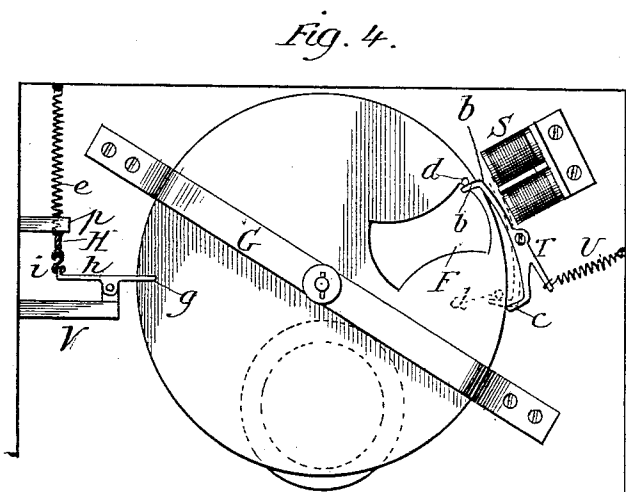
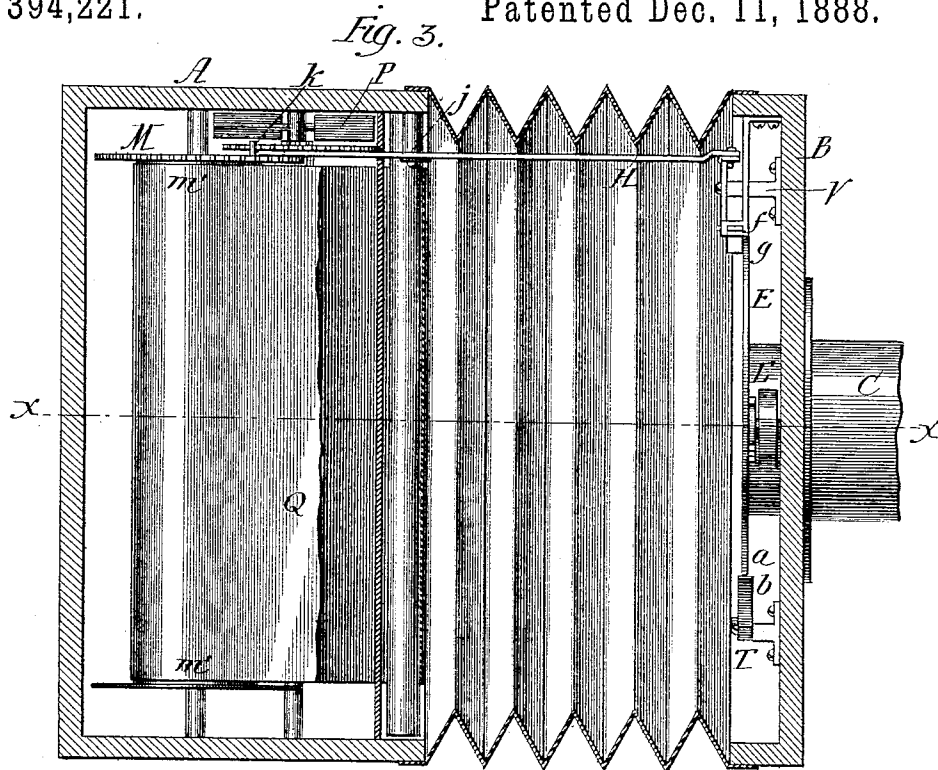


M. J. STEFFENS.
PHOTOGRAPHIC APPARATUS.

No. 394,221.

Patented Dec. 11, 1888.



Witnesses:
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UNITED STATES PATENT OFFICE.

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PHOTOGRAPHIC APPARATUS.

SPECIFICATION forming part of Letters Patent No. 394,221, dated December 11, 1888.

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To all whom it may concern:

Be it known that I, MATHEW JOSEPH STEFFENS, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented a new and useful Improvement in Photographic Apparatus, of which the following is a specification, reference being had to the accompanying drawings, in which—

10 Figure 1 is a horizontal section taken on line *x x* of Fig. 3; Fig. 2, a partial section taken on line *y y* of Fig. 1; Fig. 3, a vertical section taken on line *z z* of Fig. 1; and Fig. 4, a section similar to Fig. 2, with the holding devices modified.

