

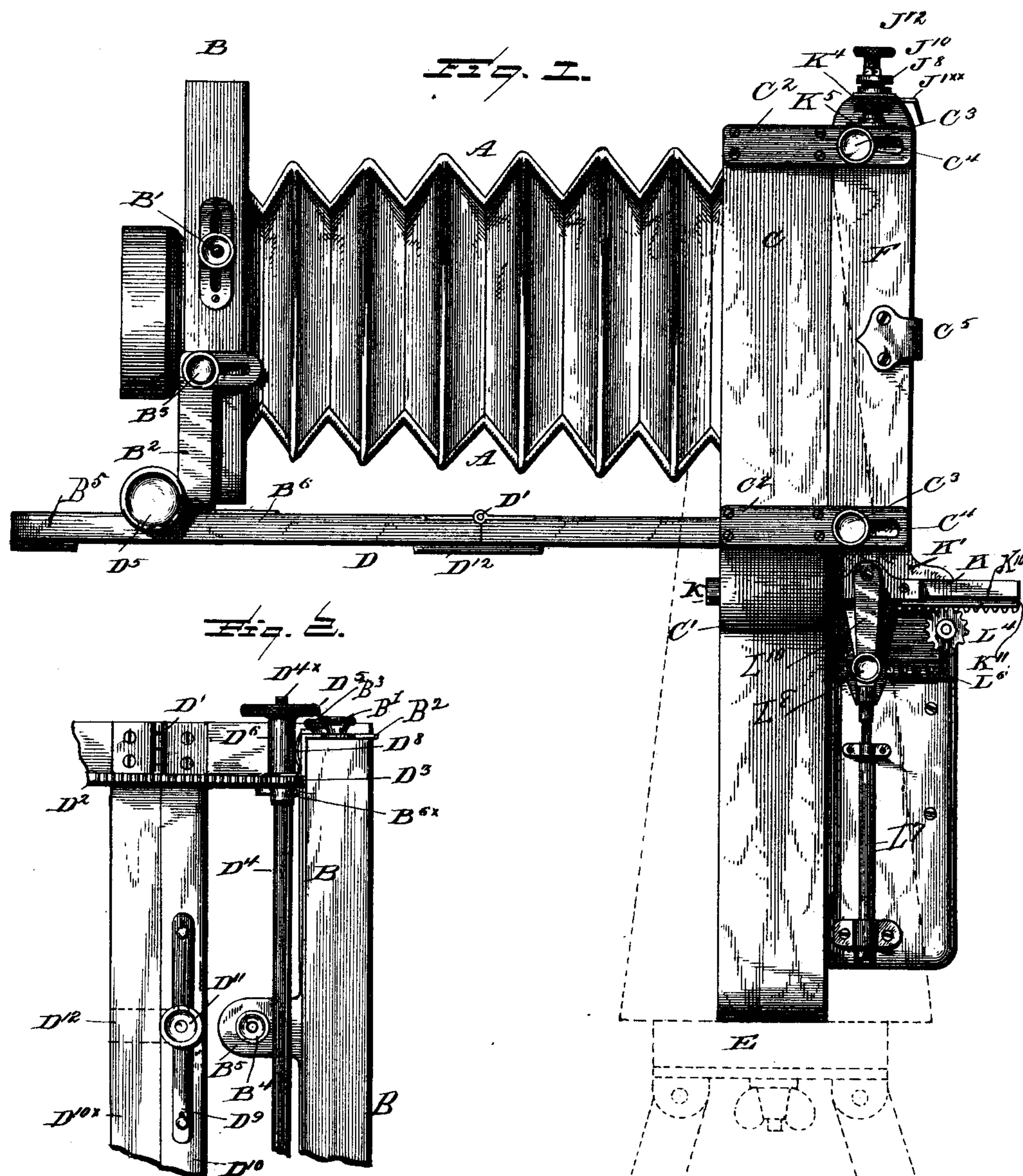
(No Model.)

6 Sheets—Sheet 1.

**T. S. WILES.**  
**MAGAZINE CAMERA.**

No. 464,783.

Patented Dec. 8, 1891.



Witnesses  
J. Murdman.  
L. C. Hills

Inventor  
Thomas S. Wills.  
by E. B. Stocking  
Attorney.

