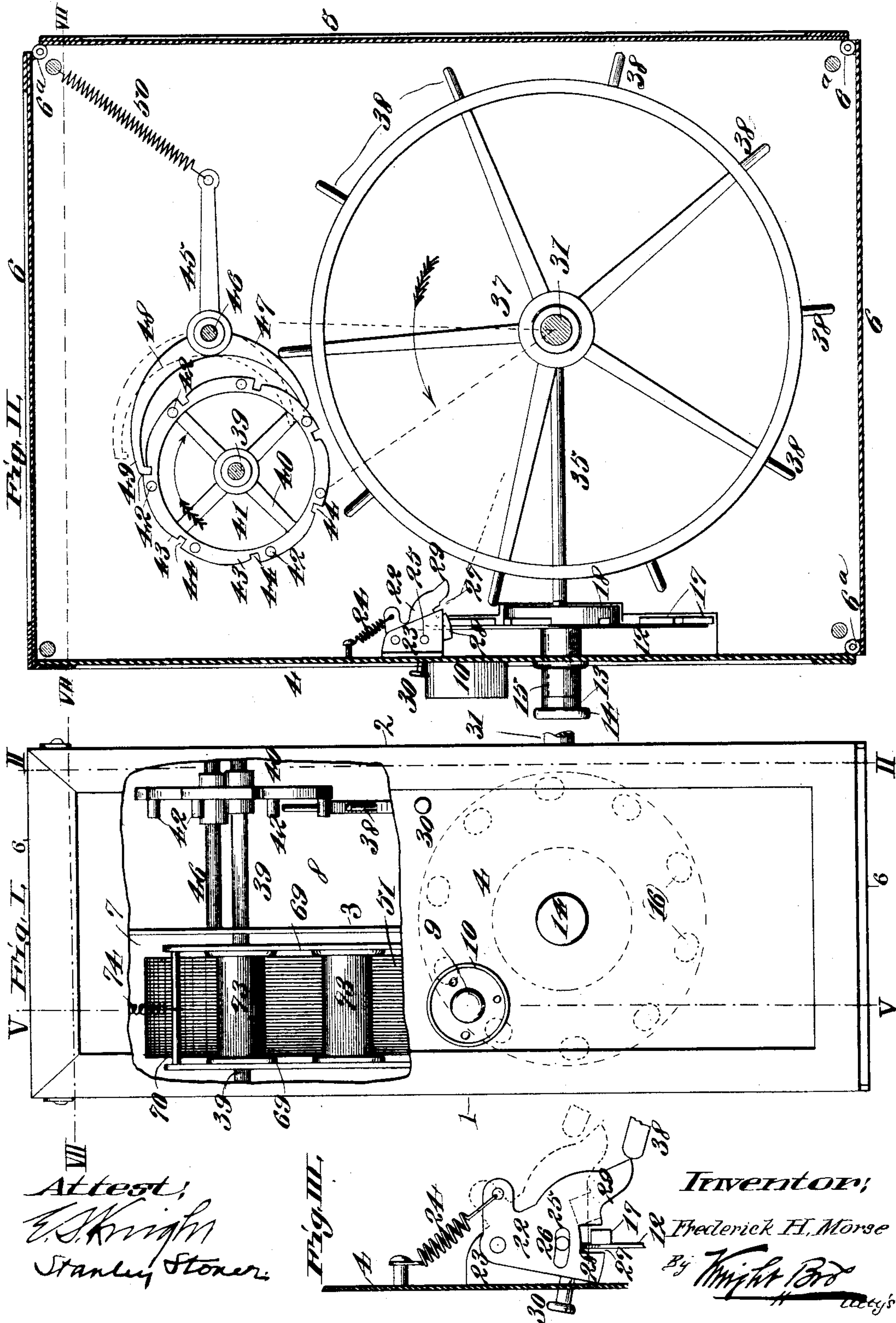
Patented July 19, 1898.

F. H. MORSE.
KINETOGRAPHIC CAMERA.

(Application filed Sept. 7, 1897.)

(No Model.)

3. Sheets—Sheet 1.



No. 607,783.