15 The object of this invention is to improve the construction and operation of the apparatus shown in my former patent, No. 359,902, and in machines for taking instantaneous photographs. Its nature consists in the improvements hereinafter described, and claimed as new.

20 In the drawings, A B represents the parts of the outer case, which, as shown, are connected by a bellows-section; but ordinarily the bellows will be omitted, and where adjustment is required the section B will be made deep enough to slide over the section A. An adjustment of any kind will not be
30 found necessary except where instantaneous pictures and those requiring a little time are taken in or by the same camera. C indicates the lens-tube; D, the lens; E, the shutter or disk containing the light-opening; F, the light-
35 opening; G, bridge or cross-bar for supporting the inner end of the shaft of the disk E; H, stop-lever; I, partition-plate; J K, spring cylinder or spool for taking up the sensitized paper; L
40 L', springs; M N O, gear-wheels; P, balance or fan wheel; Q, paper; R, rollers; S, magnet; T, armature-pawl; U, spring; V, supporting-bars; *a*, notch or projection on the edge of the disk E; *b*, armature end of the pawl T; *c*, hook or catch on the opposite end of the pawl; *d*, project-
45 ing pin on the face of the disk E; *e*, spring; *f*, sliding bar operating the pivoted bar *h* and link *i*; *j*, pivot for the lever H; *k*, pin projecting from the face of the wheel or gear-disk M; *l*, linings or projections to prevent the ad-

mission of light between the rollers R and the casing; *m*, pins on the upper paper cylinder or spool; *n*, key-hole for winding up the spring L'; *o*, slide or clamp for attaching the end of the paper to the lower roller; *p*, a limit-pin or stop.

55 The section A of the case with the partition I form what may be called a "dark-box," and the admission of light may be prevented by the projections *l*, which are in rear of the rollers R, or they may be placed in front and be made somewhat higher. A strip of thick cloth will usually be sufficient for this purpose. Within this dark-box the paper-cylinders K are located, the paper being placed on the upper one and from that wound to the
65 lower one, which is provided with a long coiled spring, L, which is attached to the cylinder and its center shaft in a manner similar to the attachments of the mainsprings in watches to their barrels. The upper roller is provided
70 with a gear-wheel or flange, M, with which is geared the pinion N, rotating the wheel O, and the fan-balance wheel P. These gear-wheels and fan-balance are for the purpose of preventing a too rapid rotation of the upper
75 paper-cylinder, and other well-known retarding devices—such as a brake-spring or spring-shoe—may be applied for this purpose in place of the gear mechanism here shown; but I prefer the device shown, as it does not require
80 any special adjustment. The upper roller is provided at or near each end with pins *m*', which assist in holding the paper, and also provide marks by means of which the sheet may be cut into sections at the right points
85 before the pictures are developed.

The paper Q is wound upon the upper cylinder K and its free end is carried around the two rollers R and attached to the lower cylinder, K, by means of the slide or clamp *o*,
90 which slide may be fitted into a groove, as is common in curtain-rollers, or it may be a clamp operated by suitable screws. The paper is prevented from unwinding by means of the pin *k*, Fig. 3, resting against the end of
95 the lever H, which locks and holds it on each revolution of the cylinder.

The pivot-lever H, as shown in Fig. 1, is

provided with slots and pins to permit of extending the case. These slots and pins ordinarily will not be used, and when used the relative size of the slots and pins must be such as to permit of a proper vertical movement of the lever H. The movement of this lever, by which its inner end is disengaged from the pin *k*, is caused by the slide *f* having a projection or tooth, *g*, against which the pin *d* strikes when the disk or plate E is rotated and lifts the slide, which, operating upon the pivot-bar *h*, depresses the link *i* and the outer end of the lever H sufficiently to elevate the inner end out of contact with the pin *k*, so that the upper roller will take one rotation, caused by the strain of the spring L of the lower cylinder upon the paper Q. During this rotation the pin *d* will have passed the projection or notch *g*, when the spring *e* will return the slide *f*, and thereby the lever H, so as to again stop the rotation by its end coming in contact with the pin *k*.