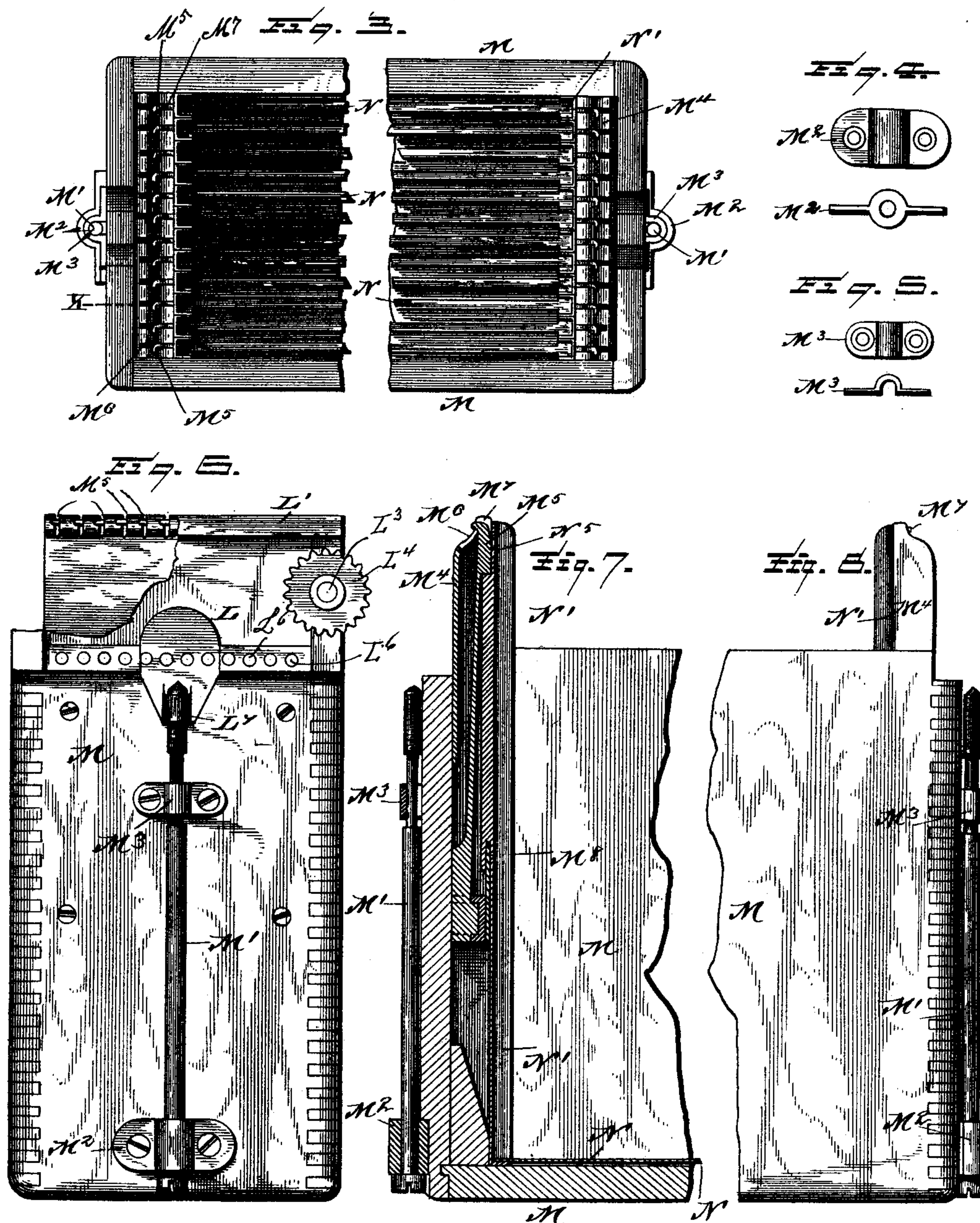
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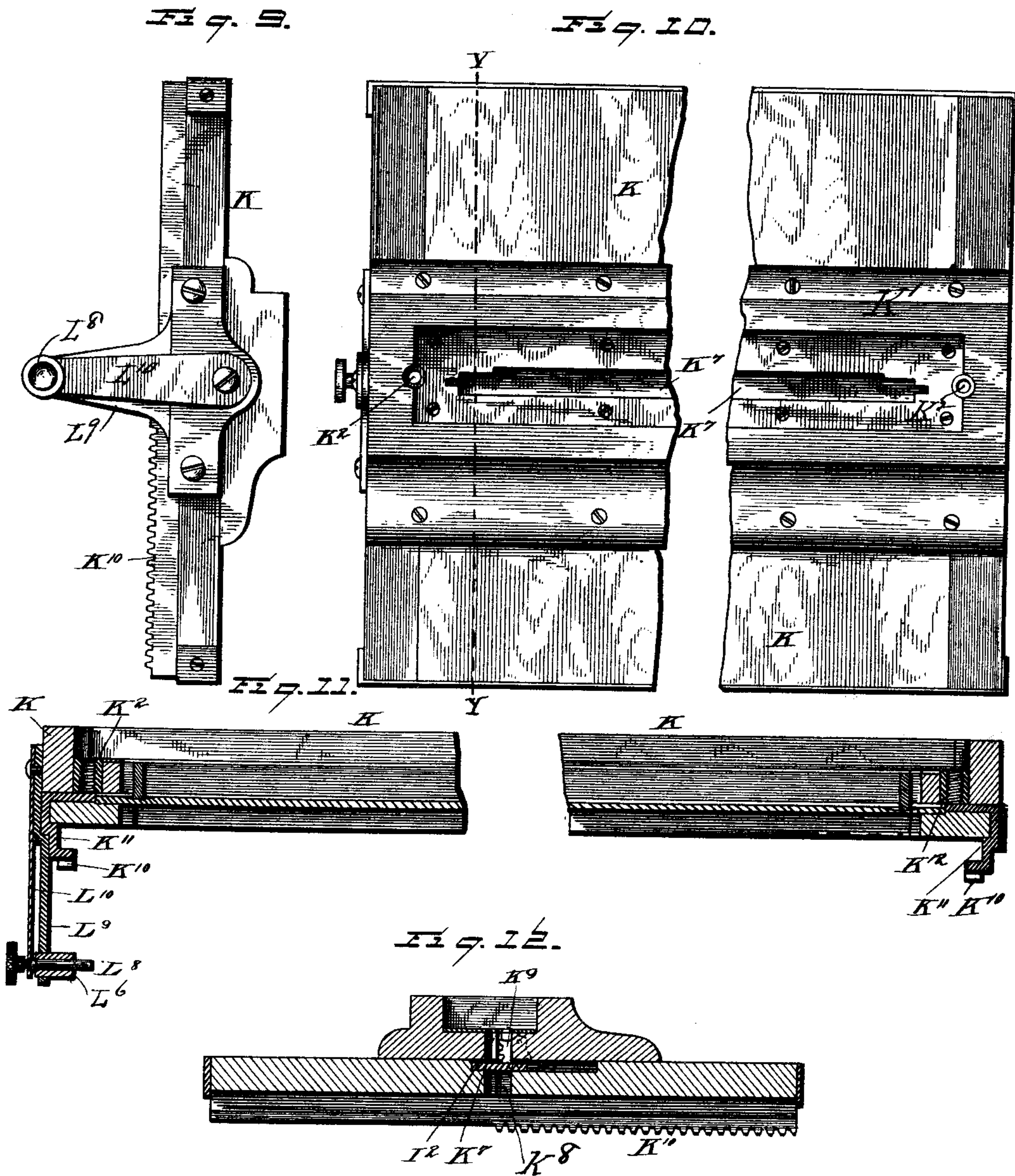
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