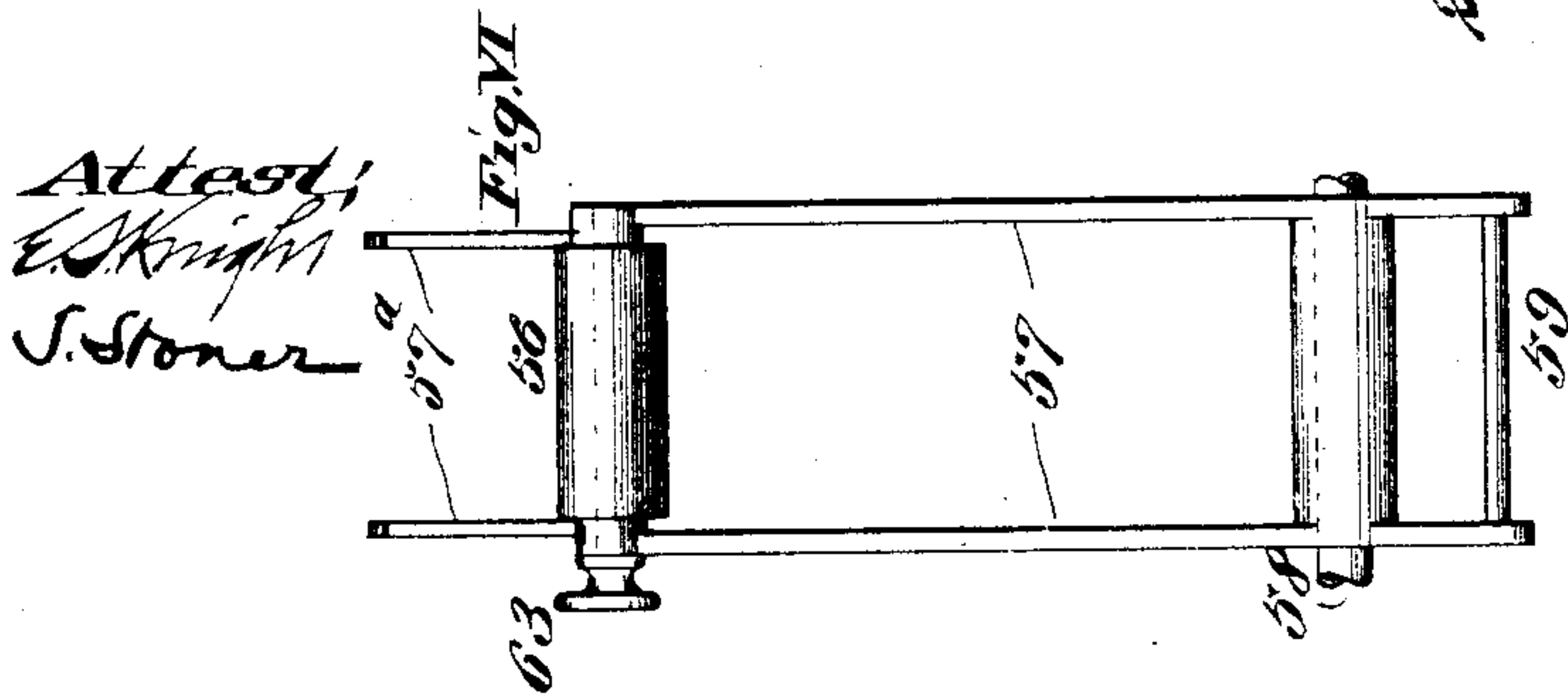
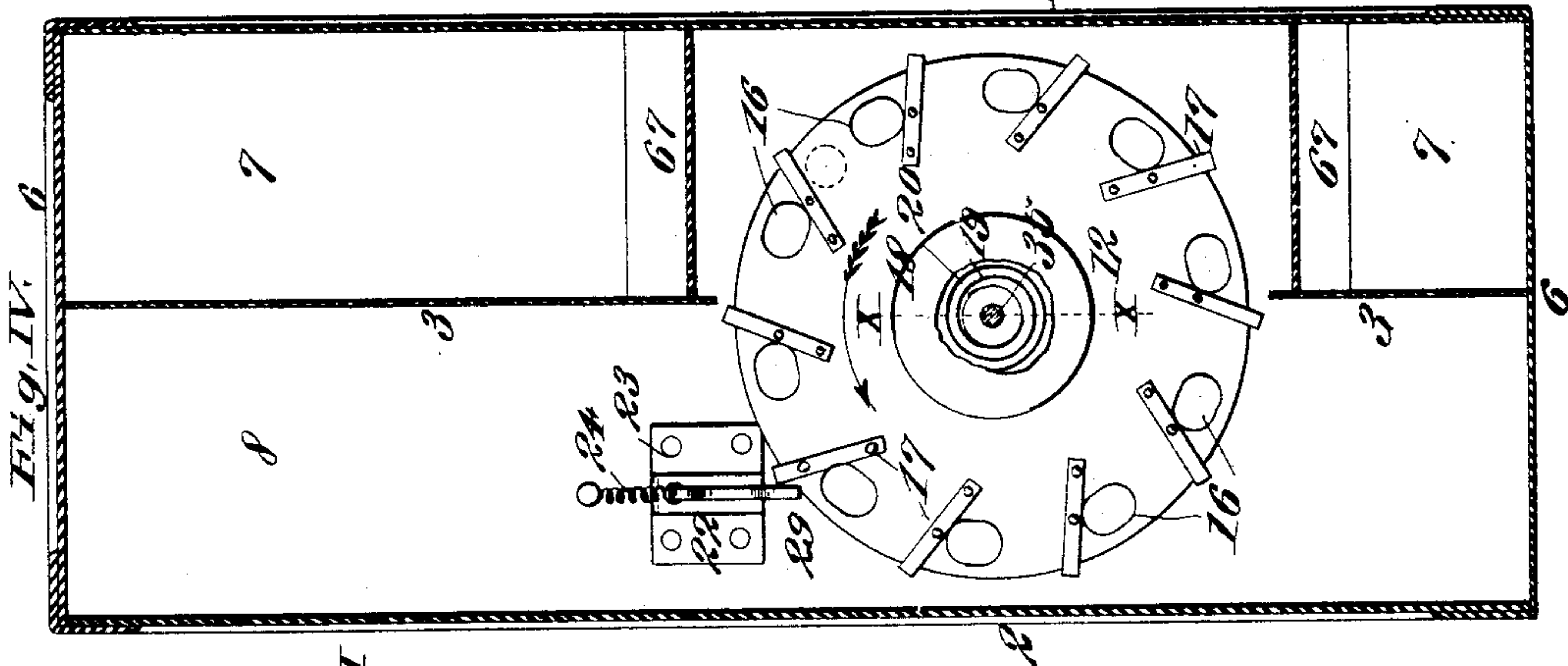
