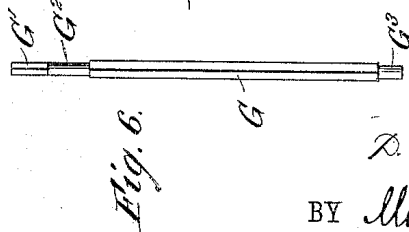
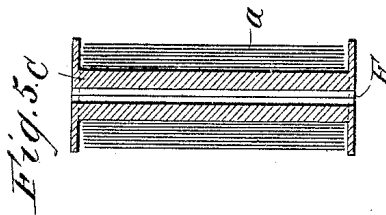
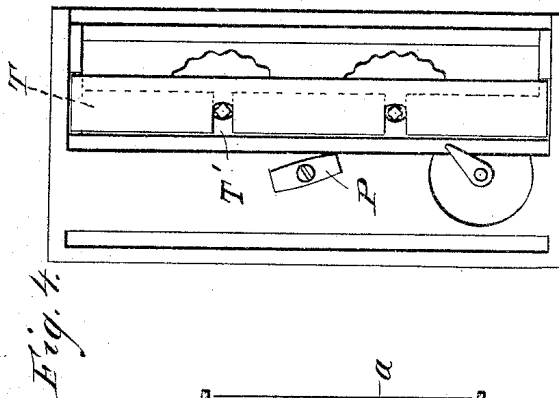
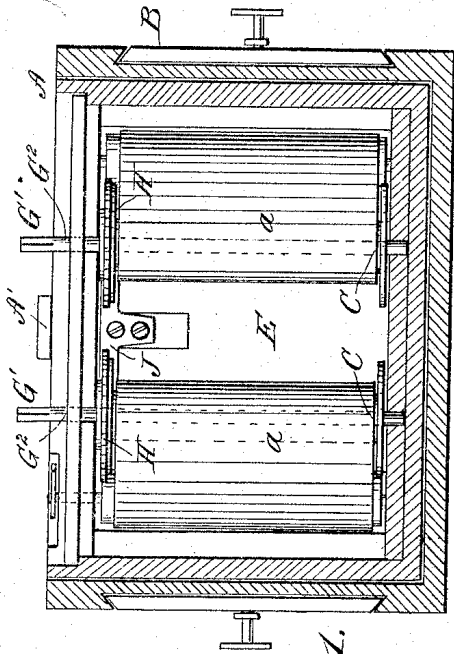
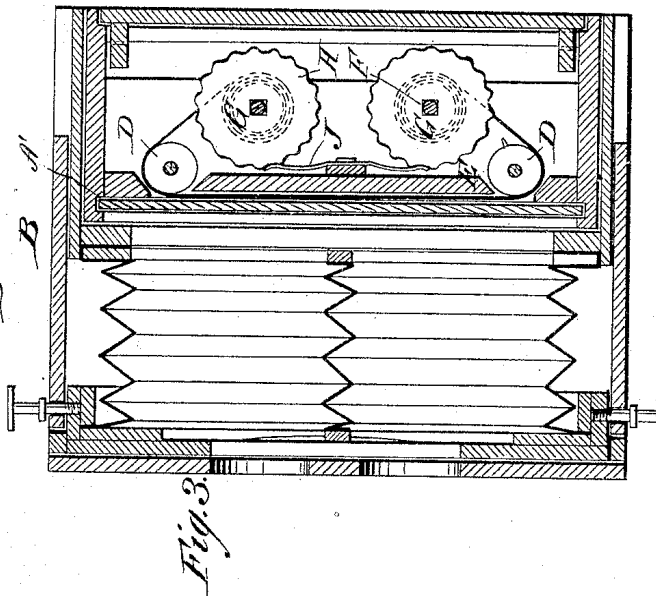
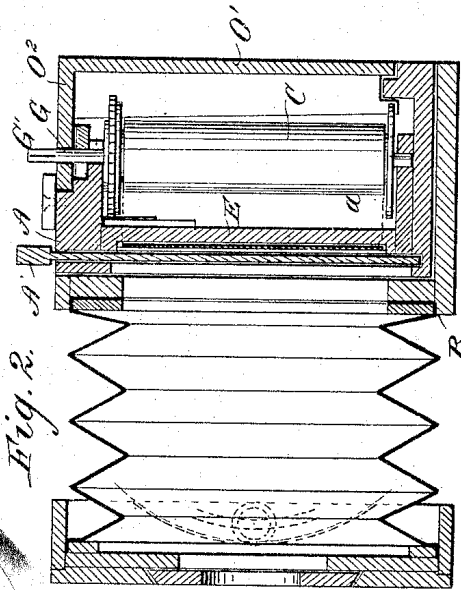


