No. 768,154. PATENTED AUG. 23, 1904.

A. R. SELDEN.

TRIPOD.

APPLICATION FILED APR. 23, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

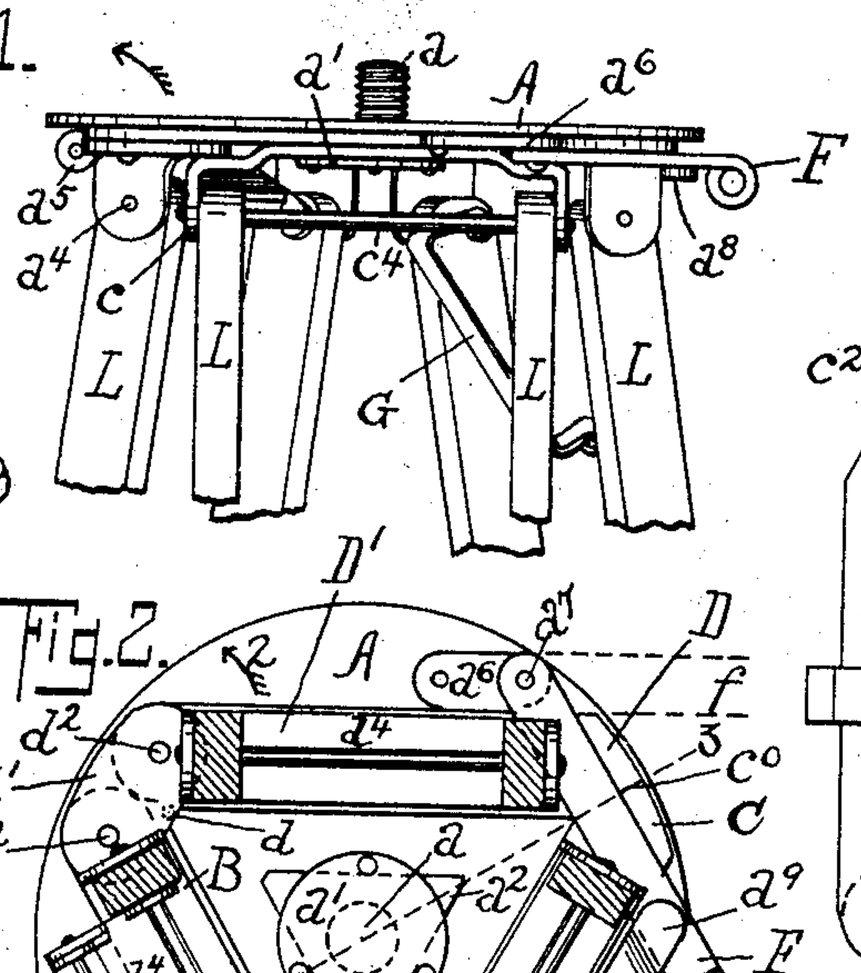


Fig. 3.

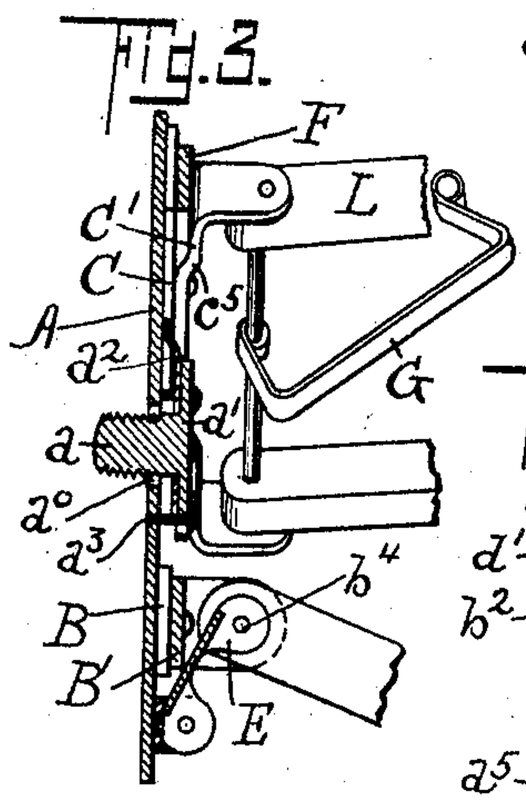


Fig. 2.

Fig. 5.