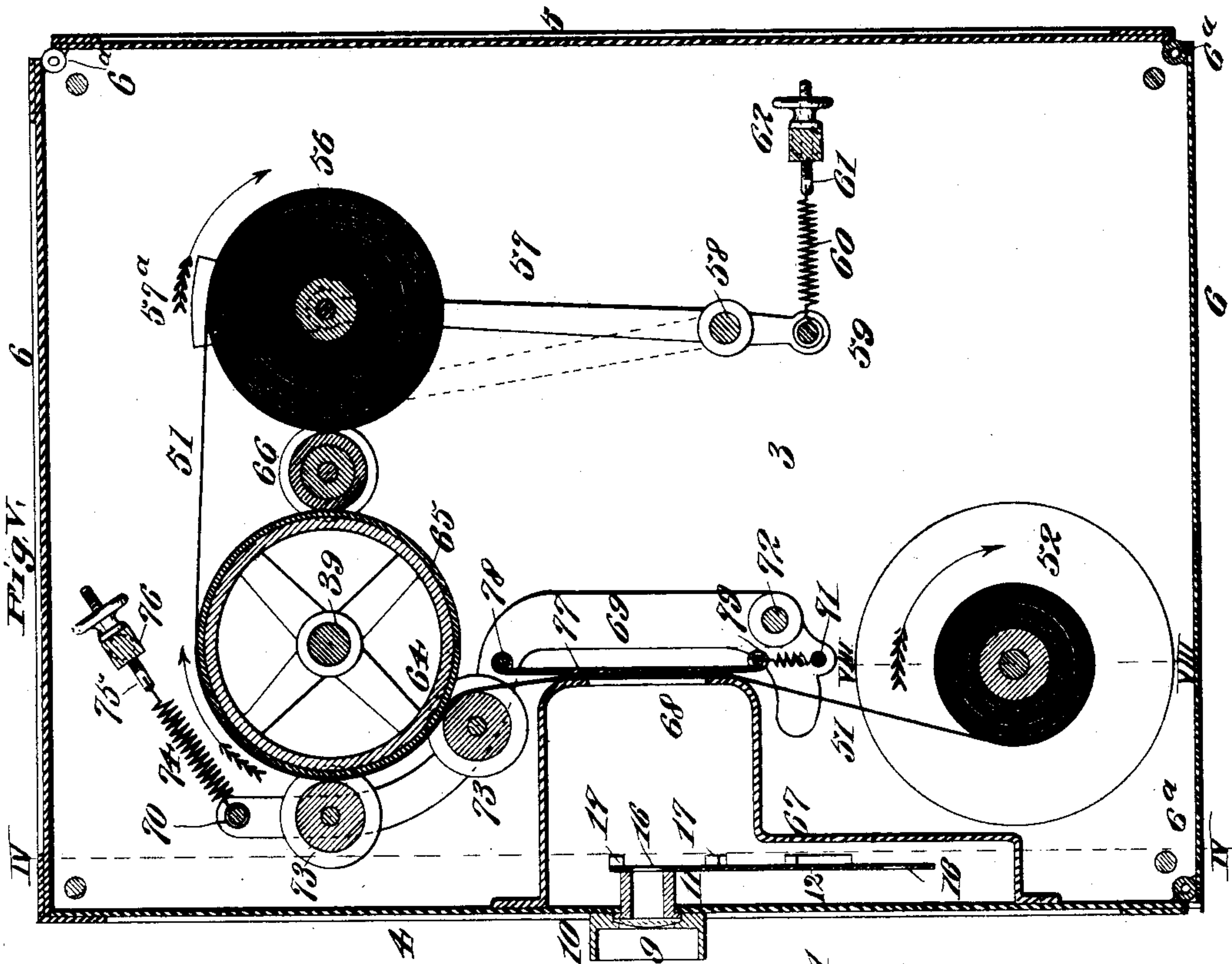
Patented July 19, 1898.