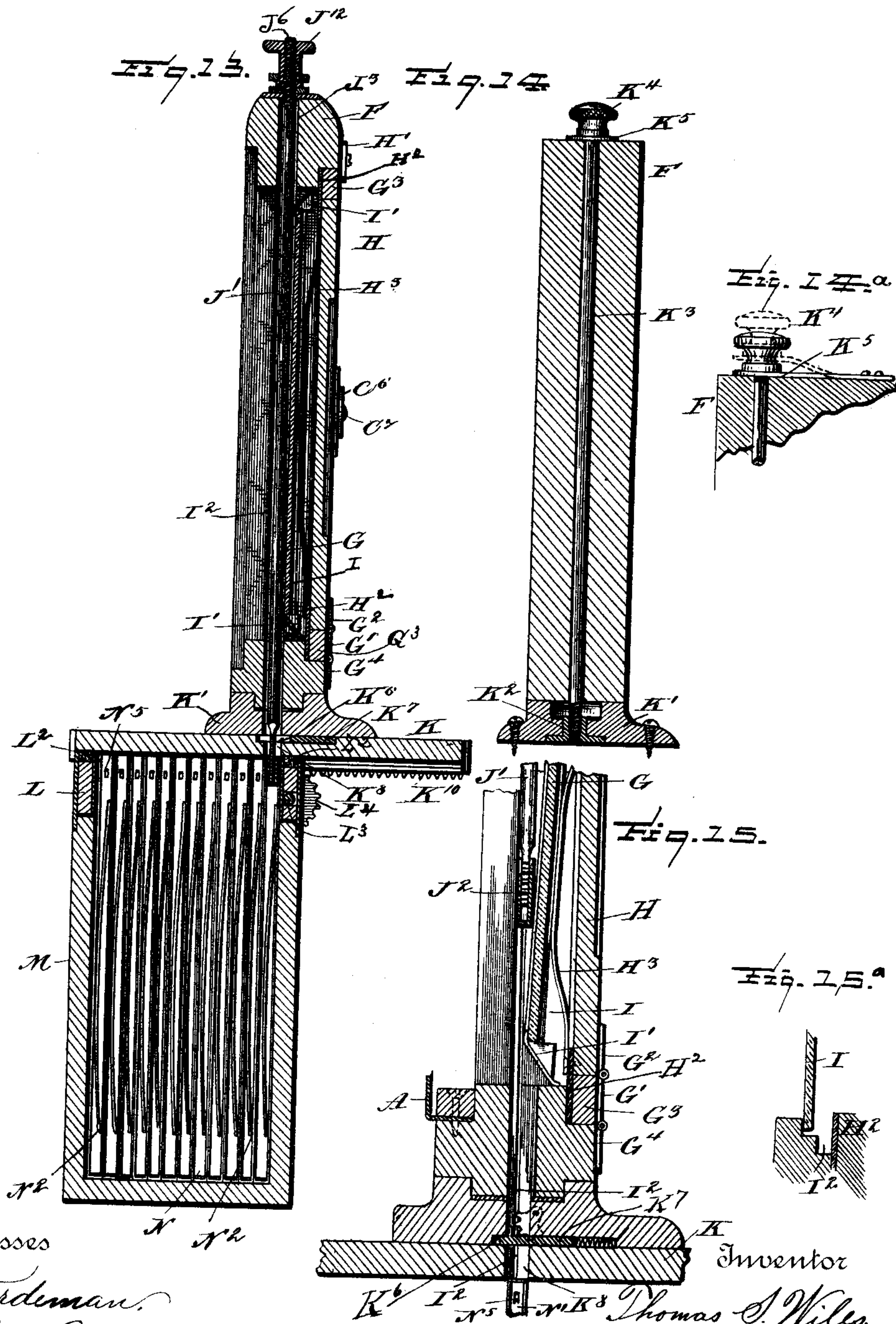
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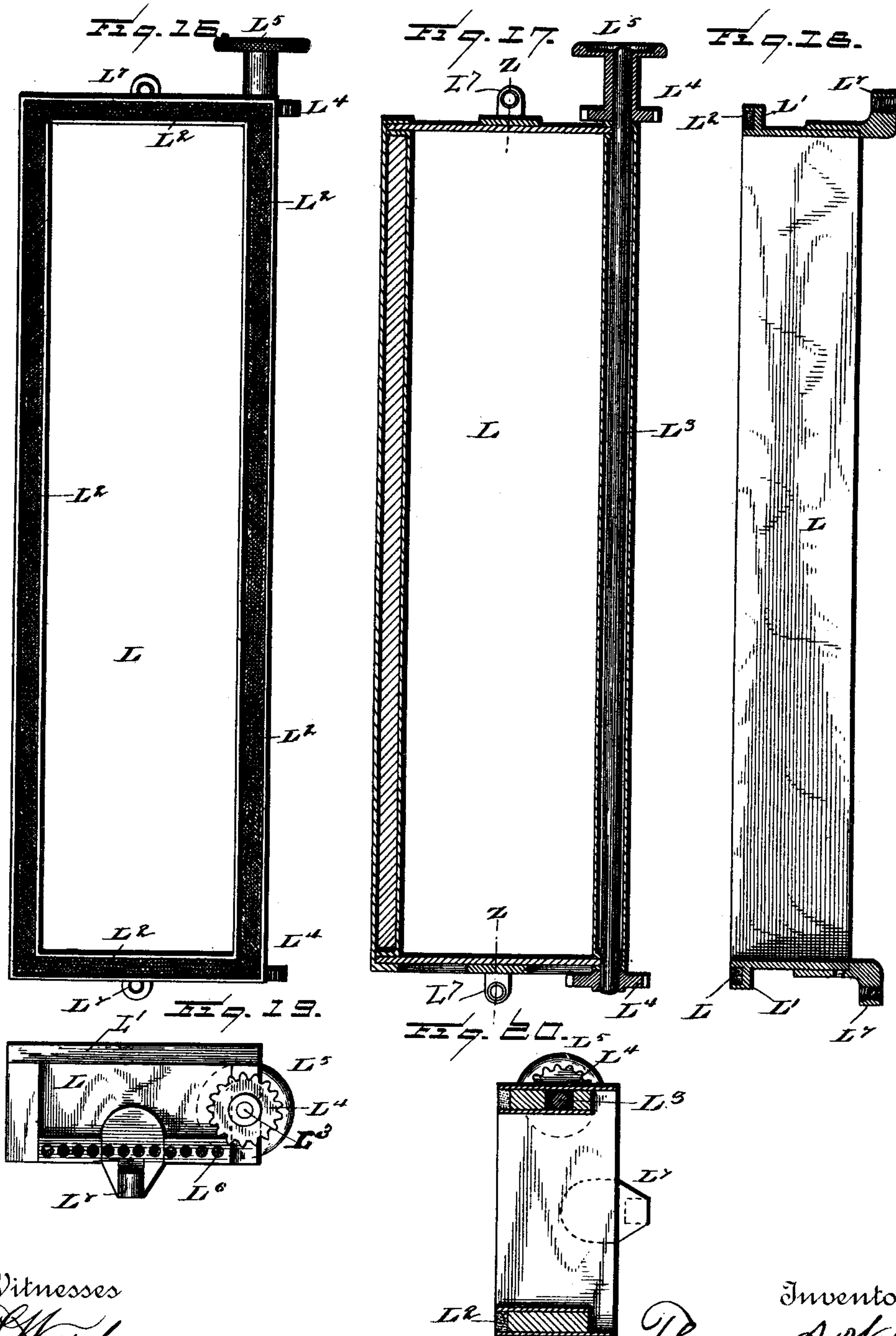
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6 Sheets—Sheet 5.