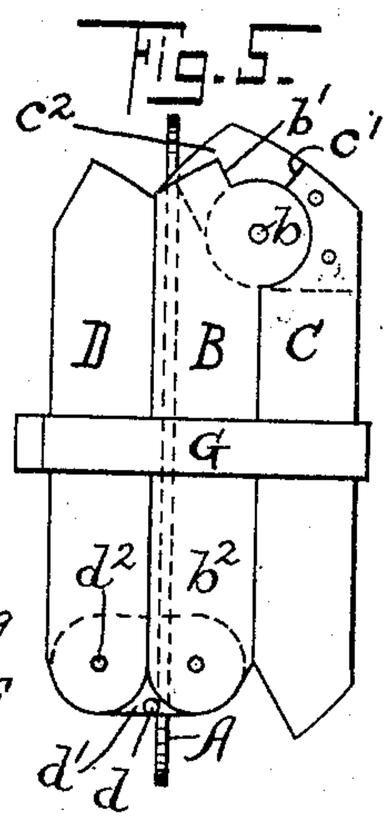


Fig. 4.

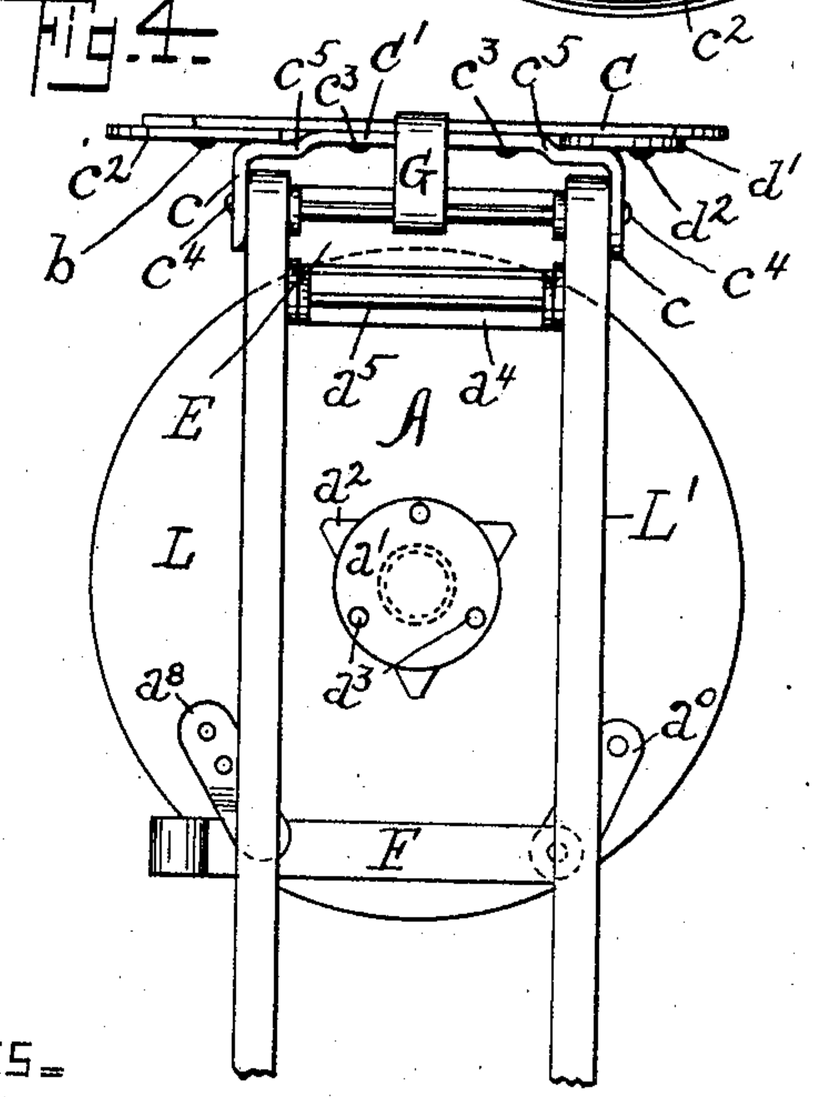
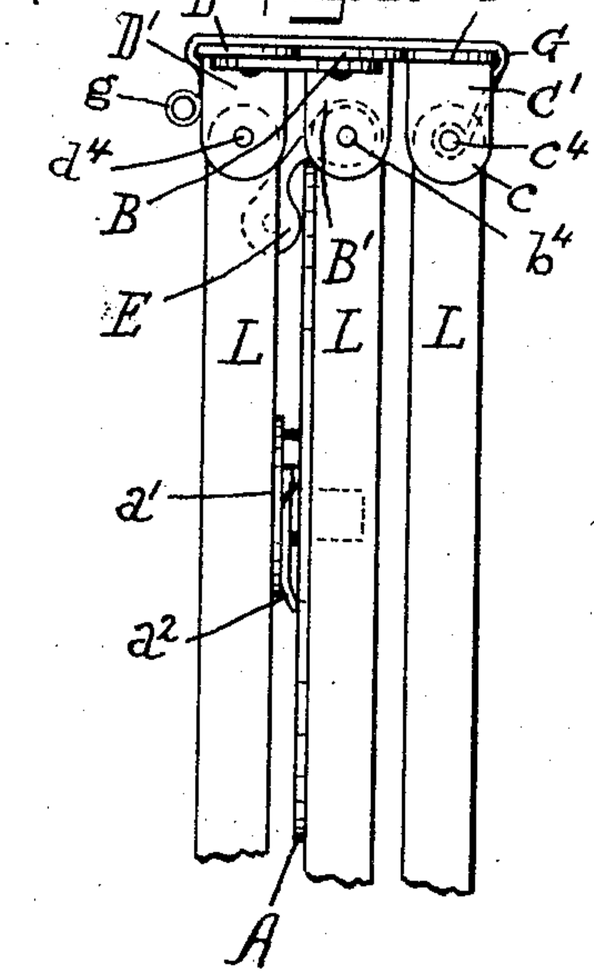


