(No Model.) 2 Sheets—Sheet 1.

T. SAMUELS.

APPARATUS FOR HOLDING DRY PLATES OR FILMS.

No. 306,528. Patented Oct. 14, 1884.

Fig. 1.

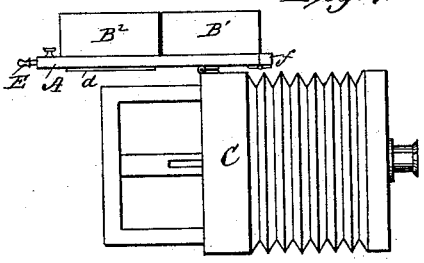


Fig. 3.

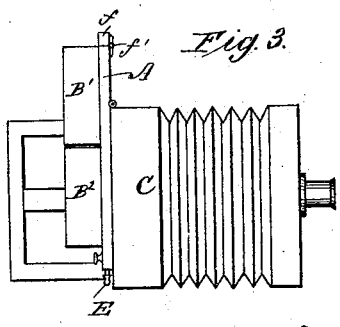


Fig. 2.

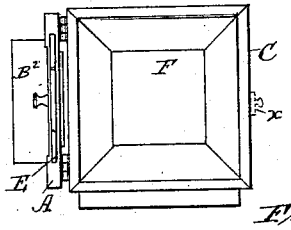


Fig. 4.

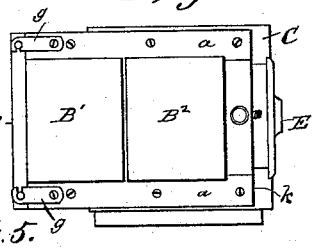


Fig. 6.

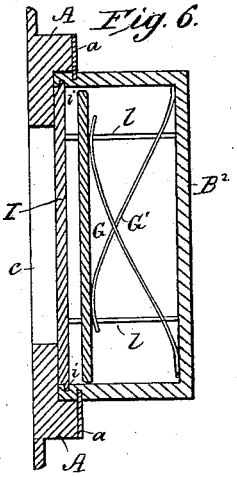


Fig. 5.

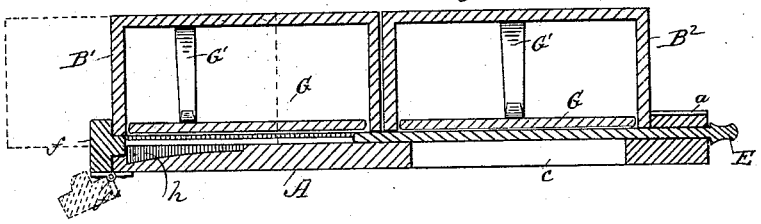
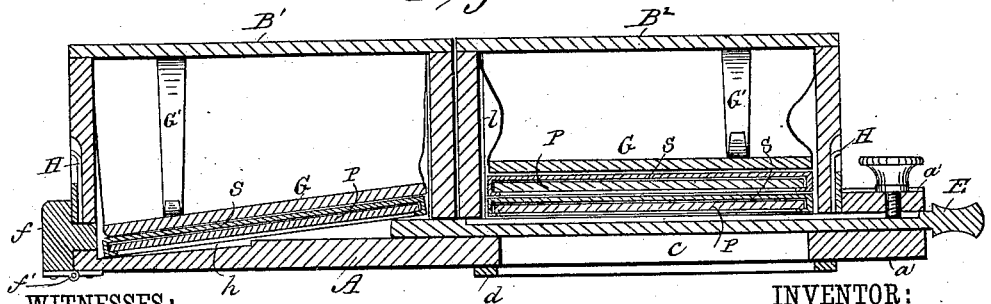


Fig. 7.



WITNESSES:

W. W. Hollingsworth

Solon C. Kemon

INVENTOR:

Thos. Samuels

BY Munn & Co

ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

T. SAMUELS.

APPARATUS FOR HOLDING DRY PLATES OR FILMS.

No. 306,528. Patented Oct. 14, 1884.

Fig. 8.

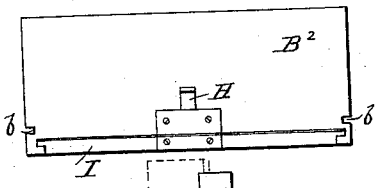


Fig. 9.

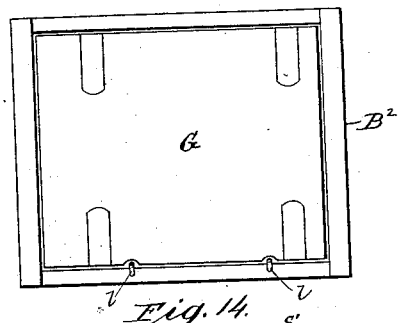


Fig. 10.

