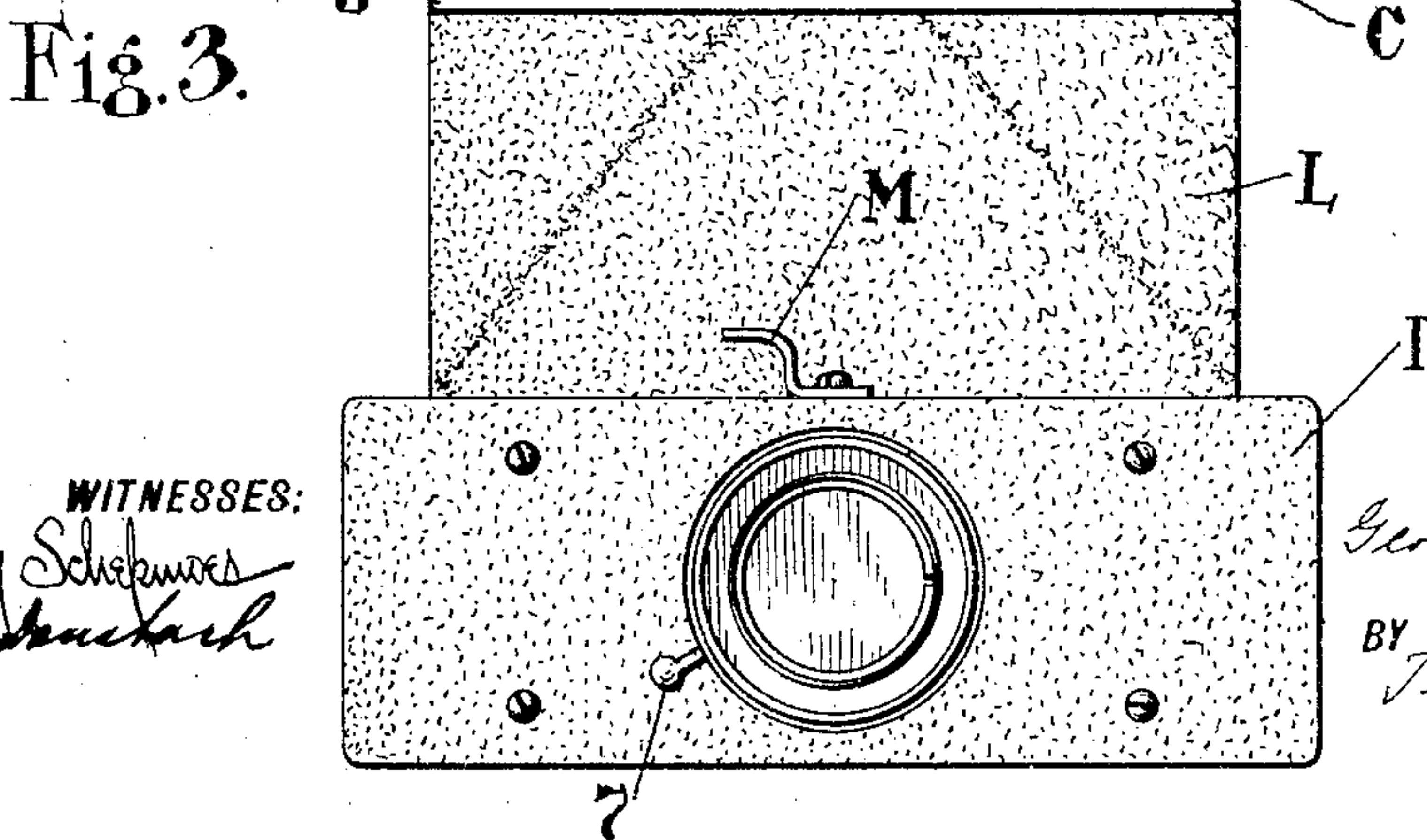
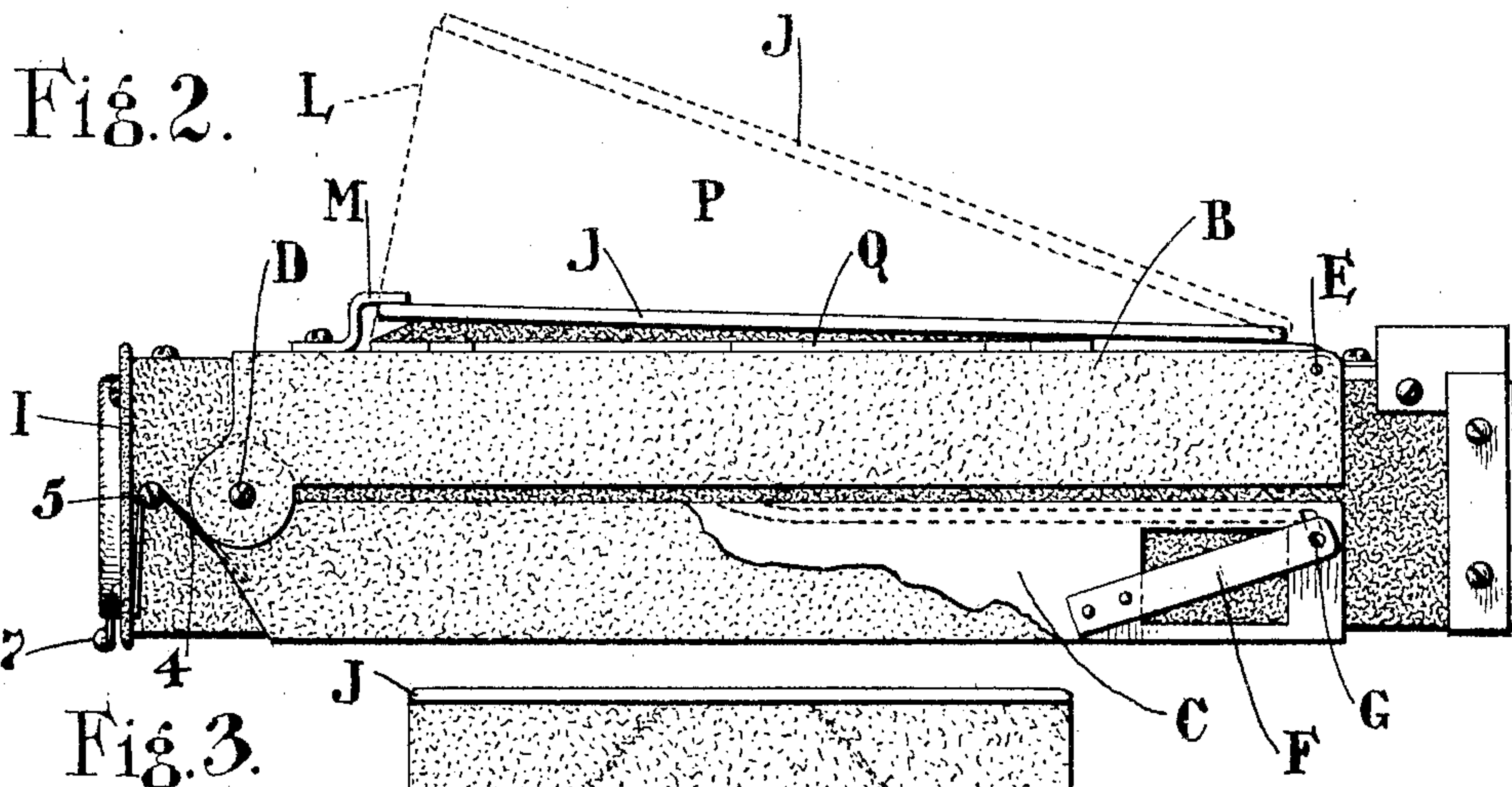