Fig. 6.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 7.

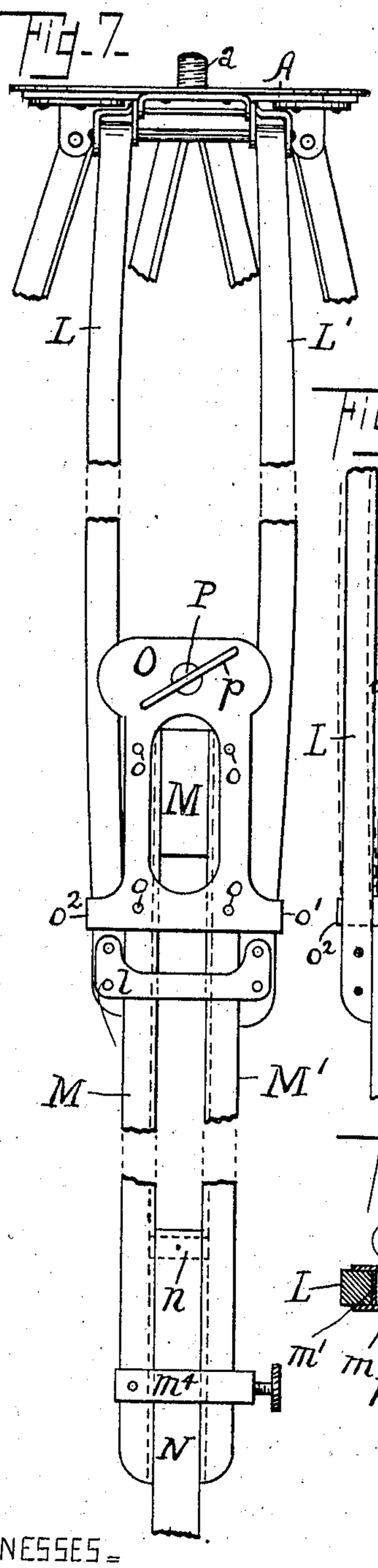

Fig. 8.