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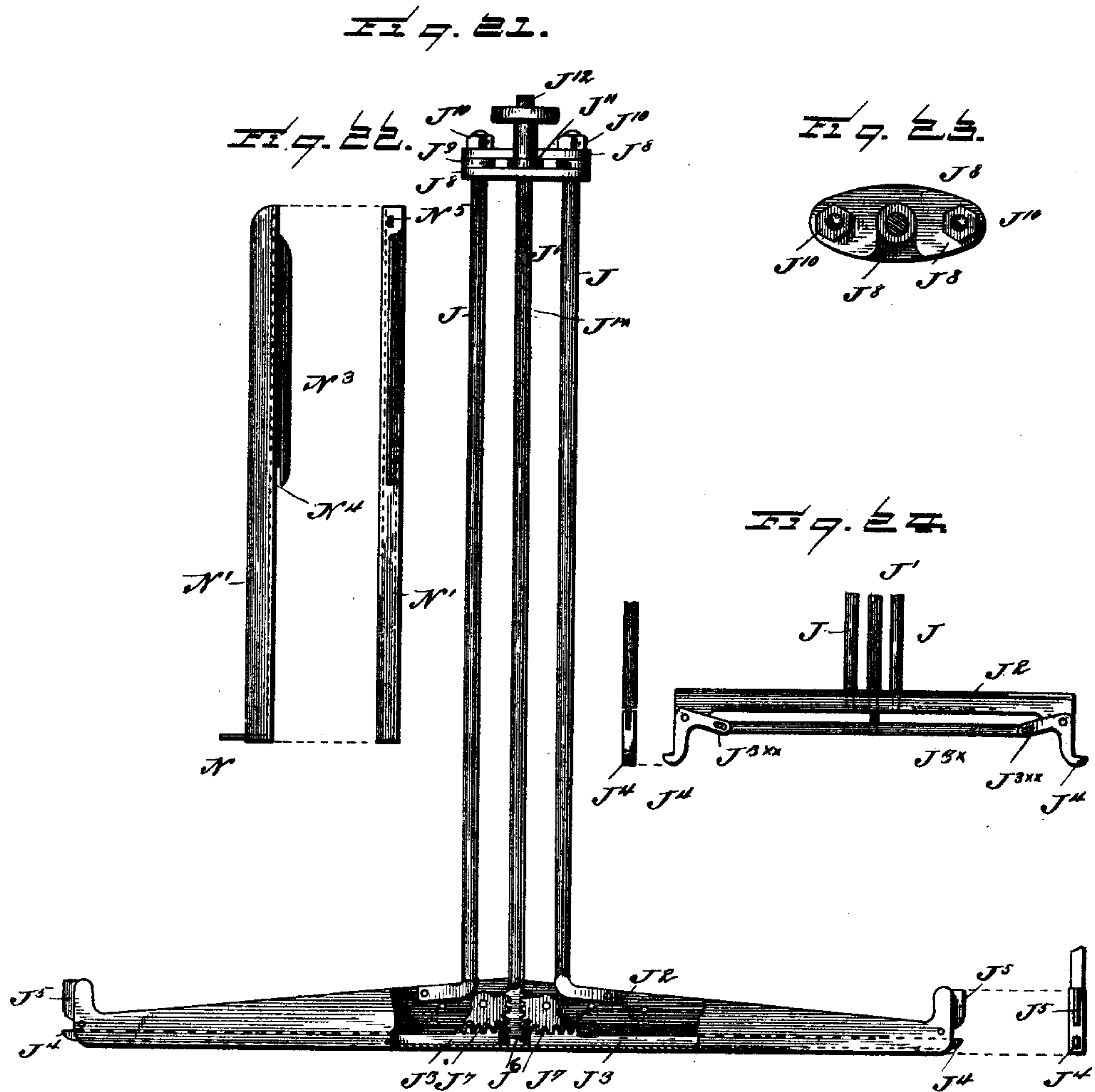
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6 Sheets—Sheet 6.