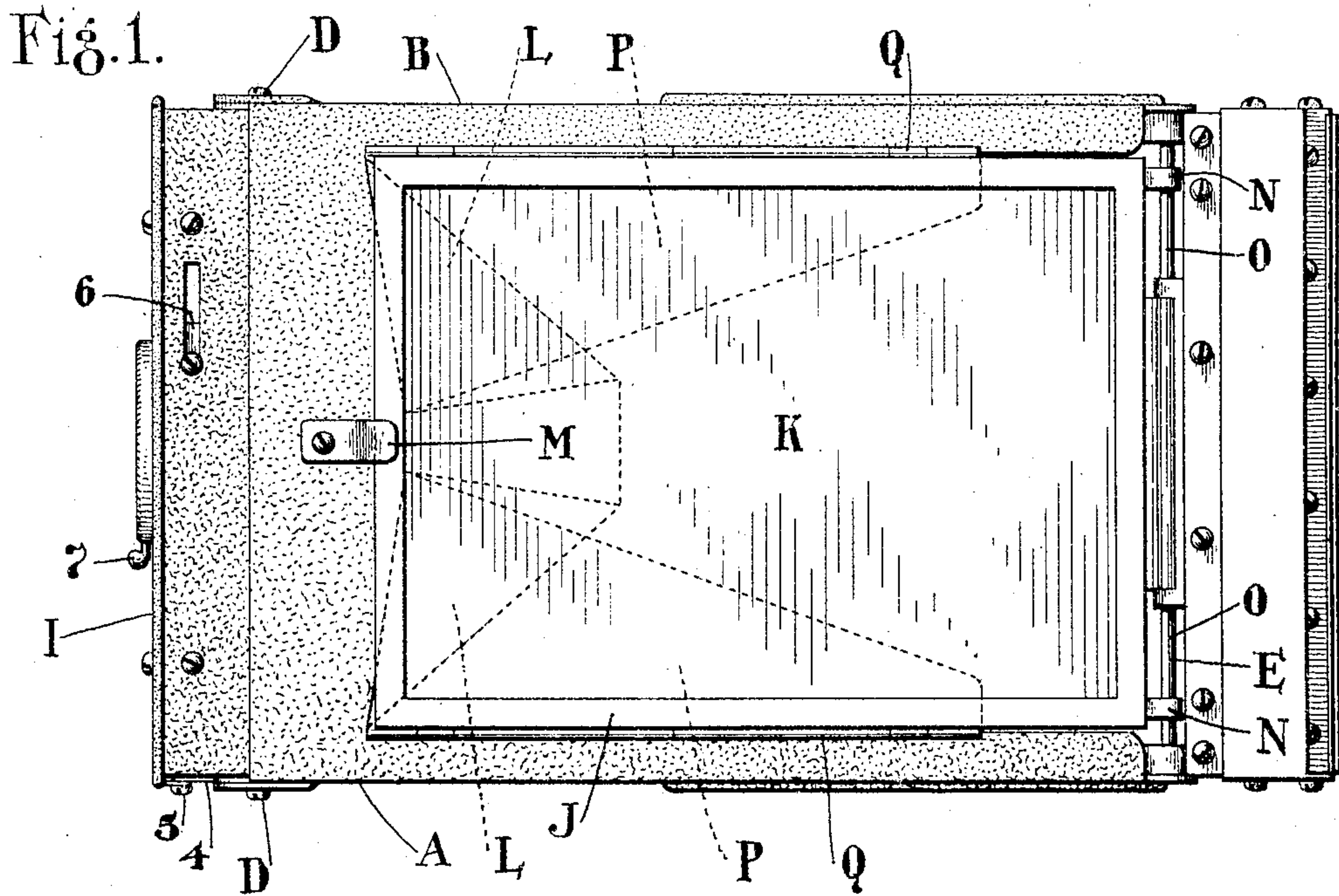