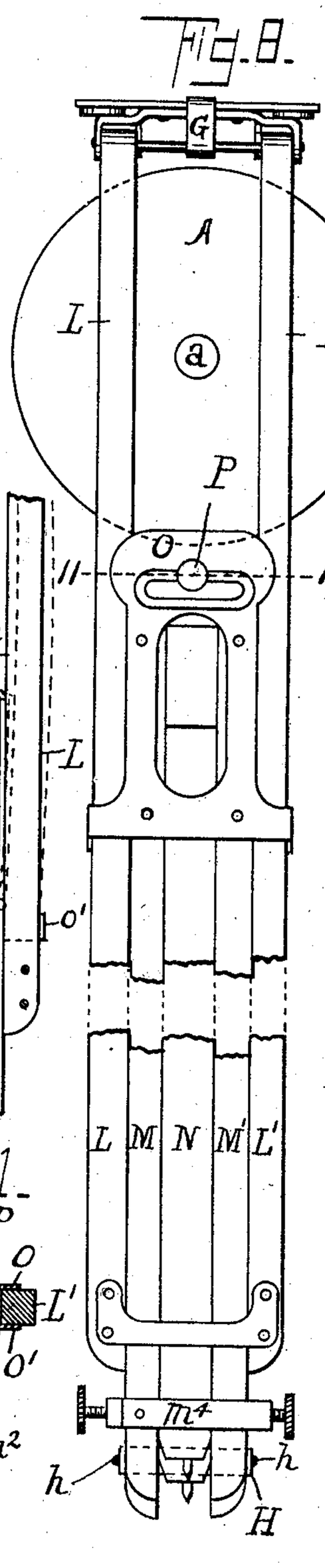

Fig. 9.

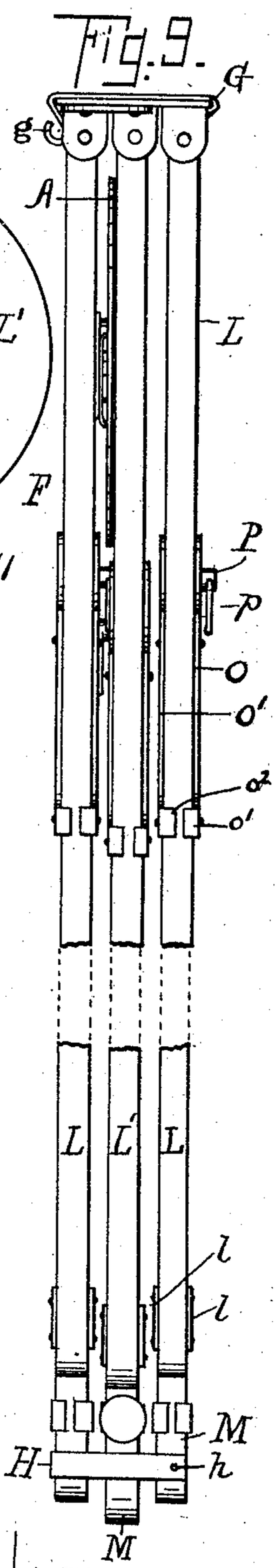

Fig. 10.

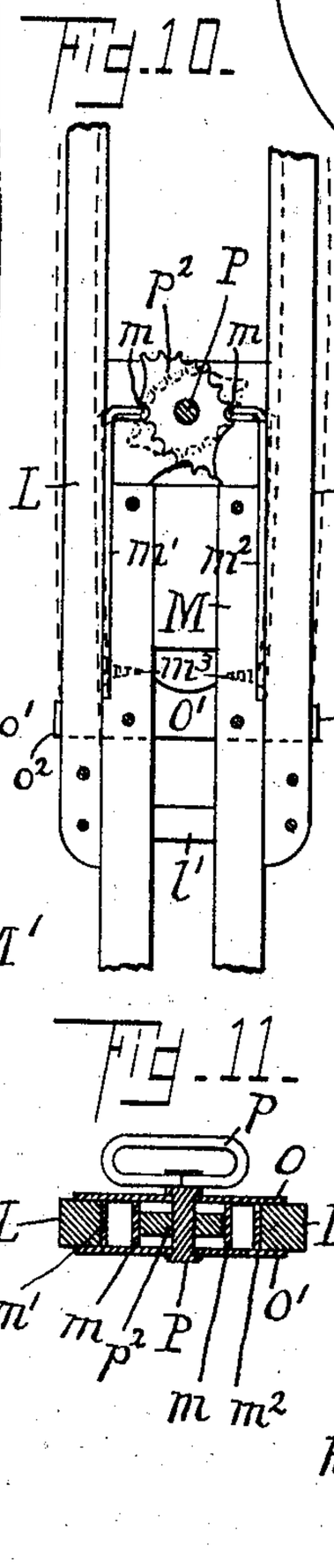

Fig. 11.

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No. 768,154. Patented August 23, 1904.

UNITED STATES PATENT OFFICE.

ARTHUR R. SELDEN, OF ROCHESTER, NEW YORK.

TRIPOD.

SPECIFICATION forming part of Letters Patent No. 768,154, dated August 23, 1904.