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# UNITED STATES PATENT OFFICE.

THOMAS S. WILES, OF ALBANY, NEW YORK.

## MAGAZINE-CAMERA.

SPECIFICATION forming part of Letters Patent No. 464,783, dated December 8, 1891.

Application filed October 15, 1890. Serial No. 368,220. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS S. WILES, a citizen of the United States, residing at Albany, in the county of Albany, State of New York, have invented certain new and useful Improvements in Magazine-Cameras, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention has relation to what are known as "magazine-cameras;" and the principal objects of the invention are to provide a camera which is adapted for all the desirable adjustments of its lens-board and plate-holder and at the same time to permit of the adaptation and use in connection therewith of a magazine and plate-transferring device which shall be of minimum simplicity and maximum accuracy.

Other objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a side elevation of a magazine-camera constructed in accordance with my invention. Fig. 2 is a partial plan with the front frame moved back of the hinge-line, the lens-tube and bellows being removed. Fig. 3 is a plan of the magazine detached. Figs. 4 and 5 are front and end elevations of the bearings for the magazine-attaching screws. Fig. 6 is an end elevation of the magazine and its upper section. Fig. 7 is a vertical section on the line  $x$  of Fig. 3. Fig. 8 is a partial side elevation of the magazine with its upper section removed. Fig. 9 is an end elevation, and Fig. 10 a plan, of the top of the magazine. Fig. 11 is a central longitudinal vertical section of the magazine. Fig. 12 is a transverse section on the line  $Y$  of Fig. 10 of the magazine-top. Fig. 13 is substantially a central vertical section of the rear frame with the magazine in position thereunder. Fig. 14 is a similar section near one side of the plate holding portion and showing the rod that connects the top of the magazine to the camera at the plate-holding portion thereof. Fig. 14<sup>a</sup> is a detail showing the spring for holding the rods. Fig. 15 is a vertical section illustrating the action of the focusing-screen during the plate-transferring operation. Fig. 15<sup>a</sup> is a sectional detail which will be hereinafter more particularly referred

to. Fig. 16 is a plan of the upper section of the magazine, showing the construction employed to produce a light-proof joint between it and the top. Fig. 17 is a transverse section taken on a line passing through the center of the pinions employed in moving the magazine for manipulating successive plates therein. Fig. 18 is a vertical section taken on the line  $z$ , Fig. 17. Fig. 19 is an end elevation of the upper section of the magazine. Fig. 20 is a transverse section of the same. Fig. 21 is a side elevation, with parts broken away, of the plate-manipulating devices and an accompanying end elevation of the lower portion thereof. Fig. 22 is a side and an edge view of one end of a plate-holding frame. Fig. 23 is a plan of the upper end of the plate-manipulating devices, and Fig. 24 is a side elevation and an accompanying end elevation of a modified plate-manipulating device.

Like letters of reference refer to like parts in all the figures of the drawings.

A represents the bellows, B the front frame, and C the back frame, of a camera. The back frame is extended below the folding front-frame-supporting platform D and adapted in any suitable manner for connection with a tripod E. (Shown in dotted lines.) The back frame may, if desired, be widened, as indicated by dotted lines in Fig. 1, to provide a substantial base for connection with a tripod, and it may be extended at either side in curved  $C'$  or other outlines to permit the passage of the projecting parts of the magazine, which are passed in a use of the camera through the extension of the frame.

The folding platform D is made in sections united by hinges  $D'$  and is provided with a rack  $D^2$ , also formed in sections abutting against each other at the hinge-line. Pinions  $D^3$  are mounted on a shaft  $D^4$ , extending from side to side of the platform and at the lower edge of the front frame B. At each end of the shaft there are thumb-nuts  $D^5$ , one of which (shown in Fig. 1) is for rotating the shaft and the pinions  $D^3$  to propel the front frame, which carries the lens, for the purpose of focusing. The opposite thumb-screw  $D^5$  is in the form of or rigidly connected with a sleeve  $D^6$ , interiorly threaded to fit the screw-threaded end  $D^{4x}$  of the shaft. A brass bracket or plate  $D^8$  embraces the shaft  $D^4$  be-



tween the pinion  $D^3$  and sleeve  $D^6$  and is connected with the front frame B. The object of this construction is to lock the frame in position after the operation of focusing, and this is accomplished by turning the thumb-nuts  $D^5$  and sleeve  $D^6$  on the threaded shaft so as to bind the plate  $D^8$  snugly between the sleeve and pinion.

$D^9$  represents a spring which is connected with the cross-bar  $D^{10}$  of the platform, in which the thumb-screw  $D^{11}$  is mounted. The thumb-screw passes through the spring and is adapted to enter the free end of a plate  $D^{12}$ , which is secured to and projects beyond the companion cross-bar  $D^{10x}$  of the platform. These bars are at the hinge-line of the platform and, when the same is extended, abut against each other, and the object of the plate  $D^{12}$  is to bind or lock the platform in an extended position, while the object of the spring is to automatically retain the thumb-screw  $D^{11}$  in its elevated position and within the aperture in the bar  $D^{10}$  when not seated in the threaded end of the plate  $D^{12}$ .

$B^7$  is a thumb-nut mounted on a screw projecting from the lens-board, and, like its companion on the opposite side of the front frame, projecting through said frame, permitting of a vertical adjustment of the lens-board within the frame and the retention of a desired adjustment by binding the ends firmly against the plates surrounding the slots, as shown, to prevent wearing of the frame. This, however, is the common form of adjustment in this class of devices.

$B^2$  is a plate provided one at each end of the frame and connected therewith by means of a thumb-nut  $B^3$ , passing through a slot in the plate, as shown, for the purpose of adjusting the front frame and lens-board to different angles from a vertical line.