G. WASHINGTON.
PHOTOGRAPHIC CAMERA.
APPLICATION FILED APR. 5, 1904.

5 SHEETS—SHEET 1.



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5 SHEETS—SHEET 2.

Fig. 4.

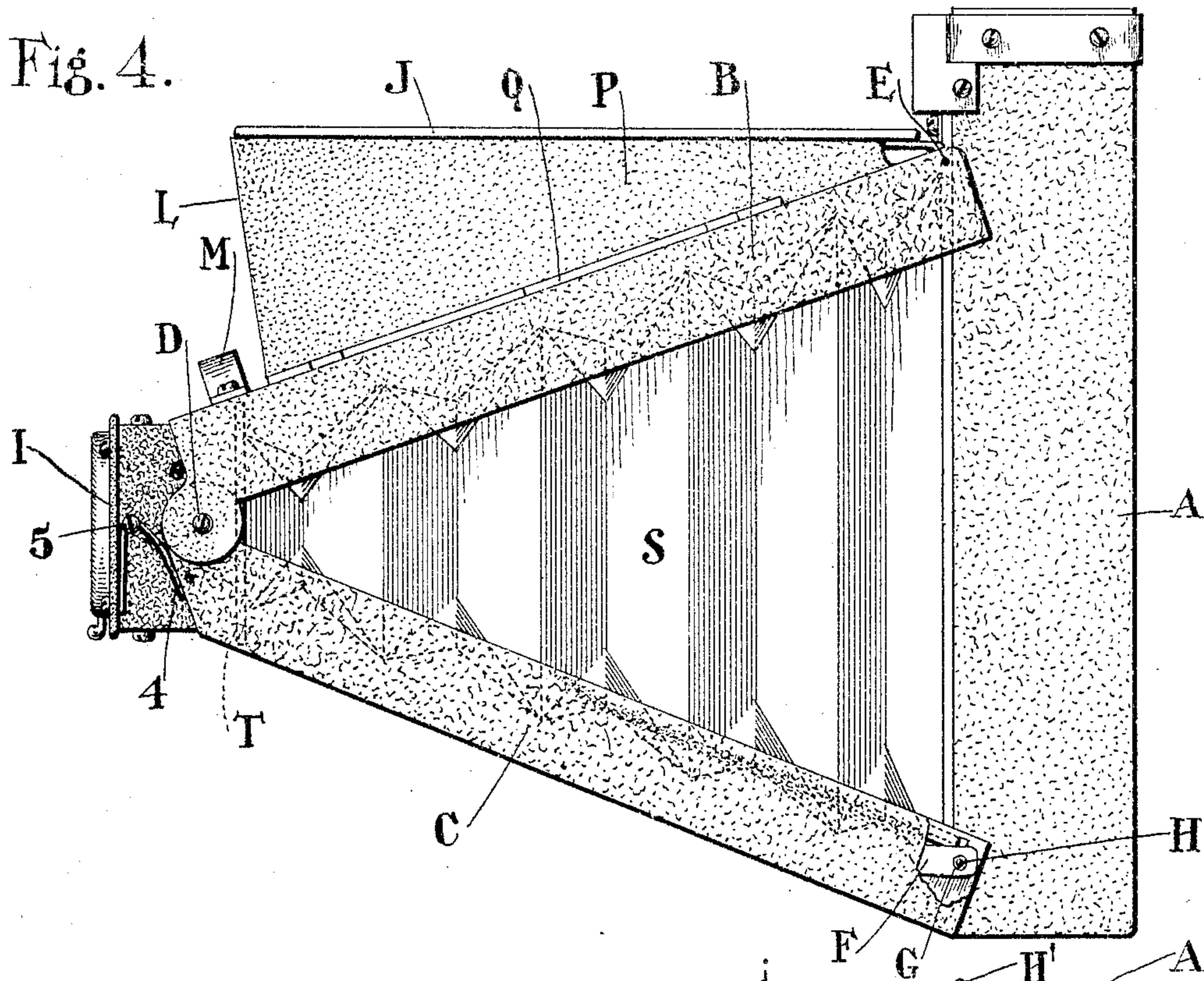
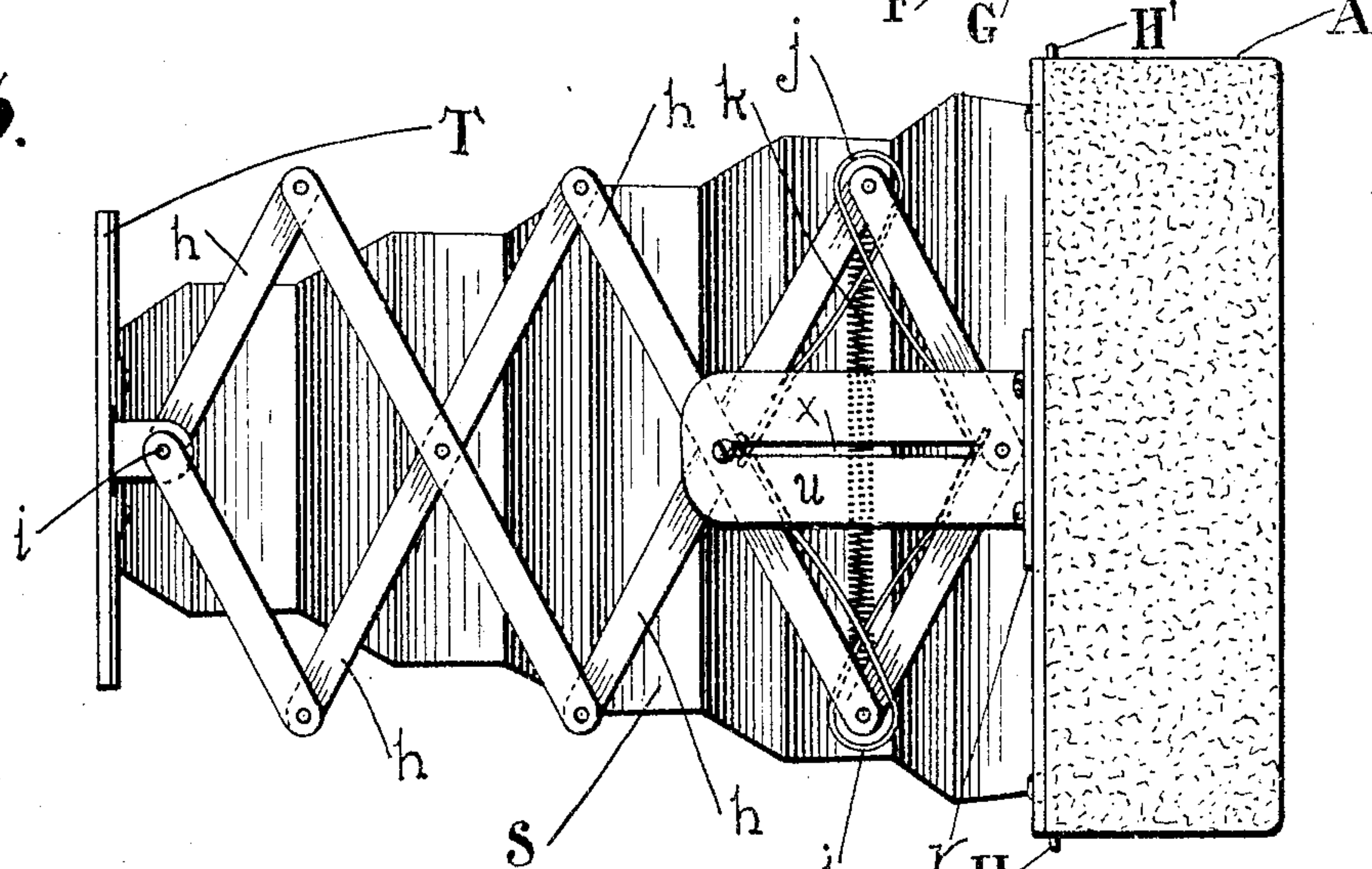


Fig. 5.



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5 SHEETS—SHEET 3.

Fig. 6.