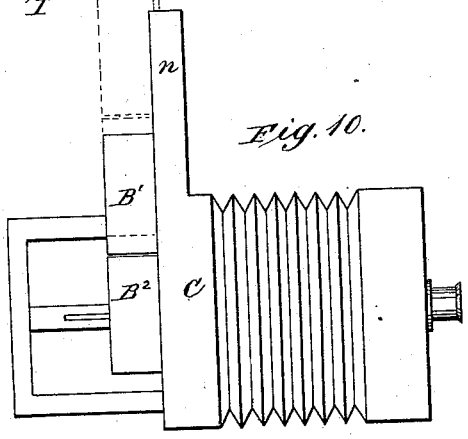


Fig. 14.

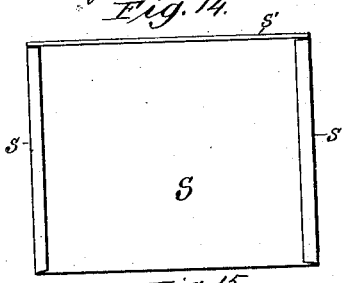


Fig. 15.

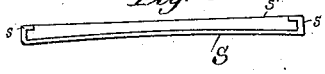


Fig. 11.

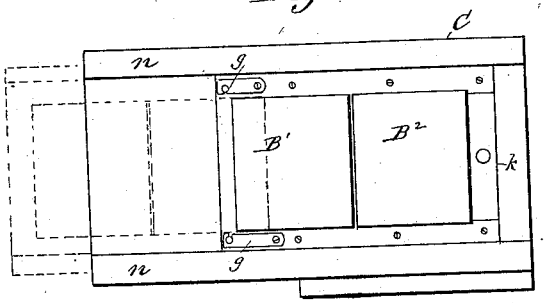


Fig. 12.

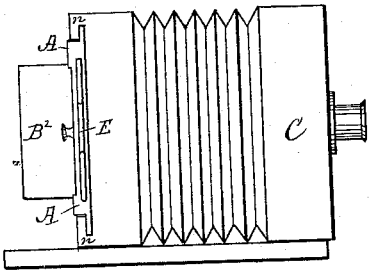
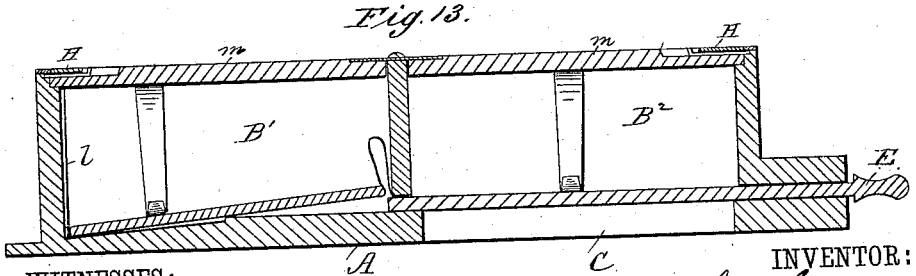


Fig. 13.



WITNESSES:

W. W. Hollingsworth

Solon C. Kemon

INVENTOR:

Thos. Samuels

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

THOMAS SAMUELS, OF MONKEN HADLEY, COUNTY OF MIDDLESEX, ASSIGNOR OF ONE-HALF TO ALEXANDER MELVILLE CLARK AND WILLIAM CLARK, BOTH OF MIDDLESEX COUNTY, ENGLAND.

APPARATUS FOR HOLDING DRY PLATES OR FILMS.

SPECIFICATION forming part of Letters Patent No. 306,528, dated October 14, 1884.

Application filed November 27, 1883. (No model.) Patented in England February 15, 1883, No. 843; in France August 4, 1883, No. 156,881; in Belgium August 7, 1883, No. 62,248, and in Germany August 20, 1883, No. 26,261.

To all whom it may concern:

Be it known that I, THOMAS SAMUELS, a subject of the Queen of Great Britain, residing at Monken Hadley, in the county of Middlesex, England, have invented certain new and useful Improvements in Apparatus for Holding Dry Plates or Films Before, During, and After Exposure and for Changing Them in the Photographic Camera, (for which I have received Letters Patent in Great Britain, No. 843, dated February 15, 1883,) of which the following is a specification.