F. H. MORSE.
KINETOGRAPHIC CAMERA.

(Application filed Sept. 7, 1897.)

(No Model.)

3 Sheets—Sheet 2.



Attest,
E. Knight
J. Stoner

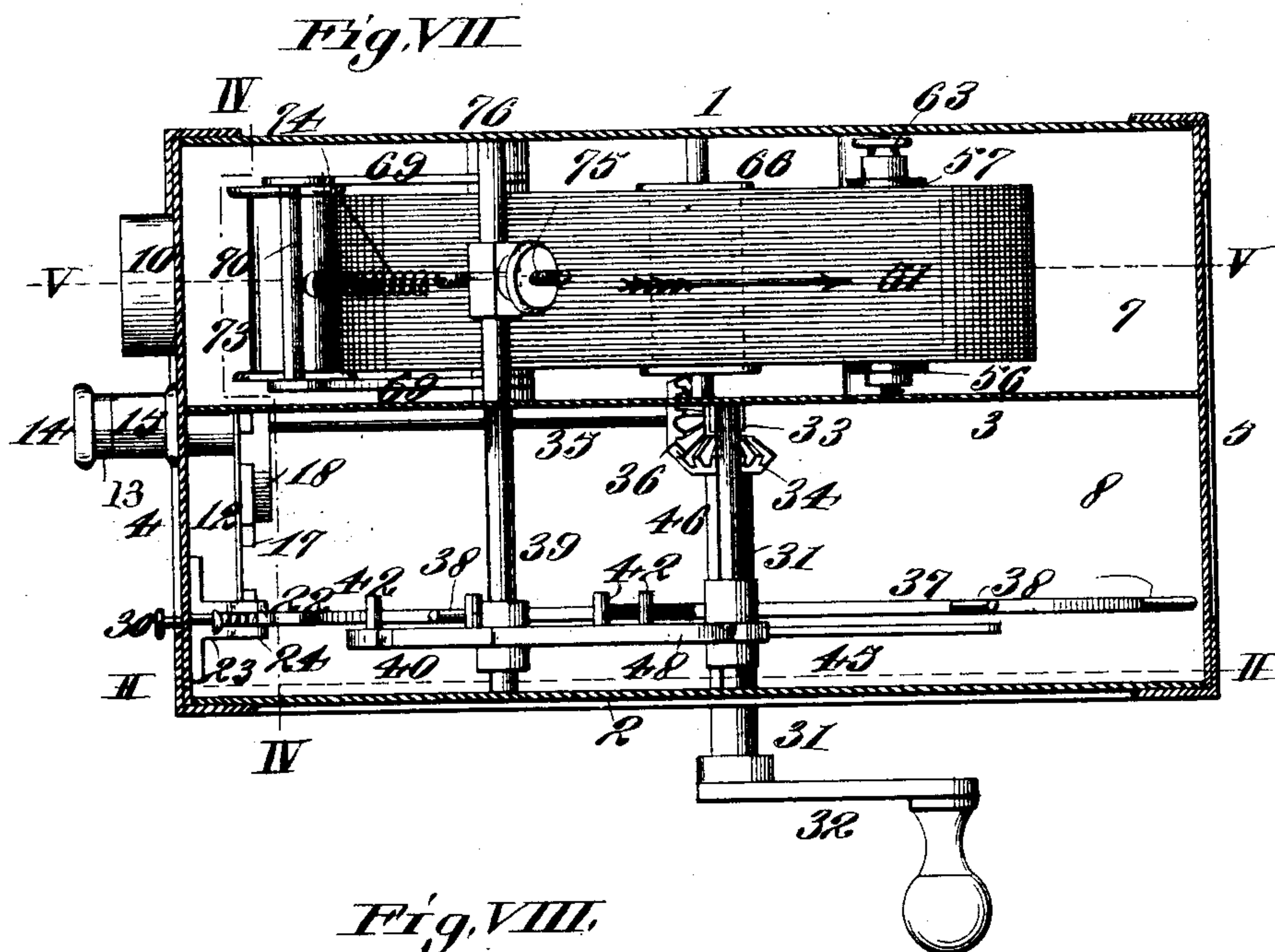