The disk E is a plain thin vulcanized-rubber disk provided with the light-hole F, which will pass the lens D on each rotation of the disk. The rotation of this disk is caused by the spring L', which is wound up or put under tension by applying a suitable key at *n* to the square end of its shaft. When the spring is wound up, the disk is held or prevented from rotating by the notch or projection *a* resting against the end *b* of the armature-pawl T, which is held out of contact with the magnet S by the spring U, applied to an extension or other part of the pawl. This pawl is also provided with a hook, *c*, which, when the part *b* is in contact with the magnets, will be operated inward and catch the pin *d* and hold the disk so long as a current of electricity is applied to the magnet. This arrangement prevents the necessity of any rapid manipulation of the electric current, as the hook *c* will hold the disk as long as the electric current is applied, and when switched off the spring U will return the point *b*, so as to insure its being in position to stop the disk on a single revolution, which is important, as more than one revolution would ruin an instantaneous picture.

Under some circumstances, such as very dark days, or when it is desired to take pictures by moonlight, more time is required, and for this purpose a second stop, *a*, or pin *d* may be arranged so as to stop the disk and hold the opening F in line or register with the opening C, in which the lens D is placed, and for taking instantaneous pictures when the light is very strong means for contracting the opening F may be applied to the disk, as shown by the full lines.

When the disk E is in rotation, the pin *d* strikes the projection *g* and operates the lever H, as before described, so that a section of the sensitized sheet is always in position for a picture, and it will be seen from the construction and operation of the apparatus that any

desired number of pictures may be taken, as long sheets of this paper can be found in the market.

This apparatus is designed to be used in connection with a balloon for elevating it to an altitude above interference from immediate surroundings, and, as it is liable to turn with the balloon, a number of pictures showing the outlying country in various directions can be taken at a single elevation, and to insure the taking of pictures in opposite directions a cord for turning it may be applied, or the wires by which the magnet S is connected with the battery may be used for this purpose by moving or turning the battery.

It will be seen that each picture as soon as taken is drawn into the dark section or chamber of the case, and when the case is taken to the dark-room and so much of the strip as has been used is cut up the pictures are developed in the usual manner.

It will be evident that the rolls or cylinders K should be of a diameter proper to expose a complete new surface between the rollers R for each exposure, and that the section A may be considerably shallower, as the only important thing is to keep the paper stretched in the focus-line.

I do not confine the use of my improved apparatus to its use with a balloon, as it may be used in any and all places where pictures can be taken, and also in positions to take passing trains, running horses, at doors of houses, bank and safety-deposit vaults, and under water when in a suitable water-tight box or case, and in various other places or situations, and by this construction and arrangement a number of pictures can be taken without changing the position of the camera.

In the form shown at Fig. 2 the arm *b* of the dog T acts as a slight brake as it presses on the edge of the disk E, while in the form shown at Fig. 4 the end of the arm *b* is placed at the side of the disk and bent down so as to engage with the pin *d*, which becomes the stop *a*, and thus frees the dog from any brake action; and the devices for disengaging the lever H are simplified, as the projection *g* is only an extension of the pivoted bar *h*, located in a higher position, which dispenses with the bar *f* and shortens the link *i*, and by bringing the end of the lever H lower the pivoted lever *h* may be so connected therewith as to dispense with the link *i* without changing the operation or effect of the lever H.

It will be understood that a winding-key and a holding-pawl may be applied for winding the spring L and for holding it when necessary.

What I claim as new, and desire to secure by Letters Patent, is—

1. The cylinder K, having the flange M and pin *k*, with the stop-lever H, and means for operating the same, substantially as described.
2. The combination of the disk E, having

the pin *d* and stop *a*, with the dog T, magnet S, and spring U, substantially as specified.

3. The combination of the disk E, having the pin *d*, with the pivoted bar *h* and projection *g*, connection or link *i*, and lever H, substantially as described.

4. The combination of the paper-cylinders K, rollers R, lever H, link or connection *i*, bar

h, and projection *g*, with the disk E, having the pin *d*, pawl T, and magnet S, substantially as specified.

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