Application filed April 23, 1902. Serial No. 104,343. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR R. SELDEN, a citizen of the United States, residing at Rochester, county of Monroe, State of New York, have invented certain new and useful Improvements in Tripods, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of the top with the legs cut off. Fig. 2 is a bottom view of the top with legs cut off. Fig. 3 is a section on dotted lines 3 3, Fig. 2. Fig. 4 is a side view with top plate folded. Fig. 5 is a top view with top plate folded. Fig. 6 is a side view with top plate folded. Fig. 7 is a side view showing top and clamping mechanism of one pair of legs. Fig. 8 is a front view with legs folded. Fig. 9 is a side view with legs folded. Fig. 10 shows one of the leg-clamping mechanisms with side plates removed, and Fig. 11 is a cross-section on dotted lines 11 11, Fig. 8.

The object of this invention is to provide a strong rigid folding tripod in which the legs and head are always fastened together and the legs susceptible of being folded together to make a small and compact tripod easy to carry and easy to handle.

My invention consists of the mechanism and arrangements of parts hereinafter described and claimed.

The instrument-base or top plate A is a plate of metal of any desired size and shape and has a hole a^0 in the center, through which the screw a for attaching a camera or other instrument, projects upward. This central hole is a little larger than the screw a to allow a free movement of the screw up and down. On the lower end of the screw a I provide a flange a' of somewhat larger diameter than the hole a^0, through which are made three holes through which pins, rivets, or screws a^3 pass freely and are fastened to the top plate A. Between the plate A and flange a' a spring-piece a^2 is placed of triangular shape, as shown in Figs. 2 and 4. This spring-piece is made of thin metal and has the three corners bent up, as shown at a^2, Fig. 3, so as to come in contact with the under surface of the plate A, while its center has a hole through which the screw a projects and bears against the upper side of the flange a', leaving a space equal to about one thread of the screw a between the upper side of the spring a^2 and the under side of the plate A. This construction is designed to allow a little movement of the instrument to be used on the tripod in pointing to the right or left, as the operation of screwing the instrument down on the top plate will compress the spring a^2. The rivets or screws a^3 being fast in the top plate and the flange being allowed a free movement tends to draw the flange away from the heads of the rivets or screws a^3 toward the top plate A and a contrary motion of the instrument the reverse, while the spring will keep a constant pressure between the instrument and the top plate.

Resting against the under side of the top plate A are three flat pieces of metal B C D at an angle of sixty degrees to each other of sufficient strength to sustain and form holders for the three legs of the tripod and when placed side by side, as shown in Figs. 5 and 6, to allow the different members of the legs to come together, as shown in Fig. 6. These holders B C D are of the shape as shown in Fig. 5 and are hinged together as follows: C is hinged to one end of B, and D to the other end of B. The pivoting-point between B and C is on a line with their adjacent sides when they are together or parallel and is formed by making a circular projection with B as a center out from the side of B and making a corresponding indentation in the side of C, as shown in Fig. 5, and placing a lip c^2 underneath both B and C, fastened rigidly to C by rivets or otherwise, through which the pivoting-pin b holds B to C. The projections b' c' on the respective ends of B and C form stops which allow C to swing away from B just far enough to form the proper angle for operation.

The holders B and D are held together by a double-jointed hinge, as shown in Figs. 2 and 5, in which the pivoting-points are shown at b^2 d^2 with a link connection d' on the under side of the heads B D. This jointed hinge allows the head D to swing through an arc of three hundred degrees from the position

shown in Fig. 2 to that shown in Fig. 5, where the holders B and D are parallel to each other and their adjacent sides in contact. I place a stop d on the connecting-link d' to limit the travel of the link d' in one direction with respect to the holders B and D, respectively.

On the under side of the holders B C D, I place pieces B′ C′ D′, bent in such a manner as to form connections between the heads and the legs of my improved tripod. These connecting-pieces B′ C′ D′ are fastened by rivets, screws, or otherwise to the holders B C D. As describing one holder will describe all three, reference is made to C as the one best illustrated to show the construction and operation.

The connection C′, Fig. 4, has a straight central part through which two rivets or screws c^3 c^3 fasten it rigidly to the holder C. Outside of the rivets or screws c^3 I make an offset equal to the thickness of the link d' and connecting-piece c^2 to allow their free movement between the pieces C and C′ at the ends of the latter. At a point of equal distance from the center of connection C′ and just inside of the pivoting-point b between the holders B C the connection C′ is bent downward at right angles to form lips c c for the purpose of attaching one pair of tripod-legs by the rod c^4, on which the legs swing.