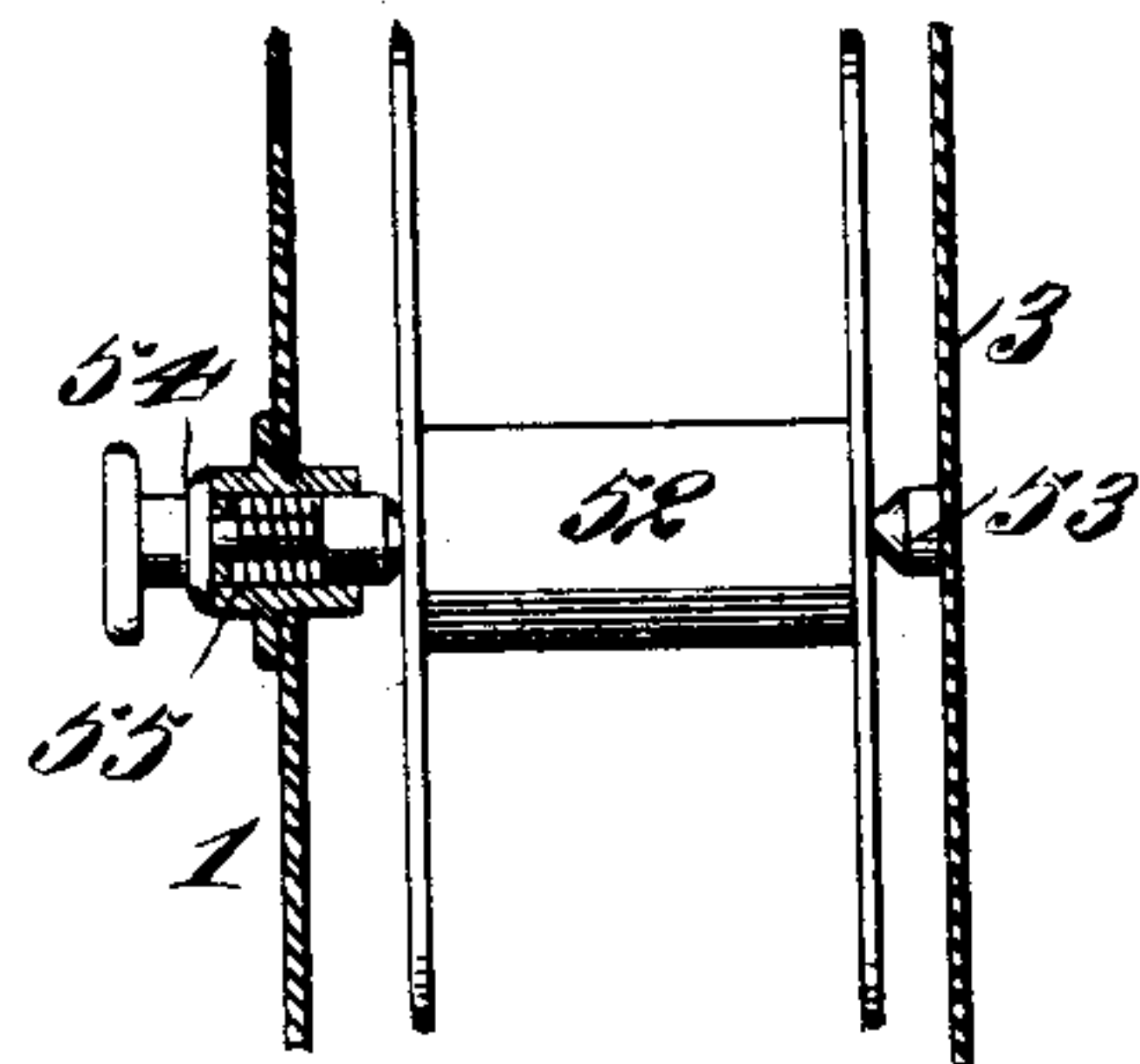
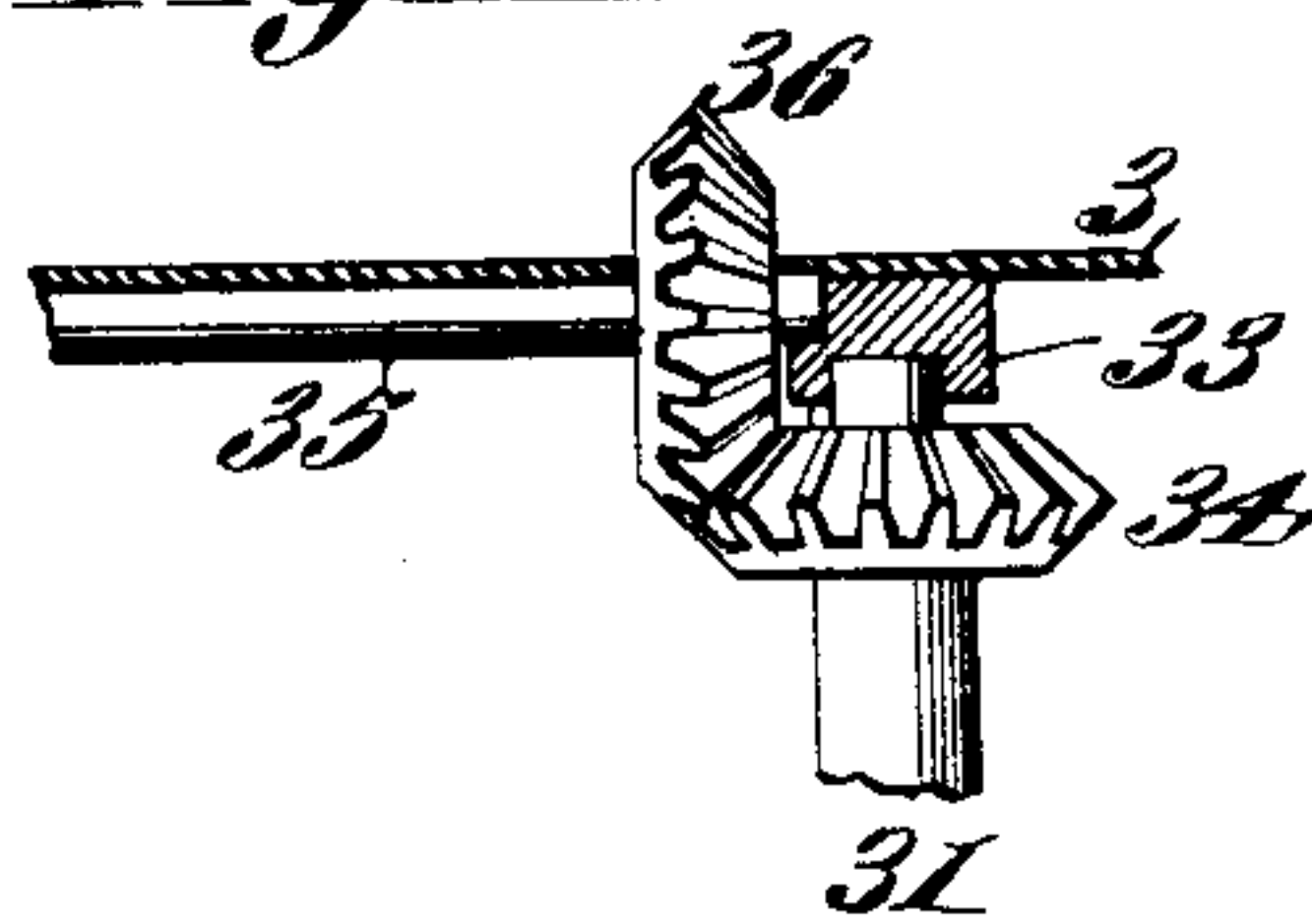
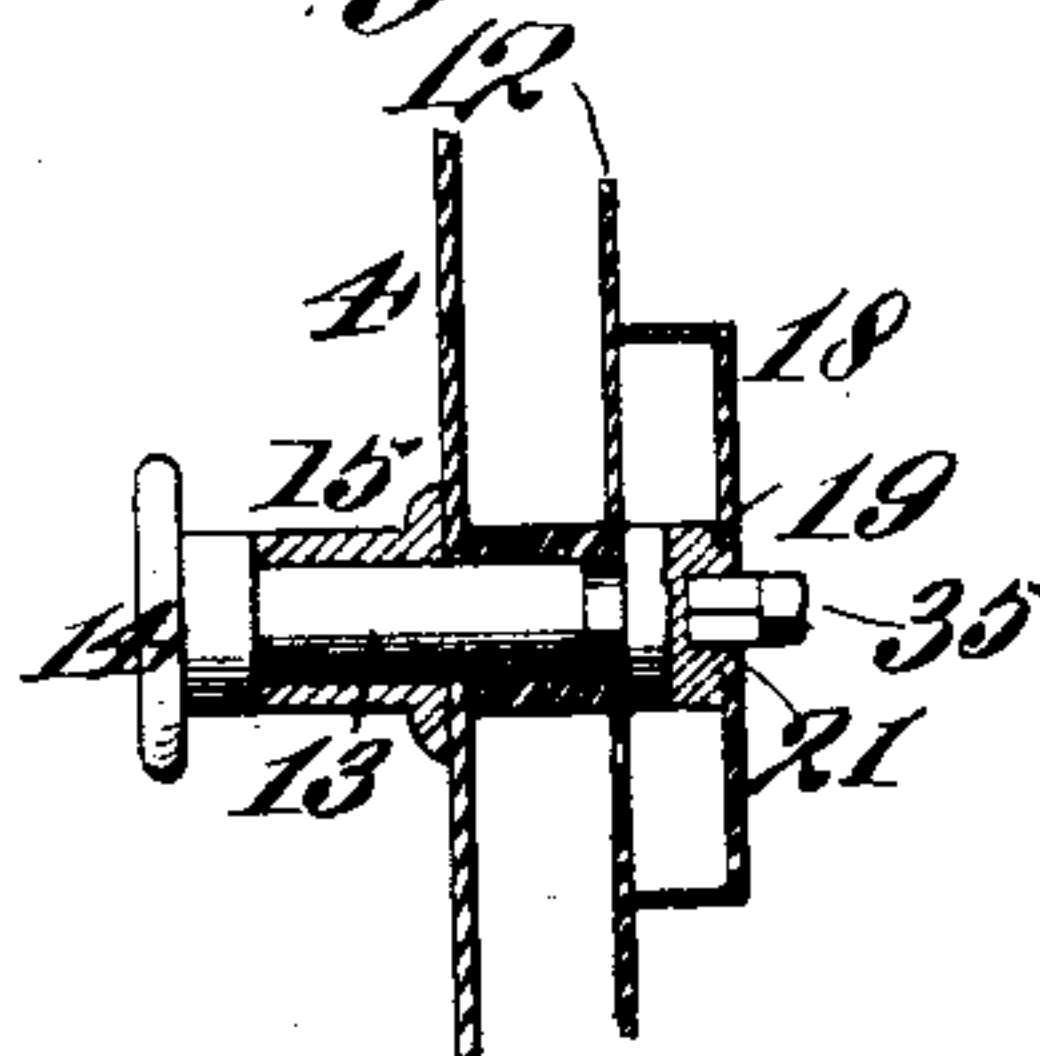
Inventor,
Frederick H. Morse
By *Wm. H. Brod*
attys