D. H. HOUSTON.

PHOTOGRAPHIC APPARATUS.

No. 355,084.

Patented Dec. 28, 1886.



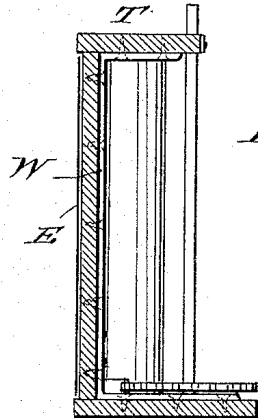
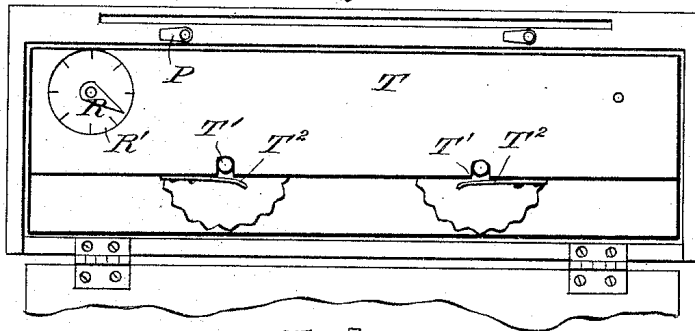
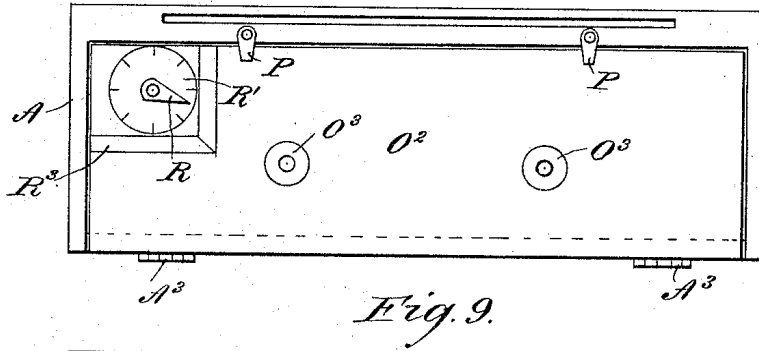
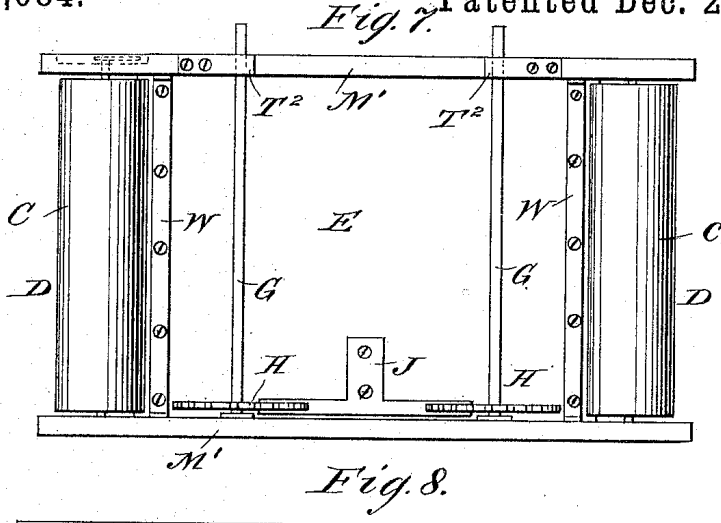
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Fig. 11.