Having described the top plate and holders for the legs of my improved tripod, I will now describe the mechanism by which they are fastened together.

Fig. 2 of the drawings shows that the three holders for the legs form when in place under the top plate an equilateral triangle at an angle of sixty degrees, respectively, with relation to each other and each covering an arc of a circle of one hundred and twenty degrees.

At one side of the bottom of the top plate A at a point outside of and parallel with the connection B′, I place a U-shaped clip a^4, fastened rigidly to the plate A in any convenient manner, through the downwardly-projecting lips of which passes the rod a^5, forming one joint of a two-jointed hinge.

E, Fig. 3, is a link connection between the rod a^5, attached to the top plate A, and the rod b^4, forming the connection between the top plate and the holders of the legs and constituting a double-jointed hinge or connection. The link E has a flat central portion, and at the four corners has a lip turned up with a hole through each for the rods a^5 and b^4 to pass through and is of proper length to hold the plate A and holder B in close contact when the tripod-head is in operation.

On the opposite side of the plate A from the clip a^4 and in position to hold the holders C and D at an angle of sixty degrees, respectively, with the holder B, I place two stops a^6 and a^8, fastened rigidly to the plate A, of the same thickness as the holders C D. The stop a^6 has a rivet or pin through one end a^7, which forms a pivoting-point for locking the lever F, and stop a^8 has an offset a^9, equal to the combined thickness of the holder C and locking-lever F, under which the lever F is inserted in the operation of setting up the tripod. When the holders C and D are turned on their respective pivots, connecting them with the holder B, until their ends come together at c^0, Fig. 2, they will just go between the stops a^6 and a^8. The lever F being raised away from the plate A by the stop a^6 the thickness of the holders D and C will come, on being turned from the position shown in dotted lines f to the position shown in full lines, over the ends of holders D and C and under the offset on stop a^8, thus locking the holders D C firmly to the plate A.

The surfaces on the link d' and connecting-piece c^2 are made large to come into the slot made between the holders B C D and the connection B′ C′ D′ in order to strengthen the joints and make them rigid against movement in any direction except around the pivots, materially aiding in the perfect operation of the tripod, and the locking-lever F, passing diagonally into the same slots on its side between the holders C D and connecting-pieces C′ D′, locks the parts securely together.

The legs of my improved tripod are of the three-joint telescopic kind, but of a materially different construction from any that I know of at the present time. While I use two members for both the upper and middle sections and one for the lower section, they all slide on each other, as shown.

The members L L′ of the upper section of the leg are hinged to the connection C′ by the rod c^4 passing through their upper ends, securing them against motion in relation to the plate C′ in any direction except around the rod c^4. At the lower end of the members L L′ and fastening them together I place two U-shaped plates l l' on each side of L L′ with rivets going through both plates l l' and members L L′, securely fastening them together against parallel motion or racking. The middle section of the leg is also composed of two members M M′, securely fastened together by a block M^2, which is of the same thickness as the members of the middle section and of width slightly greater than the lower section N to allow of the lower section sliding easily between the members of the middle section.

To the upper end of the middle section of one of the legs I fasten on the outer and inner sides two plates O O′ of a form as shown in Fig. 7 by four rivets o o o o. These plates O O′ in their central part are of a little greater width than the middle section of the leg. At the upper end they are broadened out to partially cover each of the members L L′ of the upper section, and at the lower end I carry out a lip o' o^2 on each side of a greater width than the combined width of all three sections and bend them at right angles around the

members L L′, as shown in Fig. 9, thus forming a stop against outward pressure when the members L L′ are spread out to give them tension and rigidity, but allowing for free action up and down when no tension is put on the members of the upper section. Through the upper part of the plates O O′, I place a stub P, carrying on its outer end a folding thumb-piece *p*, and on its center, between the plates O O′, a double eccentric cam p^2 is rigidly fastened, as shown in Fig. 10, and its inner end is reduced in size, making a shoulder coming against the inner surface of plate O′, the end being riveted over or otherwise fastened to the plate O′. The double eccentric cam p^2 has a series of notches cut in its two eccentric surfaces, into which the projections *m m* on the spring-plates m' m^2 fit. The notches in the eccentric cam are for the purpose of holding the cam in any place it may be set and are not so deep but that the projections *m m* will pass from one to another easily when the cam is operated. Spring-plates m' m^2 are let into the upper part of the middle section of the leg an amount equal to their thickness, so that their outer surface is flush with the outer surface of the section, as shown in Fig. 10, and are fastened to the section by screws m^3, as shown. The projections *m m* of the spring-pieces m' m^2 are bent at right angles to the spring-pieces and at the end where they come in contact with the eccentric cam p^2 are given a rounded end by being returned on each other, thus forming a curve which will slip easily from one notch to another in cam p^2. The action of the thumb-piece *p* turns the double eccentric cam p^2, forcing the spring-pieces outwardly against the members L L′ of the upper section of the leg, thus bending them between the points where they are fastened to the head C and the lips o' o^2 of the plates O O′, thus giving the members of the upper section of the leg a rigid tension and binding the upper and middle sections of the leg firmly together against slip up and down.