F. H. MORSE.
KINETOGRAPHIC CAMERA.

(Application filed Sept. 7, 1897.)

(No Model.)

3 Sheets—Sheet 3.

*Fig. VIII.**Fig. IX.**Fig. X.*

Attest:
E. Knight
Stanley Stoner

Inventor:
Frederick H. Morse.
By *Knight, Bro.* atty's

UNITED STATES PATENT OFFICE,

FREDERICK H. MORSE, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF
TO JASON C. SOMERVILLE AND WILLIAM F. BELL, OF SAME PLACE.

KINETOGRAPHIC CAMERA.

SPECIFICATION forming part of Letters Patent No. 607,783, dated July 19, 1898.

Application filed September 7, 1897. Serial No. 650,816. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK H. MORSE, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Series Photographic Cameras, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to that class of photographic cameras employed in effecting photographic exposures upon a traveling sensitized film or strip. Such cameras are especially intended for use in the production of panoramic series of views of moving objects, the succeeding views produced on the film or strip illustrating the successive positions assumed by the object or objects being depicted.

My invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a front elevation of the camera, showing a portion broken out to afford an insight into the interior mechanism. Fig. II is a sectional view taken on the lines II II, Figs. I and VII. Fig. III is an enlarged detail side view of the shutter-dog and fragments of the adjacent parts. Fig. IV is a sectional view taken on the lines IV IV, Figs. V and VII. Fig. V is a sectional view taken on the line V V, Fig. VII. Fig. VI is a detail view of the sensitized-strip-receiving-spool carrier. Fig. VII is a sectional view taken on the lines VII VII, Figs. I and II. Fig. VIII is a detail view of the sensitized-strip-delivery spool, with a section shown taken through the spool-mounting on line VIII VIII, Fig. V. Fig. IX is an enlarged detail view of the shutter-spring-winding gear. Fig. X is an enlarged sectional view taken on line X X, Fig. IV.

1 and 2 designate the side walls of the camera-casing.

3 designates a partition located intermediate of said side walls.

4 designates the front casing-wall, 5 the rear wall, and 6 the end walls. These walls are preferably joined by hinges 6^a, so that they may be disconnected from the bottom and top for the purpose of affording access to

the interior of the camera, and two of the walls being provided with a detachable connection that permits of their separation to allow the removal of the walls.

The camera is capable of use when located in any position whatsoever, as it may be set on its side or upon its end, or when it is desired to take a picture of anything directly above it it may be set with its rear wall at the base, as the operation of the camera will be the same, no matter in what position it may be arranged.

Between the side wall 1 and partition 3 is a compartment 7, that contains the sensitized strip and its holding and transmitting mechanism. This compartment is rendered inaccessible to the entrance of light. Between the partition 3 and the side wall 2 of the casing is a compartment 8, that contains the operating mechanism.

9 designates the lens, mounted in the front wall 4, protected at the exterior by a ring 10. At the rear of the lens is a tube 11, that extends into the compartment 7.

12 designates the shutter, which is in the form of a disk carried by a shaft 13, provided with a button 14, the shaft 13 being mounted in a boxing 15. This shutter has its forward face in contact with the tube 11 back of the lens 9.

The shutter 12 is provided with a series of apertures 16, located near its edge, said apertures being preferably elongated, as shown in Figs. I and IV. These apertures admit the entrance of rays of light through the lens into the shield and onto the exposed surface of the film or strip, as hereinafter described, on the manipulation of the shutter.

On the shutter 12, adjacent to the apertures 16, are tongues 17, the purpose of which will be hereinafter explained.

18 designates a spring-containing barrel on the inner face of the shutter 12. Loosely mounted in the barrel 18 is a disk 19, that receives the connection of a spring 20, the other end of said spring being attached to the barrel 18. In the disk 19 is a non-circular recess 21, to which reference will hereinafter be made.

22 designates a dog pivotally mounted in a

hanger or bracket 23 and normally held with its free end projected inward by the exertion of a spring 24, connected to the dog and to the front wall 4 of the casing. The play of the dog 22 is limited by a pin 25, seated in the hanger 23 and passing through a slot 26 in the dog.

The dog 22 is provided with a notch 27, that is adapted to permit of the edge of the shutter 12 and the tongues 17 traveling therethrough when the dog is retracted by the mechanism to be described. The free end of the dog has a heel 28, that is normally held in the path of travel of the tongues 17, and a nose 29, that is adapted to be struck to trip the heel of the dog from engagement with the shutter-carried tongues.

30 is a pull-pin by which the dog may be retracted from the exterior of the camera.

31 designates the operating-shaft of the mechanism of the camera. This shaft is provided with a hand-crank 32 for its actuation, or it may be provided with any other actuation device, through the medium of which the shaft may be manually or mechanically operated. The inner end of the shaft 31 is seated in a block 33 on the partition 3 and carries a miter-wheel 34.

35 designates a shaft having one end seated in the block 33 and provided with a miter-wheel 36, that meshes with the miter-wheel 34. The opposite end of the shaft 35 is of non-circular form, corresponding to the recess 21 in the disk 19, and is adapted to enter said recess.

37 designates a trip-wheel mounted on the shaft 31. This wheel is provided with a plurality of prongs 38, that project from its rim. The prongs trip the sensitized-strip-carrying mechanism and the shutter-controlling dog 22 in the manner to be herein described in the reference to the operation of the apparatus.

39 designates a shaft that extends from side wall to side wall of the casing and is mounted in the side walls and the intermediate partition.

40 is a spacing-wheel carried by the shaft 39, the rim 41 of which has studs 42 upon one of its sides, located equidistant apart. The periphery of the wheel-rim 41 has inclines 43, that lead to notches 44, there being the same number of notches 44 and the same number of inclines 43 that there are studs 42.

45 designates a rocking bar or escapement mounted on a shaft 46. This rocking bar or escapement has a curved arm 47, that is normally in the path of the prongs 38 of the trip-wheel 37, and it also has a curved arm 48, provided with a spur 49, that is arranged to travel on the periphery of the rim 41 of the wheel 40 and engage in the notches 44, said arm being held in contact with the rim 41 by the exertion of a spring 50, connected to the rocking bar 45 and to one of the tie-rods that join the side walls of the casing.

The operating mechanism thus far described is located in the compartment 8 of the

camera. The sensitized-strip holders and transmitters are located in the compartment 7, and I will next proceed to the description of such parts.