By reference to Fig. 2 it will be seen that the lateral inclinations or swinging of the front frame is provided for by the thumb-nut  $B^4$ , passing through a tongue  $B^5$ , secured to the front frame B, and through a plate  $B^6$ , Fig. 1, having brackets  $B^{6x}$ , in which the shaft  $D^4$  is mounted. By a proper manipulation of these various thumb-nuts the lens-board may be elevated or depressed, inclined from a vertical, or swung from a lateral right-angular line above the platform. Therefore it will be seen that, having provided for all the various adjustments of the lens-board, including the focusing of the lens at the front of the camera, the rear portion is left free of various conditions and requirements which would otherwise necessitate a greater or less complexity in the construction of means for successively exposing a series of plates. The simplicity of construction thus permitted aids materially in providing means which are also accurate in their operation. Nevertheless, as will be hereinafter shown, provisions have been made for producing different presentations of a plate at the time of exposure in so far as inclining it at different angles is concerned, and

that, too, when the plate-holding part of the camera is operatively connected with the magazine. Rear holder H and the magazine end are supported as one piece by the thumb-screws  $C^3$ , passing through the slots  $C^2$ , so that any inclination of the holder is simultaneously given to the magazine, thus keeping the plate-transferring mechanism and the groove in which they operate in the holder and magazine always in line with each other. In these respects the invention is not limited to the particular devices employed to produce the results stated.

F represents the plate-holder proper of the camera, the part in which the plate is exposed, and it is connected with the back frame of the camera by straps  $C^2$ , one at each corner and on the ends of the back frame. Thumb-nuts  $C^3$  are seated in the holder F and pass through slots  $C^4$ , formed in the plates  $C^2$ . Now it will be readily seen that by loosening the two upper nuts  $C^3$  the upper edge of the holder can be tilted away from the back frame, and by loosening the lower nuts the lower edge may be tilted in like manner, and, furthermore, by loosening two of the nuts at one or the other end of the holder one or the other end thereof may be swung away from the frame. In this manner the holder may be adjusted angularly with relation to the back frame in four directions and to various degrees of inclination to the back frame.

To render the space between the holder and frame C light-proof when inclinations are given the former and the magazine, such inclinations must either be confined in limit to that of the inseting of the holder in the frame, which usually exists between these parts, or a supplementary bellows or other well-known light-excluding device may be employed, and, as the slots  $C^4$  are long, a rearwardly-projecting flange fitting the interior of the rear frame might be provided for the same purpose.

$C^5$  is a clip secured at one end of the holder and projecting over its face to receive the end of a latch  $C^6$ , Fig. 13. A latch and clip is provided at each end of the holder, and the latch is pivoted by a screw  $C^7$  to a door H, which covers the ground-glass or focusing screen G, Fig. 13. A double hinge  $G^1$  is employed, and its upper leaves  $G^2$  are secured to the door, while its central leaf (indicated by the letter  $G'$ ) is secured to the frame  $G^3$ , which is virtually an extension of the door H. This frame or extension is held in a closed position by ordinary buttons  $H'$ , arranged on the holder above the frame, while the lower leaves  $G^4$  of the hinge are secured to the holder below the frame.

As before stated, the door covers the focusing-glass. To the frame is secured so as to project within the area of the door and extend completely around the inner edge of the frame a metal flange  $H^2$ , which carries upon its inner surface flat springs  $H^3$ , one at each end of the frame. The focusing-glass G is



section. At each end of the magazine there is arranged a brass or other metal casing M<sup>4</sup>. (Shown in section in Fig. 7 and in side elevation in Fig. 8.) This casing has secured therein a series of spring-latches M<sup>5</sup>, which project at their upper end through slots M<sup>6</sup>, formed in the casing. The magazine shown is adapted to receive twelve plates of the ordinary thickness when of glass. It is apparent that the number may be increased without increasing the dimensions of the magazine when thinner film-carriers are employed. The front wall of the casing is slotted, as at M<sup>7</sup>, and the slot extends nearly the entire depth of the casing.

In Fig. 7, M<sup>8</sup> represents the front wall and the termination of the slot therein.

Each of the plate-holders consists of a bottom strap N (see Figs. 7 and 22) and end pieces N', which are grooved from top to bottom and provided with a spring N<sup>2</sup>, as clearly shown in Fig. 13. On the outside of each end piece there is a projecting rib N<sup>3</sup>, which is adapted to travel in the slot M<sup>6</sup> of the casing M<sup>4</sup> and in the groove P<sup>2</sup> of the holder. The lower edge of this rib is slotted, as at N<sup>4</sup>, so as to form a lip, which takes over the upper edge of the inner wall M<sup>8</sup> of the casing M<sup>4</sup>, as clearly illustrated in Fig. 7. Near the top of each end piece there is formed a hole N<sup>5</sup>, into which the bolts J<sup>4</sup> of the bar J<sup>2</sup> take when the thumb-nut J<sup>12</sup> is operated, as hereinafter described. Now it will be seen that when the rods J J' are pushed downwardly as far as the tie-plates J<sup>8</sup> will permit that the cross-bar J<sup>2</sup> is within the upper section of the magazine and its rib J<sup>5</sup> has entered the slots M<sup>6</sup> in the opposite end pieces of an individual-plate holder, and by thus entering said ribs J<sup>5</sup> force the latches M<sup>5</sup> out of the openings N<sup>5</sup> of said end pieces, each latch M<sup>5</sup> being provided with a lug, which rests in said openings when not otherwise influenced. At this point of the operation the cross-bar is positively connected with the individual-plate holder, which has been brought opposite the throat or opening in the top of the magazine. Now by drawing upwardly the rods J J' the cross-bar and the temporarily-connected individual-plate holder are brought into the plate-holder proper of the camera and the focusing-glass is forced to the rear against the tension of the springs H<sup>3</sup>, and the plate may be now exposed, the individual-plate holder and the cross-bar J being outside the margins of the exposing-plane. After exposure the plate is returned by depressing the rods J J'. The thumb-nut J<sup>12</sup> is turned so as to draw the rod J' upwardly, which, by the intermediate connections, withdraws the bolts J<sup>4</sup> from the holder. The rods are then raised until the catch J'<sup>x</sup> takes into the opening J'<sup>x</sup> in the rod J', which indicates that the cross-bar is out of the path of the magazine, so that it may be moved by means of the thumb-nut L<sup>5</sup> and its adjuncts, first withdrawing the pin and allowing it to seat itself in the next succeeding hole L<sup>6</sup>. Now the rods and cross-bar

are again depressed and connected with the succeeding individual-plate holder, when the operation may be repeated.