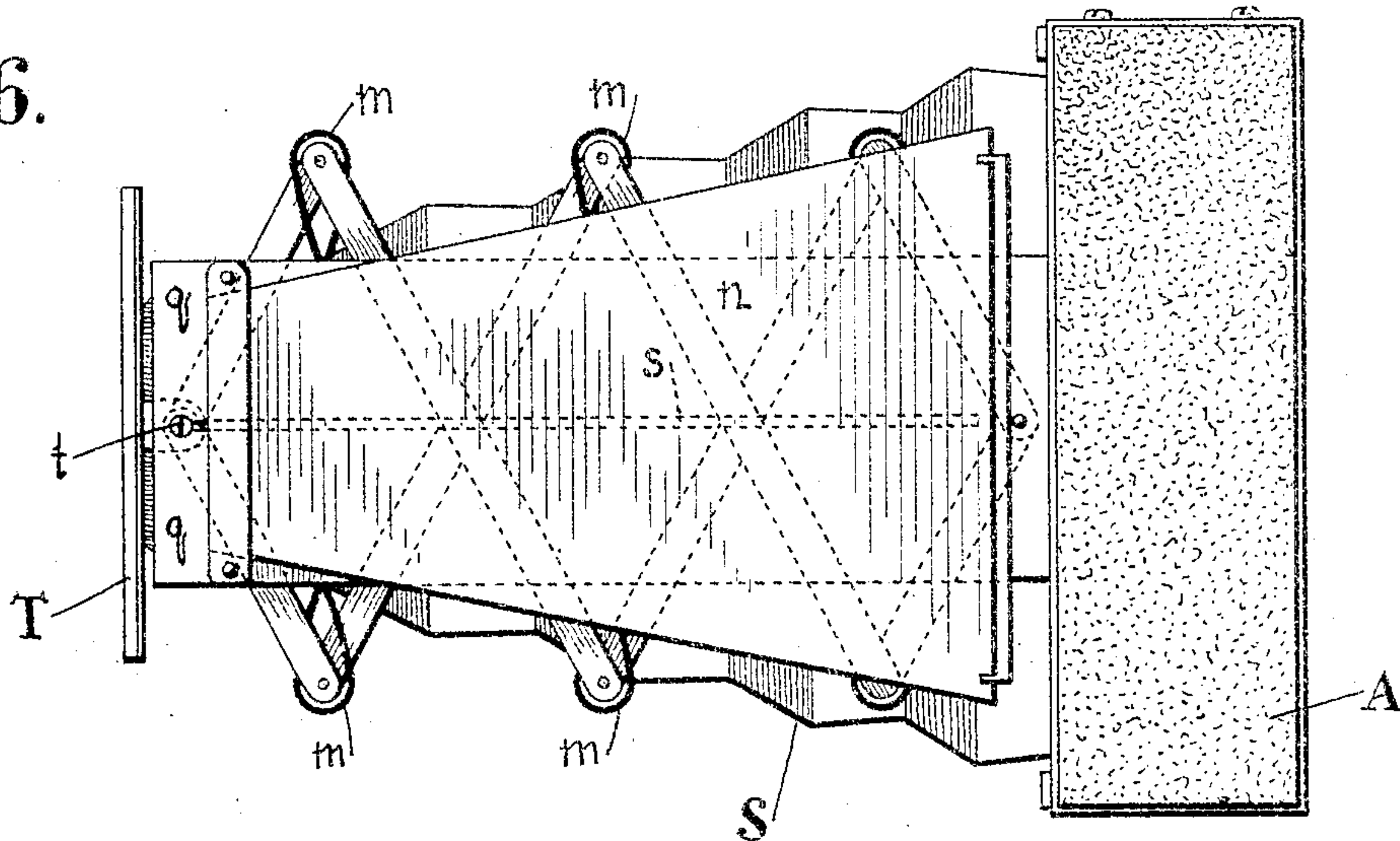
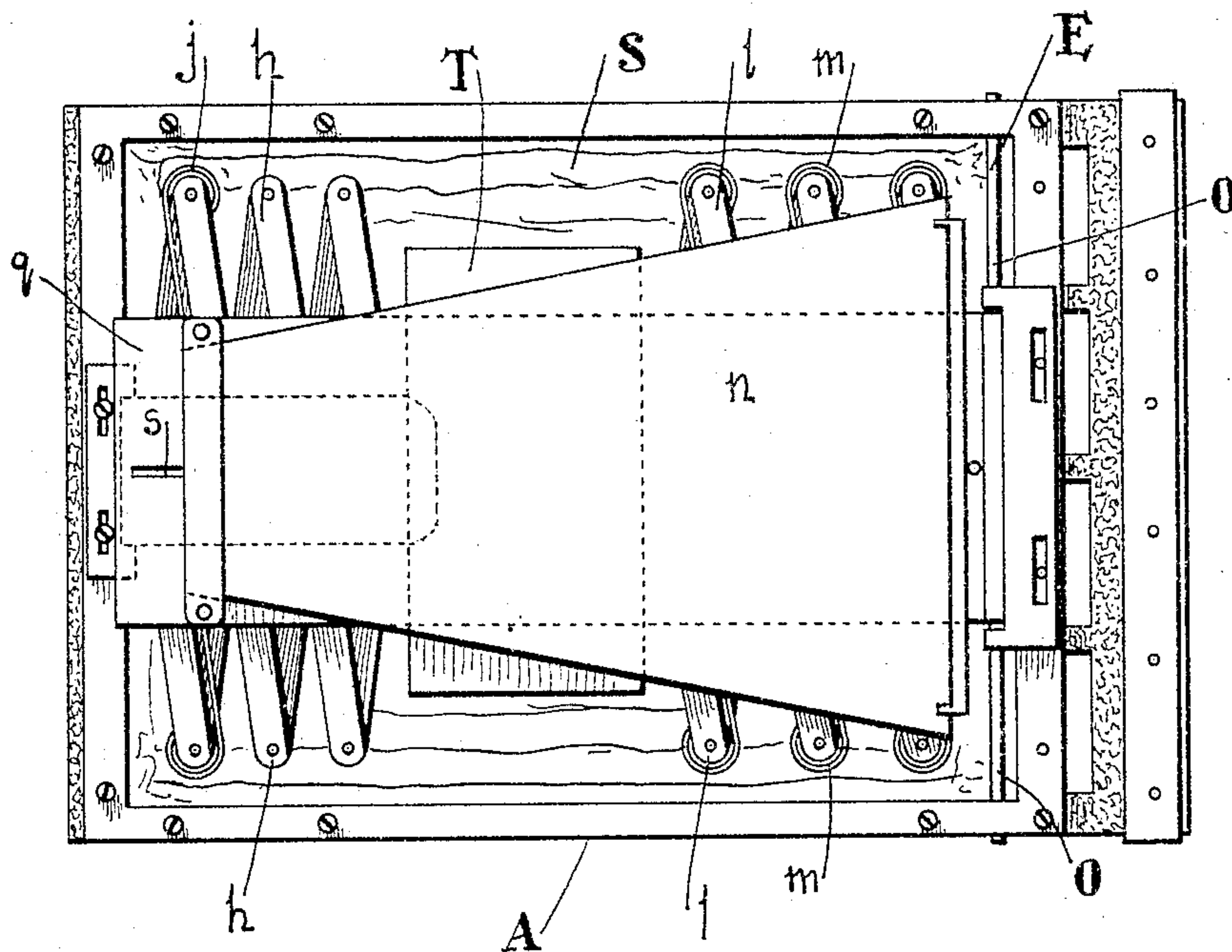


Fig. 7.