51 designates the sensitized strip.

52 designates a delivery-spool upon which the sensitized strip 51 is placed before its insertion into the camera and from which the strip is reeled in making the photographic exposures. The spool 52 is mounted at one side upon a conical bearing 53, and at the opposite side is mounted on the conical end of a pin 54, controlled by a spring 55, on the manipulation of which pin the spool may be readily inserted in position or removed.

56 designates the strip-receiving spool, which is mounted in a rocking frame 57, mounted on a shaft 58. The end of the frame 57 is provided with a rod 59, to which is connected one end of a spring 60, the opposite end of said spring being connected to an adjustment-screw 61, seated in a cross-bar 62. The spring 60 serves to hold the spool 56 projected forwardly. The outer end of the frame 57 is provided with extensions 57^a, that serve as guides to direct the strip 51 in its reeling onto the spool 56. The spool is mounted in the frame on a removable spindle 63.

64 designates an intermediate positive feed-roller mounted on the shaft 39, which, as before described, also carries the spacing-wheel 40. The feed-roller 64 is preferably provided with a pliable covering 65, such as rubber. The strip 51 travels on this feed-roller in its transmission from the delivery-spool 52 to the receiving-spool 56.

66 designates a friction-roller mounted between the feed-roller 64 and the receiving-spool 56, whereby the receiving-spool and the strip winding thereon is turned to wind the strip onto said spool as the apparatus is operated, the spring 60 serving to hold the frame 57 forward, so that the strip is always held in contact with the friction-roller 66.

67 designates a shield secured to the front 4 of the camera-casing, extending across the forward portion of the compartment. In the shield is an exposure-opening 68, (see Fig. V,) located in line with the lens 9. The sensitized strip 51 travels in contact with said shield and traverses the exposure-opening 68.

69 are irregular-shaped side bars, joined by cross-rods 70 and 71, the whole constituting a frame that pivots on a shaft 72. In the side bars of the pivoted frame a pair of pressure-rollers 73 are mounted, said rollers being held toward the feed-roller 64 by a spring 74, connected to the rod 70 at one end and having its opposite end joined to an adjustment-screw 75, mounted in a cross-bar 76, seated in the wall 1 of the casing and the partition 3. The spring 74 holds the rollers 73 pressed inwardly toward the feed-roller 64 and enables the absolute transmission of the sensitized strip, which travels between the feed-roller and the pressure-rollers.

77 designates a flexible pressure-sheet, pref-

erably of felt or other cloth, attached to a rod 78 in the side bars 69 and held stretched by a spring 79, attached to it and to the rod 71. This pressure-sheet is arranged to hold the sensitized strip 51 in close contact with the shield 67 and prevent the buckling or wrinkling of the strip 51 as it is conveyed across the exposure-opening 68.

The operation of the apparatus is as described below. The sensitized strip being placed upon the delivery-spool 52, the spool is placed in its bearings by retracting the pin 54, and the strip is threaded between the shield 67 and the pressure-sheet 77, thence between the pressure-rollers 73 and the feed-roller 64, and over the feed-roller to the receiving-spool 56, to which it is secured. The apparatus is then ready for use. On turning the operating-shaft 31 the trip-wheel 37 carried thereby is put in motion and the actuation of the various parts of the apparatus begins. In the travel of the trip-wheel the prongs 38 in succession first strike the arm 47 of the rocking bar or escapement 45, and, tripping said rocking bar or escapement, cause the spur 49 on the arm 48 to be retracted from engagement in one of the notches 44 of the spacing-wheel 40 against the action of the spring 50. After a prong has thrown the rocking bar from engagement in a notch of the spacing-wheel the continued movement brings the prong into contact with one of the studs 42 of the spacing-wheel and imparts movement to said wheel, carrying it a distance around equal to the distance between the studs 42 or the notches 44. The spur of the rocking-bar arm 48 travels from the notch 44 on the incline 43, and thence to the succeeding notch, into which it enters and remains until the succeeding prong of the trip-wheel again trips the rocking bar. As the spacing-wheel 40 is turned, as described, the feed-roller 64 being mounted upon the same shaft 39, the feed-roller is caused to partake of the same movement as the spacing-wheel and the sensitized strip is positively transmitted on the feed-roller and wound thereon to the receiving-spool 56, its transmission moving an unexposed surface of the strip into position at the shield 67 and in line with the exposure-opening 68. After the prong 38 of the trip-wheel has engaged a notch 42 and the rocking bar 45 has engaged with the spacing-wheel and the movement of the spacing-wheel, and consequently the feed-roller 64, has ceased one of the prongs 38, coming into contact with the nose 29 of the pivoted dog 22, by which the operation of the shutter is controlled, the prong throws said dog inward against the action of the spring 24, and the heel 28 of the dog is released from engagement with the tongue 17, which previously bore against it, and the notch 27 of the dog is brought into line with the shutter, the tongue thereby leaving passage-way for the travel of the tongue 17, and the shutter is propelled, the move-

ment of said tongue through the notch acting under the influence of spring 20, carried within the barrel 18 of the shutter, the prong 38, securely passing the pivoted dog, bringing the heel 28 again into the line of travel of the tongue 17, and the succeeding tongue strikes said heel, thereby preventing more than one opening 16 of the shutter from coming into line with the lens 9 and effecting more than a single exposure on each operation of the shutter.

It will be observed that there is always an intermittent movement of the spacing-wheel 40 and a period between such movements imparted to the spacing-wheel, so that the spacing-wheel, and consequently the feed-roller by which the sensitized strip is actuated, must come to a standstill before the shutter is actuated, and there is consequently a positive stop in the travel of the sensitized strip while the exposure, through the lens, on the action of the shutter is being accomplished. As the apparatus is operated and the shutter 12 revolves, the spring 20, under the influence of which the shutter is turned, is necessarily caused to become unwound. The shaft 35, provided with connection with a disk 19, to which one end of the spring is secured, is arranged to keep the spring constantly wound in operation of the machine. This shaft, as described, is in connection with operating-shaft 31 by means of miter-wheels 34 and 36. Consequently movement imparted to shaft 35 is transmitted to the disk 19 and winds the spring constantly as the machine is operated.