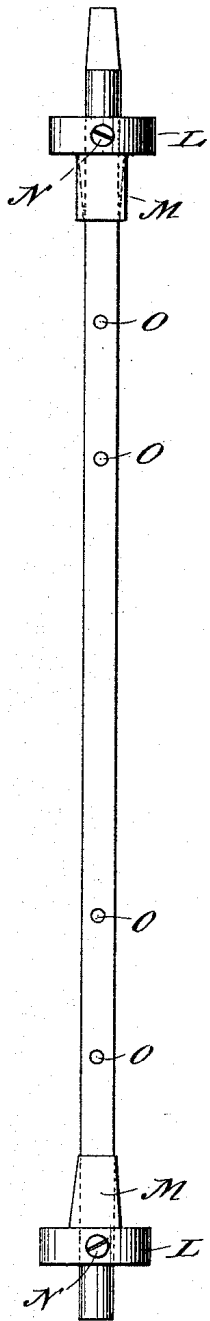


Fig. 12.

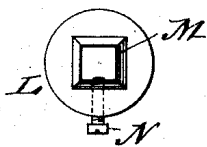
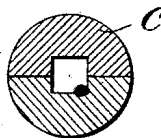


Fig. 13.



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UNITED STATES PATENT OFFICE.

DAVID H. HOUSTON, OF HUNTER, DAKOTA TERRITORY.

PHOTOGRAPHIC APPARATUS.

SPECIFICATION forming part of Letters Patent No. 355,084, dated December 28, 1886.

Application filed August 29, 1885. Serial No. 175,648. (No model.)

To all whom it may concern:

Be it known that I, DAVID H. HOUSTON, of Hunter, in the county of Cass and Territory of Dakota, have invented a new and Improved
5 Photographic Apparatus, of which the following is a full, clear, and exact description.

The object of my invention is to provide certain new and useful improvements in the photographic apparatus for which United States
10 Letters Patent No. 248,179 were issued to me on the 11th day of October, 1881.

The invention consists in parts and details and combinations of the same, as will be fully described hereinafter, and pointed out in the
15 claims.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

20 Figure 1 is a longitudinal sectional elevation of my improved photographic apparatus. Fig. 2 is a cross-sectional elevation of the same. Fig. 3 is a sectional plan view of the same. Fig. 4 is a detail plan view of the paper-holding
25 box, the cover of the same being removed. Fig. 5 is a longitudinal sectional elevation of one of the spools and the sensitized paper or film thereon. Fig. 6 is a longitudinal view of one of the spindles. Fig. 7 is a rear view of
30 the attachment, showing a modified construction of the roller-frame independent of the light-tight case, into which it is placed for use. Fig. 8 is a plan view of the same, the door being closed. Fig. 9 is a plan view, the door being
35 open. Fig. 10 is a cross-sectional view of the roll-frame. Fig. 11 is a longitudinal view of a modified construction of the spindle. Fig. 12 is a plan view of the adjustable collar on the same. Fig. 13 is a cross-sectional view
40 of the spool.