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APPLICATION FILED APR. 5, 1904.

5 SHEETS—SHEET 5.

Fig. 11.

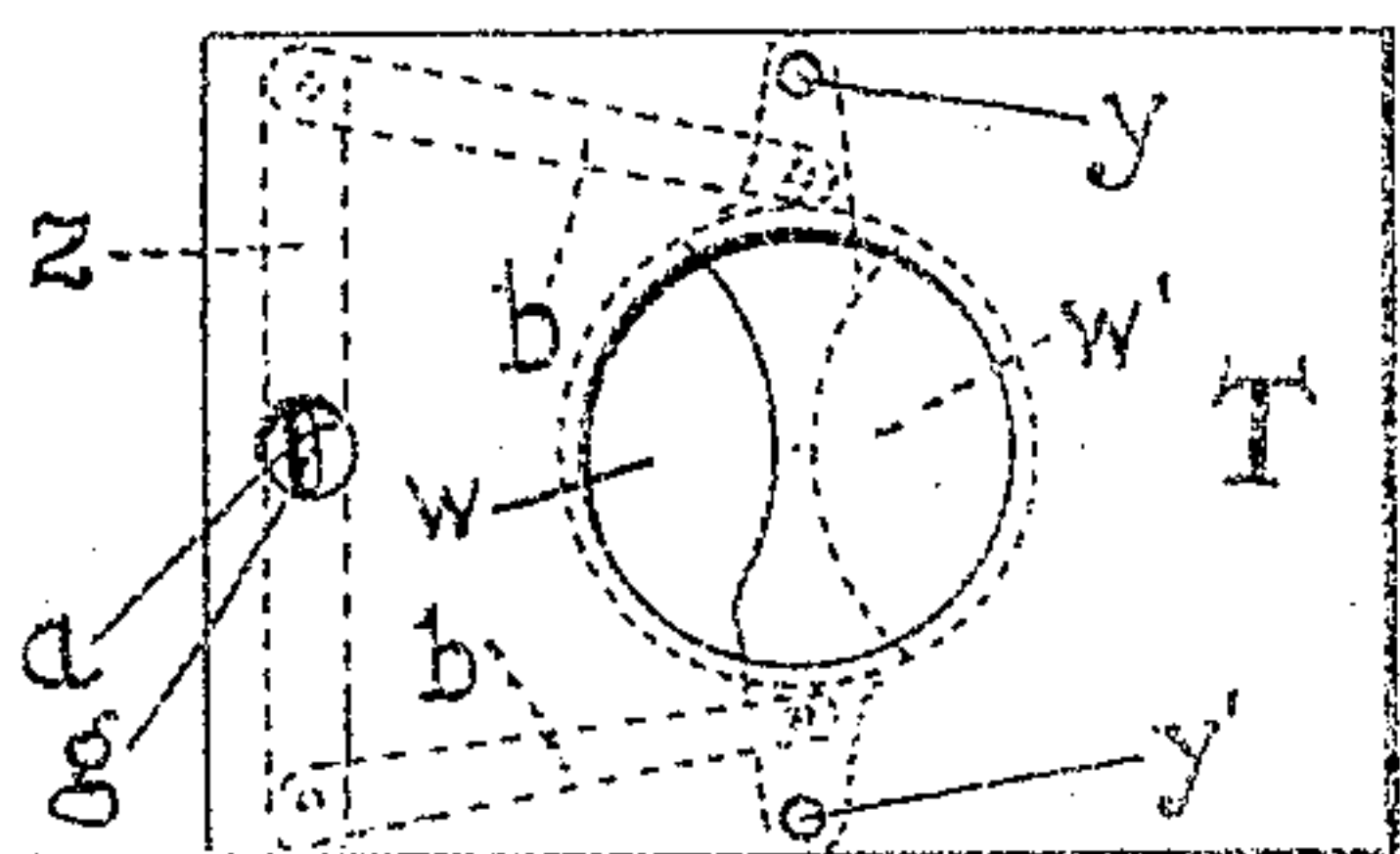


Fig. 12.