For the purpose of obtaining the desired tension upon spring 20, and thereby increasing or diminishing the rapidity of the movement of the shutter, the spring may be more tightly wound upon its disk by turning the shaft 13, upon which it is carried. To enable this to be accomplished, it is necessary to retract the dog 22 from engagement with the shutter, and to accomplish this I provide a pull-pin 30, upon grasping which the dog may be retracted and the shutter be turned by grasping the button 14 of shaft 13, and the spring 20 will thereby be wound and its tension be increased; or it may be allowed to unwind and its tension be decreased, according to the degree of rapidity desired to be obtained in the shutter. It will of course be understood that when this is accomplished it is necessary to protect the lens 9 to prevent the light from entering the casing there-through. Another means by which the shutter-controlling spring may be increased in tension is by grasping and holding the button 14 of shaft 13 and turning the operating-shaft of the apparatus, which will cause the shaft 35 to turn the disk and wind the spring regardless of any movement of the shutter while this is being accomplished. This plan, however, is only feasible when the apparatus is empty.

I claim as my invention—

1. In a series photographic camera, the combination of a casing, a lens, a shutter, means for imparting motion to said shutter, a dog arranged to control said shutter, a delivery-spool, a receiving-spool, an intermediate positive feed-roller arranged to transmit a sensitized strip from the delivery-spool to the receiving-spool, a spacing-wheel mounted on the shaft with said feed-roller, studs carried by said spacing-wheel, and a trip-wheel arranged to contact with said spacing-wheel studs and said shutter-controlling dog and actuate said spacing-wheel with the feed-roller, and dog intermittently and alternately, substantially as described.

2. In a series photographic camera, the combination of a casing, a lens, a shutter, means for imparting motion to said shutter, a dog arranged to control said shutter, a delivery-spool, a receiving-spool, an intermediate positive feed-roller arranged to transmit a sensitized strip from the delivery-spool to the receiving-spool, a spacing-wheel mounted on the shaft with said feed-roller, studs carried by said spacing-wheel, a rocking bar or escapement arranged to engage said spacing-wheel and a trip-wheel arranged to trip said rocking bar and actuate said spacing-wheel with the feed-roller, and shutter-controlling dog intermittently and alternately, substantially as described.

3. In a series photographic camera, the combination of a casing, a lens, a shutter, means for imparting motion to said shutter, a dog arranged to control said shutter, a feed-roller arranged to transmit a sensitized strip, a notched spacing-wheel mounted on the shaft with said feed-roller, studs carried by said spacing-wheel, a rocking bar having an arm provided with a spur adapted to engage in the notches of said spacing-wheel, and a trip-wheel arranged to trip said rocking bar and actuate said spacing-wheel and shutter-controlling dog intermittently and alternately, substantially as described.

4. In a series photographic camera, the combination of a casing, a lens, a shutter, means for imparting motion to said shutter, a pivoted dog arranged to control said shutter, a feed-roller arranged to transmit a sensitized strip, a notched spacing-wheel mounted on the shaft with said feed-roller, studs carried by said spacing-wheel, a rocking bar having an arm provided with a spur adapted to engage in the notches of said spacing-wheel, a spring arranged to hold said rocking-bar arm to said wheel, a second arm carried by said rocking bar, and a trip-wheel arranged to strike said second arm to trip said bar and actuate said spacing-wheel and shutter-controlling dog, substantially as described.

5. In a series photographic camera, the combination of a casing, a lens, a shutter comprising a disk having openings therein, tongues carried by said disk, a spring arranged to im-

part motion to said shutter, a dog arranged to control said shutter, means for transmitting a sensitized strip, and means for actuating said strip-transmitting means and dog intermittently and alternately, substantially as described.

6. In a series photographic camera, the combination of a casing, a lens, a shutter, a spring arranged to impart motion to said shutter, means for controlling said shutter, means for transmitting a sensitized strip, means for actuating said strip-transmitting means and shutter-controlling means, and means connected with said actuating means and said shutter-operating spring for winding said shutter-operating spring at each movement of said actuating means, substantially as described.

7. In a series photographic camera, the combination of a casing, a lens, a shutter comprising a disk, a spring connected to said disk, a dog for controlling said shutter; a sensitized-strip-transmitting feed-roller, a spacing-wheel, means for holding said spacing-wheel from movement, a trip-wheel arranged to release said spacing-wheel and trip it and said dog, and a shaft providing connection between said trip-wheel and said shutter-spring at each movement of said trip-wheel, substantially as described.

8. In a series photographic camera, the combination of a casing, a lens, a shutter, a spring for imparting motion to said shutter, a shaft upon which said shutter is mounted, a dog for controlling said shutter, a pull-pin by which said dog may be released, means for transmitting a sensitized strip, and means for actuating said strip-transmitting means and dog intermittently and alternately, substantially as described.

9. The combination of the camera-shutter and the means for controlling and operating the camera-shutter, a feed-roller, a shaft on which said feed-roller is mounted, a notched wheel also mounted on said shaft, studs extending from one side of said wheel, a pivoted bar provided with two arms, means for putting one of said arms into engagement with the notched wheel, and a toothed wheel adapted for engagement with the other arm of the rocking bar and also the studs; substantially as described.

10. The combination of the camera-shutter and the means for controlling the camera-shutter, the toothed wheel, the notched wheel, studs projecting from one side of the same, the pivoted rocking bar provided with two arms arranged in different vertical planes adapted respectively for engagement with the notched wheel and the toothed wheel, and means for putting one of said arms into engagement with said notched wheel; substantially as described.

11. The combination of the camera-shutter and the means for controlling the camera-shutter, the notched wheel, studs extending

laterally from said wheel, a pivoted rocking bar comprising two arms in different vertical planes, one of said arms being adapted to engage the notched wheel, means to engage the other arm and the said studs whereby the notched wheel is released from the first-named arm and rotated, and means for causing said first-named arm to again engage the notched wheel; substantially as described.

FREDERICK H. MORSE.

In presence of—

E. S. KNIGHT,
STANLEY STONER.