The removable box A, provided with a sliding shutter, A', fits in the rear part of the camera B, and contains the sensitized paper or sensitized film a, which is wound upon two
45 spools, C, mounted to turn in the box or roll-holder A, the said film or sensitized paper a being also passed over rollers D, so that a straight part of the said sensitized film or paper passes over a plate or partition, E, directly
50 behind the sliding shutter A'. By raising the shutter the film or paper a is exposed to the

action of the light, and the exposed part of the film is then wound upon one spool, whereby fresh paper or film is unwound from the other spool and exposed, and so on. Each spool C
55 consists of a cylinder of wood or any other suitable material, provided with a triangular, square, or other polygonal or equivalent bore, F, extending from end to end. If desired, the bore may be made circular in cross-section
60 and provided with grooves or notches for receiving splines or keys on the spindle. The spindles G, fitting in the bores of the spools C, are made square in cross-section, or have any other cross-section corresponding to that of the bore
65 of the cylinder. As stated above, they are provided with suitable ribs or splines in case they are made circular, which ribs or splines pass into the grooves of the spools to prevent slipping. The upper ends, G', of the spindles are
70 squared to adapt them to fit a key, and below the said squared ends pivot parts G² are provided on the spindles, and another pivot part, G³, is provided at the lower end, the said pivot parts turning in bearings. 75

The spindle can easily be withdrawn from the spool or passed through the same and into bearings provided for it in the box A. The square parts of the spindles also pass through
80 apertures in wheels H, having serrated or toothed edges, against which springs J rest, for the purpose of preventing the paper from unwinding too rapidly. The said wheels H may be located at the top of the box, as shown
85 in Fig. 1, or they may be at the bottom, as shown in Fig. 7.

The wheels H are not connected with the spools or with the spindles, and are provided with squared or polygonal apertures, through
90 which the squared or polygonal parts of the spindles pass, or with apertures of any other suitable cross-section, according to the cross-section of the spindles.

In some cases it will be necessary to provide means for holding the spool at the middle of
95 the spindle, especially where the spool is shorter than the spindle and the film or sensitized paper held on the spools is to be passed over the partition E at the middle of the height of said partition. To hold said spools
100 in the desired position, a support must be formed for the lower end of the spool some

distance above the lower end of the spindle, and the upper end of the spool must be held some distance below the upper end of the spindle. I accomplish this by providing the spindle with two loose collars, L, Fig. 11, the collars having squared apertures through which the spindle can pass, and being also provided with externally squared, straight, or tapered necks M, through which the spindles can pass. Each collar has a screw, N, which can be screwed into apertures O in the spindle, for the purpose of locking the collar on the spindle in the desired place. The squared, straight, or tapered necks M are forced a greater or less distance into the ends of the spools, and lock the collars on the ends of the spools.

By the use of the above-described collars on the spindles spools of any size can be held on the spindles at the middle of the same. The spools need not necessarily be bored, but can be made of two or more sections having their inner sides grooved to form a squared or other bore, which sections are then glued together, as shown in Fig. 13.

Where the above-described collars are used the main part of the spindle can be made round, and need not necessarily be made square or polygonal, as the necks on the collars prevent the spool from turning independently of the spindle.

The end of the paper or film *a* is pasted to the spools, or otherwise secured to the same. The paper or film is wound on the spools, and the said spools on which the paper is wound are merchantable articles—that is, they are to be sold entirely independent of the camera and attachments. When a spool is empty, the spindle is withdrawn from the same, the empty spool is removed, and a filled spool placed on the spindle, and the operation is continued. In a similar manner a spool upon which all the sensitized paper has been wound is removed by pulling out the spindle or drawing the spool off the spindle, and the filled spool can then be replaced by an empty spool, upon which the sensitized film is to be wound.

As shown in Fig. 5, the spool has a flange or head at each end, which construction is preferred, but is not absolutely necessary. To facilitate the removal of the spindles and spools, the upper ends of the spindles are placed in notches T' in the top plate, T, of the box A, and the said spindles are held in place by springs or latches T², secured on the edge of the top plate, T, as shown in Fig. 9. The top and back of the box A are closed by a removable door, O', having a top flange, O². The flange O² of the said door is provided with apertures O³, through which the upper ends of the spindles G can pass. The door is held in place by pivoted buttons or latches P on the top of the box A.