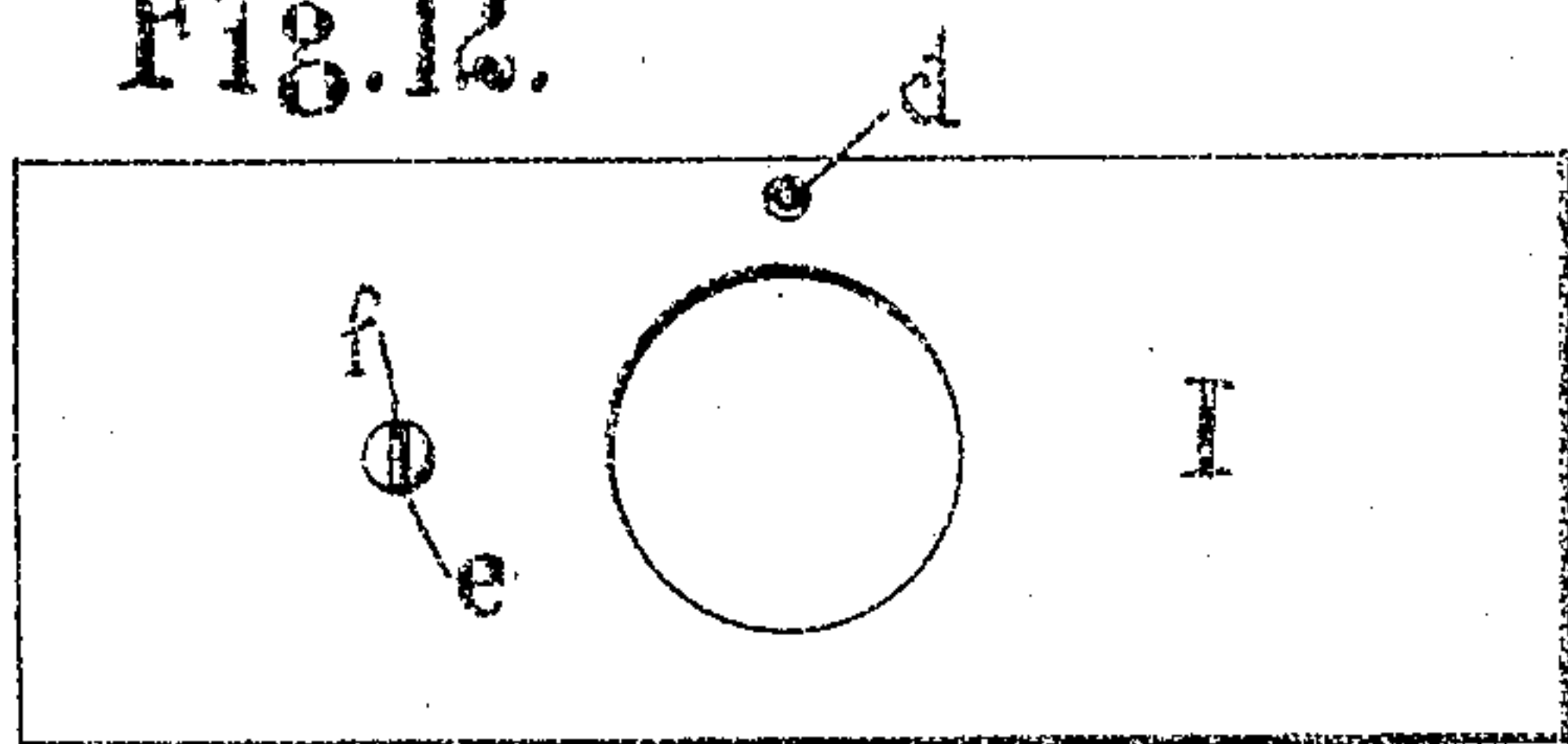
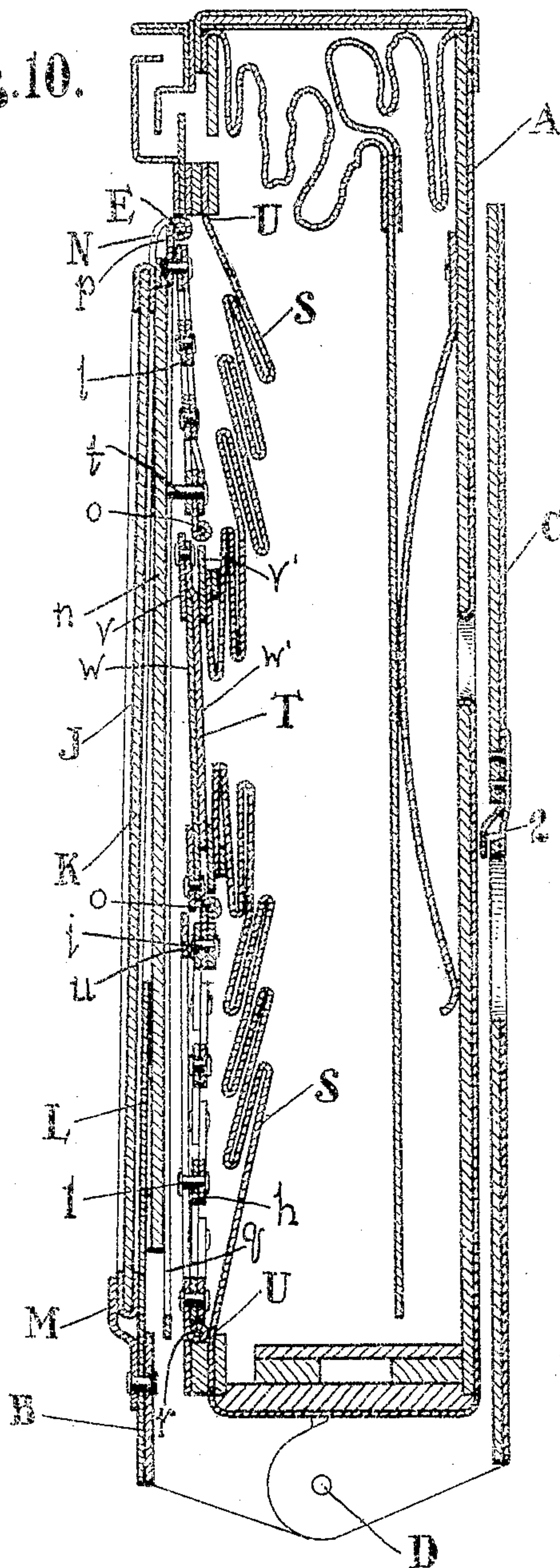


Fig. 10.



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UNITED STATES PATENT OFFICE.

GEORGE WASHINGTON, OF TOMPKINSVILLE, NEW YORK, ASSIGNOR TO
WASHINGTON CAMERA COMPANY, A CORPORATION OF NEW YORK.

PHOTOGRAPHIC CAMERA.

SPECIFICATION forming part of Letters Patent No. 778,518, dated December 27, 1904.

Application filed April 5, 1904. Serial No. 201,647.

To all whom it may concern:

Be it known that I, GEORGE WASHINGTON, a subject of the King of Great Britain, and a resident of Tompkinsville, Staten Island, borough and county of Richmond, city and State of New York, have invented a new and useful Improvement in Photographic Cameras, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 illustrates a plan view of the camera folded. Fig. 2 illustrates a side elevation of the parts shown in Fig. 1, the ground-glass frame being shown in its closed position in full lines and in its elevated position in dotted lines. Fig. 3 illustrates a front elevation of that which is shown in Figs. 1 and 2, the ground glass and its frame being in elevated position. Fig. 4 illustrates a side elevation of the apparatus in the position the parts occupy at the time of exposure. Fig. 5 illustrates a view from below of the bellows-operating mechanism, the outer casing being removed, showing two kinds of springs—one for starting and the other for continuing positive sharp forward movement of the bellows mechanism to insure proper action of the shutter. Fig. 6 illustrates a view from above of the bellows-operating mechanism, the outer casing being removed, the same as in Fig. 5, and showing also the mirror in its relation to the bellows mechanism. Fig. 7 illustrates a plan view of the mirror, the actuating devices for the bellows, and the bellows themselves when folded for transportation, the ground glass and its frame being removed and the outer casing or parts being also removed. Fig. 8 illustrates a longitudinal vertical section, the parts being in the position they occupy when focusing, the chamber for the reception of the sensitized material being left off. Fig. 9 illustrates a longitudinal vertical section, the parts being in the position they occupy just after the picture has been taken. Fig. 10 illustrates a longitudinal vertical section, enlarged, of the apparatus closed or folded, as for transportation. Fig. 11 illustrates the detail of the shutter mechanism. Fig. 12 illustrates a view of the rear or inter-

rior side of the lens-box, which also contains the shutter-motor.

A is a box or chamber adapted to receive the sensitized surface, whatever its form may be. It is a light-tight receptacle, and, depending upon the detail of construction, is so constructed and arranged as to receive and properly manipulate plates, rolled film-cartridges, or film-packs. The special character of the sensitized material forms no essential feature in this invention. Therefore there need be no further specific description of this part of the apparatus excepting to say that this box or chamber forms, as it were, the base or foundation to which the other parts are attached and by which they are supported in their several positions.