While I have particularly described the construction illustrated in the drawings, it is apparent that many modifications can be made and adaptations can be adopted varying in any manner and to any extent within mechanical skill. For example, the substantial elements of the means for focusing and of the means for tilting the front frame may be applied to a back frame of a camera, if desired. So, also, certain features of construction may be employed in other than magazine-cameras.

What I claim is—

1. A camera provided with a plate-holder proper, adjustable at all points of connection with the camera and having a sliding magazine secured to the plate-holder, substantially as specified.
2. A camera having its lens-board connected with its front frame for vertical adjustment and its front frame connected with its plate-holder proper adjustable at all points of connection, and a sliding magazine communicating with the plate-holder, substantially as specified.
3. In a camera, the combination of a foldable platform and a locking-bar fixedly secured to and extending from one section to the other, a thumb-screw, and an automatic retainer, substantially as described.
4. In a camera, a back frame extended to form a magazine-embracing frame and a basis for the connection with the camera of a tripod, substantially as specified.
5. The combination, in a camera, of a back frame constructed to permit the passage therethrough of the magazine and for the connection therewith of a tripod, a plate-holder proper, and a magazine operatively connected therewith, substantially as specified.
6. In a camera, a back frame extended to embrace a magazine, in combination with a plate-holder proper, adjustable plate-holder-connecting devices, and with a magazine operatively connected with the plate-holder, substantially as specified.
7. In a camera, the combination, with its back frame, of a plate-holder proper, and a magazine-top secured thereto by means of rods passing through the plate-holder frame and retained therein by means of springs, substantially as specified.
8. In a camera, a plate-holder having a door provided with a surrounding frame, and compound hinges for pivotally connecting the door and frame to the holder, substantially as specified.
9. In a camera, a plate-holder having a door provided with a surrounding frame, compound hinges for pivotally connecting the door and frame to the holder, and independent door and frame fastening devices, substantially as specified.
10. In a camera, a plate-holder proper hav-



mounted in a metal or other frame I, the upper and lower rails I' of which are beveled, the bevels of the rails being presented on the inside—that is, on the side of the focusing-glass which is arranged toward the lens of the camera. The purpose of this bevel is to facilitate the transfer of plates from the magazine into the holder. The holder is grooved in each end at I<sup>2</sup>, and the front walls of the groove extend inwardly, as shown more clearly in detail in Fig. 15<sup>a</sup>, so that the focusing-plate, when not otherwise influenced, will be forced by the springs II<sup>3</sup> against said inwardly-projecting front wall. The faces of these walls are substantially in the focusing field or plane of the camera. The upper bar or top of the holder is perforated, as at I<sup>3</sup>, (see Fig. 13,) for the passage of three rods J J' and J', which are a part of the plate-transferring mechanism. This mechanism is clearly shown in Fig. 21, and it consists of the rods J J', secured at their lower ends to a cross-bar J<sup>2</sup>, which has arranged therein rack-bars J<sup>3</sup>, terminating in bolts J<sup>4</sup>. The cross-bar J<sup>2</sup> is provided at each end with a flange or rib J<sup>5</sup>, which is adapted to ride in the grooves I<sup>2</sup>, formed in the sides of the holder. The rod J' terminates in a rack J<sup>6</sup>, which meshes with the teeth of segments J<sup>7</sup>, pivoted on opposite sides of the rod and within the bar J<sup>2</sup>. These segments also mesh with the rack-bars J<sup>3</sup>. At the upper ends of the rods J there are arranged tie-plates J<sup>8</sup>, spaced by washers J<sup>9</sup> and bound to the rods by nuts J<sup>10</sup>. Between the tie-plates a space is left for a collar J<sup>11</sup>, formed on the thumb-nut J<sup>12</sup>, which is screw-threaded on the rod J'. Instead of the rack-bars, segments, and screw-thread construction the rod J' may be rigidly connected to a cross-bar J<sup>3x</sup> and these at each end united by a slot connection J<sup>3xx</sup> to pivoted bolts or latches J<sup>4</sup>, as clearly illustrated in Fig. 24. In both constructions the rod J' has an aperture or notch J'<sup>x</sup>, into which a spring-bolt J'<sup>xx</sup>, Fig. 1, is adapted to take for the purpose of retaining the plate-lifting devices in any desired position.

Now it will be noticed that when the bar J<sup>2</sup> is forced downwardly across the focusing-plane of the camera it will come into contact with the upper inner beveled bar of the focusing-glass frame and force said frame rearwardly against the tension of the springs II<sup>3</sup>, as clearly shown in Fig. 15, (which is drawn upon a large scale), while the lower beveled edge of the focusing-glass frame facilitates the entrance of the bar J<sup>2</sup> from below in the same manner.