One of the rollers D is provided with a pointer, R, which indicates on a graduated circle, R', the position of the paper in front of the partition E. The paper is marked by per-

forations produced by a pin on one of the measuring-rollers, D, shown in Fig. 3. The circumference of the measuring-roller should be equal to one-half, one-third, or one-fourth of the width of the film required to be measured off for each picture, so that the film may be cut apart for development and finishing at the marks left by the perforator.

The hinged cover O' is provided with an opening, R³, in one corner, through which the pointer R and its circle are shown, the edges of the opening being provided with a light-tight joint. The partition E is preferably held in place by U-shaped metal pieces W, the top and bottom arms of which are secured to the top plate, T, and to the bottom plate of the box A, or to the top and bottom plate of the independent frame M', Fig. 7, which is a frame composed of top and bottom plates connected by the partition E, against which the frame rests, and also connected by the U-shaped metal braces. This frame carries all the interior working parts of the roll-holder, and is made to fit snugly in the light-tight box of the roll-holder, and can be removed therefrom.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a roll-holder, a removable bar of wood or other suitable material, T, said bar having notches T', which notches hold the top ends of the spool-shafts in place, substantially as herein shown and described.

2. In a roll-holder, the combination, with the frame M', having a top and bottom plate connected by the partitions E, of the removable spool-shafts G, which spool-shafts have fixed on them, just above their bottom pivot ends, toothed wheels H, upon which a spring-pawl, J, rests, and of hollow spools placed removably on said spool-shafts, the tops of which spool-shafts are held in place by the springs T², or any suitable latch, substantially as shown and described.

3. In a roll-holder, the combination of the spool-shafts G, the removable bar of wood T, having notches in the same, said notches engaging the upper ends of the spool-shafts and holding said upper ends of the spool-shafts in place, and removable hollow spools on the spool-shafts, substantially as shown and described, and for the purpose herein specified.

4. In a roll-holder, the combination, with the frame M', having a top and bottom plate connected by the partitions E, which frame fits in the light-tight box of the roll-holder, of the removable spool-shafts G, passed through removable hollow spools and removable toothed wheels on the spool-shafts, against which toothed wheels a spring-pawl, J, rests, and of the roller D, having bearings in the frame M, substantially as shown and described.

5. The combination, with a roll-holder, of a top plate having notches T', spindles having their upper ends placed in the notches, springs or latches secured on the top plate for holding

the upper ends of the spindles in place, and spools on the spindles, substantially as herein shown and described.

6. The combination, with a roll-holder, of a box, A, the spindles G in the same, removable spools on the spindles, the back door, O', having a top flange, O², provided with small holes O³, and the latches P, for locking the door in place when shut, substantially as herein shown and described.

7. In a roll-holder, the combination, with the box A, of the spindles G, carrying rolls of sensitized paper, the rollers D, of which one has a pointer, R, and the hinged door O', having a top flange, O², provided with spindle-holes O³, through which key ends of the spindles pass, substantially as herein shown and described.

8. The combination, with the box A, having a top plate, T, of the spindles G, having their upper ends held in notches in the top plate, T, spools carrying sensitized paper or film mounted on the spindles, and a door hinged to the top of the box A, and having an opening, R³, through which the pointer on the roller D can show, and provided with apertures O³, through

which the upper ends of the spindles can pass, substantially as herein shown and described.

9. The combination, with the box A, of the U-shaped brace W, secured on the upper surface of the bottom of the box, the partition E, secured to the upright parts of the braces, and the top plate, T, secured on the tops of the braces, substantially as herein shown and described.

10. In a roll-holder, the frame M', composed of a top and bottom plate connected by a partition and U-shaped braces, which frame fits in the light-tight box of the roll-holder and is removable therefrom, substantially as herein shown and described.

11. In a roll-holder, the combination, with the frame M', having a top and bottom plate connected by the partition E, of the removable spool-shafts G, passed through removable hollow spools, and removable toothed wheels H, upon which a spring-pawl, J, rests, substantially as shown and described.

DAVID H. HOUSTON.

Witnesses:

J. H. GALE,
FRED. B. SIMMONS.