B and C are two frames which extend transversely of the apparatus. They are pivoted to each other, as at D. (See Figs. 1 and 2.) The upper one, B, is pivoted, as at E, to the front of the box, and the frame C is provided with two spring-plates F, (see Figs. 2 and 4,) one at each side, which are provided in their free ends with holes G, which are engaged with pins H H', projecting from the sides of the box A near its lower edge when the parts are swung from the position they occupy as shown in Fig. 2, in which the part B is folded down upon the front side of the film-holding box A and the part C is carried around its forward end and folded upon the back thereof into the position shown in Fig. 4, thus holding the said parts or frames B and C in their forwardly-projected operative position.

I is a box or casing which contains the lens, as best shown in Figs. 4, 5, and 6. It also contains the motor which actuates the shutter mechanism, as will be hereinafter explained. This box extends transversely across the entire front of the apparatus, closing the front end of the combined frame B C.

J is a frame supporting the ground glass K, and L is light-excluding material, preferably bellows-cloth, adapted to be folded upon itself in the form of gussets, so that the ground-glass plate can be closed down upon the top of the frame B and held in its closed position

by a suitable clip or fastener M. The method of folding the gussets is well illustrated in Fig. 1 in dotted lines. This ground-glass frame is pivoted at N N (see Fig. 1) to an axis or cross-pin O, which acts as the axis or shaft upon which all of the parts pivoted on this cross-line of the apparatus are fulcrumed.

To insure the proper relation between the ground glass K and the mirror, which is about to be described, I make the two folding side wings P P in the form of three-cornered pieces of metal, which are hinged at Q Q to the frame B, as shown best in Fig. 1, and I cover these metallic side wings or thin plates P P with the bellows-cloth L, and in order that they may be projected from their closed position, as shown in full lines in Fig. 2, to the operative position, in which the ground glass is ready for use in focusing, as shown in dotted lines in Fig. 2, I provide a spring R, (see Fig. 9,) one for each of the side plates P, which rests beneath the respective side plates when they are folded and tends always to swing them upwardly and outwardly, carrying the focusing-glass with them.

S represents the bellows, which carries the shutter mechanism T on its front end. The rear end U of the bellows is suitably attached light-tight to the box A, and the shutter mechanism is inclosed between metallic plates V V', (see Fig. 9,) which, with suitable closures at the edges, constitute the box or casing just referred to.

The details of the shutter are shown in Fig. 11—that is to say, there are two shutter-blades W W', pivoted at Y Y', respectively, to the plates P, and a balance-lever Z, pivoted at a , has two links b b connecting the ends of the lever Z with the respective shutter-blades, so that when the pivot a is turned, in a manner which will shortly be described, the shutter-wings are caused to open and immediately close again, thus making the exposure. The motor for the shutter is provided as follows: Within the lens-box D, already described, there is suitable mechanism put under tension in any preferred manner and held under tension by a suitable latch, which is released by pressing inwardly a little pin d , located at the bottom and inner side of the lens-box D. The mechanism is such that when released it gives to a stud e , which is provided with a rib f , projecting inwardly beyond the face of the casing D, a reciprocating quarter-turn move, whereby the shutter is operated as follows: The axis or pivot a of the shutter mechanism, (shown in Fig. 11,) upon which the balance-lever Z is fulcrumed, has a slot g cut in it, which is adapted to loosely receive the projecting rib f , above referred to, so that when the lazy-tongs carry the shutter-casing forwardly against the inner side of the lens-box D the rib f will engage in the slot g , and when these parts are thus engaged, and not until then, the little pin d will be pushed inwardly

by the contact with it of an appropriate part of the casing for the shutter mechanism under the impulse of the lazy-tongs springs, which project the bellows and the shutter-casing against the inner side of the lens-box, and when the little pin d , as above stated, is pushed inwardly the shutter-motor is released and the reciprocating movement is given to the axis a , which is transmitted, by means of the rib f and slot g , to the balance-lever of the shutter-blades, whereupon an exposure is made.

The lazy-tongs construction above referred to which actuates the bellows, &c., is arranged on both the upper and lower sides of the bellows. Those on the lower side, referring more particularly to Figs. 5, 6, 8, and 9, are seen at h . They may be of any suitable construction—that is to say, flat spring-bars h h h , suitably pivoted together, as shown, and connected at i to a pivoted stud, one on the upper and one on the lower edge of the shutter-casing T, and the lazy-tongs are projected by suitable spring mechanism. In the drawings hereof I show two forms of spring—one a longitudinally-extendible form, composed of bent wires j j , and the other a coiled transversely-retractile spring k . I prefer to employ these two forms of spring, because when the bellows is drawn back, as shown in Fig. 8, the pull of a transversely-arranged spiral spring, such as the spring k , would be almost directly on end relative to the bars h . Therefore in order to promptly start the outward movement of the bellows it is desirable to have the auxiliary wire springs j , which act for longitudinal thrust in the first instance more effectively than the transversely-acting coil-spring k , while the latter insures an energetic continuation of the forward or projecting movement of the bellows, thus securing effective operation and sure and positive engagement of the front face of the shutter-casing with the rear face of the lens-box for the release of the shutter, as above described. It is not essential, however, that two kinds of springs be used, as illustrated, because, as will be readily understood, springs may be otherwise arranged to effect the desired end.

On the upper side of the bellows similar lazy-tongs l l are arranged, which have a corresponding operation and project the upper edge of the shutter-casing and bellows just as those already described project and manipulate the lower edges of the parts stated, and in this upper lazy-tongs I illustrate the bent-wire springs m m , which are similar to the springs j j , quite to the forward end of the lazy-tongs. This construction may sometimes be desired if the apparatus is large and the bellows correspondingly heavy.

n is a mirror which rests upon and is supported by the upper set of lazy-tongs l l , which are pivoted at their rear ends to the film-box A or to some suitable part attached to it, as shown at p p , and in order that the

proper relation may be maintained between the mirror and the exposure-opening through the shutter I connect the two together by attaching a plate of thin metal q to the under side of the mirror-frame, which has a narrow slot s (see Fig. 6) cut in it lengthwise, in which slides the pin or screw head t , which connects the front end of the upper lazy-tongs to the pivoted plate connected with the shutter-casing T, thus guiding and controlling the upper edge of the shutter-casing, and in like manner I control the under set of lazy-tongs by providing a shorter plate u , which is pivoted at v at its rear end and is provided with a slot x , through which a screw 1 slides, thus guiding the lower edge of the shutter-casing.

In order that the bellows may be properly held when retracted into the position shown in Fig. 8, which position it assumes during the operation of focusing, I arrange a catch 2 (see Fig. 8) at about the central part of the folding frame C, adjacent to an opening 3 therein, in such position that when the shutter-casing T is drawn rearwardly into the position shown in Fig. 8 one edge or side of the exposure-opening in it will engage with this catch 2, as shown clearly in Fig. 8, so that the parts will be held in their then position; but by the insertion of the finger of the operator through the opening 3 the parts may be disengaged and then all will move rapidly forward to the position shown in Fig. 9—in other words, into the picture-taking position.