The single member N of the lower section slides between the members M M′ of the middle section of the leg and is fastened to it by the clamp m^4 and thumb-screw, fastened rigidly to the member M. The upper end of the member N of the lower section of the leg has a guide keeping it in line with the middle section made by placing a flat piece of metal in a groove in the upper end of N of greater length than the width of the member N, the projecting ends of which run easily in grooves in the inner surfaces of the members M M′ of the middle section.

I have described the holder C and the connection C′ as in two pieces; but it will readily be seen that they can be combined in one piece, thus simplifying the construction.

The operation of folding the head of the tripod from an operative position to a folded position for transportation is as follows: First pull out the locking-lever F to a position shown at *f*, Fig. 2, in dotted lines. Then the plate A may be folded over and downward in the direction of the arrow in Fig. 1 until it takes a position parallel with one leg, as shown in Fig. 6. The holder D of one leg is then turned on its two-jointed hinges in the direction shown by the arrow 2 in Fig. 2 until it is parallel with B. Then the holder C is folded inwardly in the direction of the arrow 1 in Fig. 2 until it also is parallel with B. When the three legs are folded together, they take the position shown in Figs. 8 and 9, the plate A coming between two of the legs, where it is held firmly from swinging, the clamps G and H, hereinafter described, holding the different parts firmly together. This operation may be done before or after extending the legs, or the legs may be extended before or after the head has been put in position for use. The operation of the legs is telescopic, the two lower sections sliding between the members of the upper section, and may be of a little less length than the upper sections in order to allow the plate A to come between the upper sections of two of the legs and not come in contact with the plates O O′ on the middle sections. The holders B C D may be made of such width as to let the upper sections come so far apart when folded that the middle and lower sections can be made of the same length as the upper section and still not interfere with the action of the plate A in folding, thus making the legs of the tripod correspondingly longer. The operation of the eccentric cam p^2 and plates m' m^2 in spreading the members L L′ of the upper section may take place at any point in the length of the upper section of the leg, and as the lower section can be operated in the same way on the middle section my improved tripod may be operated with one or more legs of any length from its shortest telescopic length to its extreme greatest length.

Fastened loosely around the rod c^4 of the holder C, I place one end of the clamping-lever G, which holds the holders B C D together in their folded position. This clamping-lever G is made of spring metal and is formed as shown in Fig. 6. Passing upward from the rod c^4, the clamping-lever G is bent around the edge of the holder C, across the holders C B D, where it is turned down with a hook shape to hold it in place around D. The end *g* is bent into a ring for convenience of operation. At the lower end of the middle section of the same leg to which the clamping-lever G is fastened I place a U-shaped clamp H, pivoted at each end to the outside surfaces of the members M M′ at *h* below the clamp m^4, near enough to the end of the section to be moved around its pivoting-points and go over the lower ends of the three middle sections when they are folded together, as shown

in Fig. 9. The object of these clamps G and H is to hold the tripod firmly together while it is folded for convenience in carrying.