K represents what I have designated as the "top" of the magazine. It has an elevated rib or plate K' secured to its top, in which are screw-threaded sockets K<sup>2</sup> for receiving the connecting-rods K<sup>3</sup>, which terminate in thumb-nuts K<sup>4</sup>, the rods being retained in the side pieces of the holder F by passing through flat springs K<sup>5</sup>, secured to the top of the holder. The springs serve to hold the rods

K<sup>3</sup> upwardly in the holder F when they are disconnected from the screw-threaded sectors K<sup>2</sup>, thereby presenting a flat lower surface of the holder when it is disconnected from the magazine. Without these springs the threaded portions of the rods would project, which would be objectionable. Within a recess K<sup>6</sup>, formed in the upper surface of the top K, is a sliding light-shutter K<sup>7</sup>, adapted to pass across the opening K<sup>8</sup>, through which the bar J<sup>2</sup> passes into the magazine. The shutter K<sup>7</sup> (see Fig. 12) is adapted to be thrown back by a segment K<sup>9</sup>, upon which the cross-bar J<sup>2</sup> impinges in its downward movement. There is a sector at each end of the shutter. The under surface of the cover is plain, and at each of its ends there is provided a rack-bar K<sup>10</sup>, formed on a flange of the plate K<sup>11</sup>, secured in any desired manner to the end of the cover. There is a flange and rack-bar at each end. The object of the flange is to form a groove or bearing for the reception of the flange L', (see Fig. 18,) projecting outwardly on the upper edge of the end of the upper section L of the magazine. This flange is grooved on its upper surface, and a felt or other light-proof packing L<sup>2</sup> (see Figs. 13, 16, 18, and 20) extends completely around the upper edge of the section. A shaft L<sup>3</sup> extends from end to end and is provided with pinions L<sup>4</sup> and a thumb-nut L<sup>5</sup>, which pinions mesh with the rack K<sup>10</sup> on the top K. One end of the section L is provided with a series of holes L<sup>6</sup>, and at each end is a depending interiorly-screw-threaded lug L<sup>7</sup> for the reception of threaded rods, hereinafter described, and employed for the purpose of connecting the magazine with its upper section.

In connection with the holes L<sup>6</sup> there is employed a pin L<sup>8</sup>, mounted in a perforated bracket L<sup>9</sup>, and pin-retaining spring L<sup>10</sup>, which are secured to the end of the top K, as clearly shown in Figs. 1, 9, and 10. The holes agree in number and position with the plate-holders within the magazine, so that by withdrawing the pin L<sup>8</sup> against the tension of the spring L<sup>10</sup> and rotating the shaft L<sup>3</sup> by means of the nut L<sup>5</sup> the pinions travel along the rack K<sup>10</sup> until the pin is forced by the spring into the next succeeding hole L<sup>6</sup>, when a succeeding plate-holder of the series within the magazine will be brought opposite the opening K<sup>8</sup> in the top of the magazine.

The magazine M consists of a light-proof box adapted to fit its upper section L and to be secured thereto by screw-threaded rods M', mounted in bearings M<sup>2</sup> M<sup>3</sup>, which are shown in front and end elevations in Figs. 4 and 5, respectively. The rod M' is reduced in size at that portion which is passed through the bearing M<sup>3</sup>, which is a bottomless bearing set over the reduced portion of the rod and secured to the wall of the magazine. This reduction in size of the rod permits of a longitudinal movement of the same within its bearings, which occurs while connecting and disconnecting the magazine from its upper



ing in the opposite pieces of its frame-work a groove, the front walls of which form the boundary of the focusing-field, and plate-transferring devices operating in said groove, substantially as specified.

11. The combination of a door and door-surrounding frame having springs, and a focusing-glass having a frame, the inner surfaces of its upper and lower edges of which are beveled, substantially as specified.

12. In a camera of the class described, a plate-transferring device comprising a cross-bar having bolts and operatively-connected bolt-operating devices, substantially as specified.

13. A plate-transferring device comprising a cross-bar, rods rigidly connected therewith, and bolts operatively connected with a movable rod, substantially as specified.

14. In a plate-transferring device, a cross-bar having movable bolts and a guiding-flange, means for operating the cross-bar, and separate means for operating the bolts thereof, substantially as specified.

15. A plate-lifting device comprising a cross-bar, rigidly-connected rods, a threaded movable bolt-operating rod, a thumb-nut, and tie-plates, substantially as specified.

16. In a magazine for cameras, a plate-holder comprising a bottom strap and end-grooved straps having holes adapted to receive the bolts of a plate-lifting device, substantially as specified.

17. In a magazine for cameras, a slotted casing provided with spring-latches projecting through slots in the casing, substantially as specified.

18. In a magazine, a slotted casing provided with spring-latches, in combination with individual-plate holders having slotted guiding ribs and holes, whereby the individual-plate holders are locked within the magazine, substantially as specified.

19. In combination with a magazine having spring-latches, individual-plate holders having holes, a plate-lifting device having ribs for detaching the latches from the individual-plate holders, and bolts for connection with said holders, substantially as specified.

20. In combination with a magazine having spring-latches, individual-plate holders having holes, a plate-lifting device having ribs for detaching the latches from the individual-

plate holders and bolts for connection with said holders, and means for operating the bolts, substantially as specified.

21. In combination with a magazine having spring-latches, individual-plate holders having holes, a plate-lifting device having ribs for detaching the latches from the individual-plate holders and bolts for connection with said holders, and means for operating the bolts for detaching the latches from the individual-plate holders, substantially as specified.

22. A photographic-plate magazine formed in two sections provided with section-uniting screw-threaded rods having reduced portions and secured to the magazine by bearings, one of which is bottomless, substantially as specified.

23. A photographic-plate magazine having a rack and pinion and a series of holes for the reception of a spring locking-pin, substantially as specified.

24. The combination, with a plate-holder proper, of a magazine having a series of plate-holders, and a series of holes arranged one opposite each plate-holder and on the exterior of the magazine, a spring-pressed pin adapted to take into the holes, a rack-and-pinion mechanism for moving the magazine, packing inserted between the moving parts of the magazine, a light-shutter, and a plate-transferring mechanism adapted to operate the light-shutter, substantially as specified.

25. In a magazine of the class described, the combination of a light-shutter adapted to close the passage between the magazine and the plate-holder proper and a light-shutter-opening device arranged in the path of and operated by the plate-transferring device, substantially as specified.

26. In a magazine of the class described, the combination, with the plate-transferring devices and the light-shutter operated thereby, of a latch for temporarily retaining said devices in a position out of the path of the magazine, substantially as specified.

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

THOMAS S. WILES.

Witnesses:

THOMAS CALDWELL,  
CHAS. F. WILES.