6 (see Fig. 1) is a slide or equivalent device whereby the shutter-motor is put under tension, and 7 is a device for adjusting the lens for focusing.

The operation of the apparatus in view of the foregoing description is apparent—that is to say, during transportation and when not in use the apparatus is arranged as shown in Figs. 1, 2, and 10, in which the bellows, the mirror, and the focusing-plate all lie in substantially the same plane—in other words, substantially parallel with the focal plane of the camera. One of the movable frames—that is to say, that which carries the mirror—and the mirror itself are folded down on one side of the box or chamber which carries the sensitized material, and the other frame is folded down upon and parallel with the opposite side of said chamber. When it is desired to use the apparatus, the parts are swung from their folded position above described and, as illustrated in Figs. 1, 2, and 3, into the position shown in Fig. 4. Thereupon upon releasing the latch m the ground glass will automatically assume the elevated position, (shown in dotted lines in Fig. 2 and in full lines in Figs. 3 and 4,) and the fingers of the operator being inserted at the triangular opening at the sides of the apparatus (shown best in Fig. 4) the shutter-casing is engaged by the fingers and pulled rearwardly and downwardly into the position shown in Fig. 8 until the catch 2 is engaged

by the exposure-opening in the shutter-casing, whereupon the parts will be held in the position shown in Fig. 8, and when in this position obviously the light will enter through the lens and the image will be reflected by the mirror n upwardly against the ground glass K and the picture and the whole of it may be properly focused. Thereupon the operator inserts his finger through the opening 3 in the underframe C and disengages the shutter-casing from the catch 2, and instantly the spring-actuated lazy-tongs project the bellows, carrying the shutter-casing T at its front end forwardly into the position shown in Fig. 9 in such manner and with such accuracy, because of the guiding device hereinbefore explained, that the projecting rib f (see Fig. 12) on the back of the lens-box properly engages with the groove or slot g in the pivot or axis a in the front of the shutter-casing, and at substantially the same instant the shutter-casing near its lower edge strikes the inwardly-projecting pin d (see Fig. 12) and releases the shutter-motor, whereupon the shutter instantly opens and closes and the exposure is made. Thereupon in a manner well understood the sensitized material, whatever its character may be, is moved or arranged so that the next exposure may be made. If rolled film or so-called “film cartridges” are used in the chamber or film-box A, then a suitable peep-hole is provided in any suitable place, and in like manner the chamber is adapted in its construction to receive and properly operate or manipulate glass plates or film-packs.

It will be obvious to those who are familiar with this art that many modifications may be made, particularly in the details of construction of the parts, without departing from the essentials of the invention. I therefore do not claim the details.

I claim—

1. A folding, focusing-camera embodying a bellows, a mirror, a focusing-surface, said mirror adapted to receive and reflect the image upon the focusing-surface, all of said parts, when folded, lying in planes substantially parallel with the focal plane of the camera.

2. A folding, focusing-camera embodying means to exclude the light from the sensitive surface, a mirror, a focusing-surface, the said mirror adapted to receive and reflect the image upon the focusing-surface, the mirror and focusing-surface, when the camera is collapsed or folded, lying substantially parallel with the focal plane of the apparatus.

3. A folding, focusing-camera embodying a bellows, mirror and focusing-surface, a shutter carried at the front of the bellows and shutter-operating mechanism brought into engagement with the shutter when the bellows is in its operative position.

4. A folding, focusing-camera embodying a bellows and means to retract and hold the same and other means to project the bellows

into operative position, a shutter and means whereby the shutter is made to act when the bellows has reached the operative position, a folding mirror and folding focusing-surface, 5 said bellows, mirror and focusing-surface all lying in substantially parallel planes when the camera is collapsed or folded.

5. A folding, focusing-camera embodying a mirror, a focusing-surface and devices for 10 excluding the light from the sensitive material, means to hold the mirror in operative position relative to the focusing-surface during the operation of focusing and to remove the mirror from the lines of light, thus expos- 15 ing the sensitized surface, at the time of taking the picture, said mirror and focusing-surface lying in substantially parallel planes when the camera is collapsed or folded.

6. In a camera a movable bellows, an in- 20 cased shutter carried by the bellows, incased spring actuating mechanism for the shutter, springs which project the bellows and the shutter against the casing for the actuating mechanism and means on the shutter-casing 25 for engaging and tripping said shutter mechanism.

7. A folding, focusing-camera embodying a bellows, mirror and focusing-surface and mechanism for automatically projecting the 30 bellows from the inoperative position assumed by it during the focusing operation into the operative or picture-taking position assumed by it at the time of exposure, said bellows, mirror and focusing-surface all lying in sub- 35 stantially parallel planes when the camera is collapsed or folded.

8. A folding, focusing-camera embodying a bellows, mirror and focusing-surface, a shut- 40 ter carried by the bellows, stationary shutter-actuating mechanism, means to project the bellows into the picture-taking position and means to hold the bellows against the stress of said projecting devices during the focusing op- 45 eration.

9. In a folding, focusing-camera, an ex- 45 tendible two-part frame pivoted together, one of said parts adapted to rest upon one side of

the chamber which contains the sensitized sur- face when the camera is folded, and the other part adapted to fold upon the opposite side 50 thereof.

10. In a folding, focusing-camera, a cham- 55 ber for the sensitized material, an extendible frame composed of two main parts pivoted together, one of them permanently hinged to the chamber for the sensitized material, a fo- 60 cusing-surface carried by one of said parts, a mirror and a bellows arranged between the two main parts, one of said parts, when the camera is collapsed, lying upon one side of the chamber containing the sensitized material 65 and the other part lying upon the opposite side thereof, the bellows and the mirror in- closed between the same and all of said parts lying substantially parallel with the focal plane 65 of the apparatus.

11. In a folding, focusing-camera, spring- 70 actuated devices which project the bellows into operative position and also release the shutter-actuating devices.

12. In a folding focusing-camera, an ex- 75 tendible two-part frame pivoted together and to the chamber which contains the sensitized material, a focusing-surface pivoted to one of said frames, a bellows, a mirror and shutter mechanism connected with the bellows, means 80 to retain the bellows when retracted during the focusing operation and other means for projecting the bellows and simultaneously re- moving the mirror from the lines of light, 85 means to guide the bellows into operative position, stationary shutter-actuating mechanism and means whereby said last-named mechanism will be engaged and the shutter 85 actuated when the bellows has reached the op- erative position.

In testimony whereof I have signed my name to this specification in the presence of two sub- scribing witnesses.

GEORGE WASHINGTON.

Witnesses:

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F. M. DONSBACH.