It therefore appears that this tripod has a set of legs connected to the base or head A, which is supported on the legs L by means of a set of members (the links, plates, or holders B C D) horizontally arranged and having end portions pivotally connected or hinged to each other end to end on vertical pivots and lapped, as described, so as to be adapted to rotary movement to and from each other, so as to close together and form a continuous frame or inclosure (triangular in the form shown) and to open outwardly in order to be capable of folding into the parallel position shown in Fig. 5 and means (the stops a^6 a^8 and the lever F) for locking said members in position to form a rigid supporting-frame. In this arrangement each of the links, plates, or holders forms a side of the frame just mentioned, and in the present example the central plate, link, or holder B is held in fixed relation to the head A; but it and the pivoted outer plates are loosely connected to the head, and the outer plates are adapted for rotary movement across the under side of the head A in parallel planes when the parts are in the position shown in Figs. 1, 2, and 3. The lever F constitutes a catch or holding device for locking the links, plates, or holders together and to the head and is part of the stop mechanism to limit the movement of the plates. The remaining portions of the stop mechanism are the stops a^6 a^8. The stop mechanism is obviously independent of the screw a, that connects the tripod-head to the camera, and the portion F of the stop mechanism is arranged to engage under the plates B C D to hold them firmly to the head. The stops a^6 a^8 limit the movement of the plates in horizontal planes, and the lever F, carried by the head or base A, engages each of the plates C and D and locks them against pivotal movement either in the horizontal plane or away from the base A.

What I claim is—

1. In a tripod, an instrument-base, a screw for fastening an instrument thereto and held on the base so as not to turn with reference thereto, but movable in an axial line, a spring between the base and the screw, said spring being compressible by the action of screwing an instrument down on the base, whereby said instrument may be turned on the screw in different directions with reference to said base and yet is held firmly by the screw.

2. In a tripod, a base having a series of pins a^3, a screw a for fastening an instrument on said base, and having a series of perforations fitting said pins, whereby the screw is movable longitudinally on said pins but cannot turn with reference to the head, a spring a^2 between the screw and the head and compressible when the instrument is screwed down on the head, substantially as described.

3. In a tripod, a base, a series of legs, a series of leg-holders, one for each leg, having parallel pivots and pivotally connected to said base, and a clamping device fastened to the base by which the leg-holders when in one position may be clamped to the base.

4. In a folding tripod, a series of holders for the tripod-legs pivoted together by parallel pivots, an instrument-base pivoted to one of the holders, and a clamping device fastened to the base, by which the series of legs may be clamped together.

5. In a folding tripod, a series of holders for the tripod-legs, a top plate hinged to the holder of one of the legs, the holders being pivoted together and adapted to fold into a parallel position and to be set in an angular position with reference to each other, and a clamping device by which the holders are held together in a parallel position with reference to each other.

6. In a telescopic leg for a tripod, two connected outer members, two connected inner members adapted to slide between the outer members, a supporting-plate extending around the outer members, and a cam movable with said plate, and set between the inner members and adapted to press them against the outer members and said plate for locking the parts in any degree of extension.

7. In a telescopic leg for a tripod, two connected outer members, two connected inner members adapted to slide between the outer members, a supporting-plate carried by the inner members and having portions extending around the outer members and a cam movable with said plate and set between the inner members for pressing them against the outer members and said plate, for locking the parts in any degree of extension.

8. In a telescopic leg for a tripod, two connected outer members, two connected inner members adapted to slide between the outer members, a supporting-plate carried by the inner members and having portions extending around the outer members, a clamping-plate on the inner side of one of said inner members having an inwardly-directed projection, and a movable cam set adjacent to said clamping-plate and having notches for engaging said projection, for pressing the inner members against the outer members and said supporting-plate and for locking the cam in different positions.

9. In a telescopic leg for a tripod, two connected outer members, two connected inner members adapted to slide between the outer members, a supporting-plate carried by the inner members and having portions extending around the outer members, and a clamping-plate on the inner side of each of said inner members having an inwardly-directed projection and a movable double cam set between said clamping-plates and having notches for engaging said projections, for pressing the

inner members against the outer members and said supporting-plate and for locking the cam in different positions.

10. In a telescopic leg for a tripod, two connected outer members, two connected inner members adapted to slide between the outer members, a supporting-plate carried by the inner members and having portions extending around the outer members, a clamping-plate on the inner side of one of said inner members having an inwardly-directed projection, and a cam pivoted in said supporting-plate adjacent to said clamping-plate, and having notches for engaging said projections, for pressing the inner members against the outer members and said supporting-plate and for locking the cam in different positions.

11. In a telescopic leg for a tripod, two connected outer members, two connected inner members adapted to slide between the outer members, a supporting-plate carried by the inner members and having portions extending around the outer members, and a clamping-plate on the inner side of each of said inner members having an inwardly-directed projection, and a cam pivoted in said supporting-plate adjacent to said clamping-plates and having notches for engaging said projections, for pressing the inner members against the outer members and said supporting-plate and for locking the cam in different positions.

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