My invention relates to an improved apparatus in the nature of a combined dark-back and holder for containing a number of sensitized dry plates or other sensitive films placed in front of one another, and for automatically bringing the said plates or films successively up to the same plane or position for exposure, and for changing and packing away the said plates or films after exposure. The said apparatus is applicable to any ordinary camera, and is serviceable also as a convenient and compact means of transporting the plates or films both before and after exposure. By means of this apparatus a number of exposures in very rapid succession may be easily obtained without the possibility of accidentally exposing the same plate twice, (which is liable to happen with double backs and some existing changing-box cameras,) there being with my apparatus no manipulation beyond the mere sliding out and in of the dark shutter, the operations of bringing up the plates or films to position for exposure and packing them away after exposure being entirely automatic, except in so far as they are dependent on the working of this slide.

My invention further comprises an envelope or sheath for each plate, by means whereof the contact of the plates or films with one another when preposited in my holder, and especially in transferring and packing them away after exposure, is avoided, and the light is prevented from passing through a plate when under exposure to those behind it.

The invention is illustrated in the accompanying drawings, in which Figures 1 and 3 are plans of a camera provided with my improved plate-holder, the parts being shown in position for exposing a plate and for focusing the picture, in the two figures, respectively. Figs. 2 and 4 are the corresponding rear elevations. Fig. 5 is a horizontal section of the plate-holder, and Fig. 6 is a vertical section through one of the plate-holding boxes. Fig. 7 is a similar section to Fig. 5, drawn to a larger scale. Figs. 8 and 9 are end and face views of one of the boxes. Fig. 10 is a plan of a camera provided with my improved plate-holder when arranged to slide (instead of swinging on hinges, as in the former arrangement) in and out of position for exposure. Figs. 11 and 12 are corresponding rear and side elevations. Fig. 13 is a horizontal section of this modified plate-holder drawn to a larger scale. Figs. 14 and 15 are face and edge views of one of the protective sheaths for the sensitized plates.

The same letters of reference indicate similar parts in all the figures.

The apparatus consists of a pair of twin plate-holding boxes or compartments corresponding in internal area to the dimensions of the plates and juxtaposed upon a board or frame, which is hinged or otherwise attached to the body of the camera, so as to take the place of the ordinary dark-back. One of these plate-holding boxes or compartments I denominate the "container," as it contains the supply of plates previous to exposure, and the other I denominate the "receiver," it being intended to receive the same plates after exposure, the plates in the container being brought successively into position for exposure and transferred thence to the receiver by means which I will proceed to describe with reference to the drawings.

A is the base-plate of the plate-holder.

B′ B^2 are twin boxes or compartments, the one, B^2, being the container, and the other, B′, the receiver.

C is the camera of any usual construction.

In Figs. 1 to 9 the plate-holder is constructed of two distinct boxes, B′ B^2, which

are interchangeable for other similar ones filled with plates held in reserve and brought into use as required. These boxes are all identical in every respect, and, being rectangular and without any external projections, a number of them may be packed compactly together for transport, and they are therefore well adapted for outdoor work. These boxes are accurately fitted to slide in rabbeted guides or gibs *a*, Fig. 6, along the top and bottom edges of the base-plate A, which engage with the corresponding grooves *b* in the top and bottom of the boxes, Fig. 8. The base-plate A is a solid board having an opening, *c*, Figs. 5, 6, and 7, in such position that its center will coincide with the optical axis of the camera when the plate-holder is in position for exposure, and of dimensions slightly less than the height and width of the plates. Surrounding this opening there is a projecting fillet, *d*, Fig. 7, fitting in a rabbet in the back of the camera, so as to make a light-tight joint between the board A and the camera. These boxes B′ B² abut closely together, so that no light can get between them, and the one B² abuts close against the end frame, *a′*, on the plate A, while a flap, *f*, hinged at *f′* to the plate A, abuts against the box B′ and is locked by catches *g*. By throwing this flap back on its hinges the boxes B′ B² can be slid out of their guides in the frame A, as indicated in dotted lines in Fig. 5. The boxes B′ B² are open on the side next the plate A, by which the box B′ is closed light-tight, while the box B² comes opposite the aperture *c*.

E is a shutter, fitted to slide through a mortise in the end *a′* of the plate A, and through corresponding recesses in the front edges of the ends of the boxes B′ B². This shutter slides in close contact with the inner surface of the board A, and the recesses in the box ends form a passage of communication from the one box to the other, as shown. Each box is furnished with a false bottom or follower, G, which is pushed up from behind by springs G′ in order, in the case of the container B², to bring the plates successively up to the position for exposure, the forward motion of the false bottom being limited by tapes made fast at each end, or by suitable stops (not shown) in such manner that the end of the false bottom next the dark shutter shall not project beyond the opening between the boxes or the mortise in which the shutter slides when the boxes are empty.

l are wire guides fixed against one side of each box for the edges of the plates to work against.

P are the dry plates, each incased in a protective sheath, as hereinafter described. The total thickness of a plate and its sheath corresponds to the thickness of the shutter E, so that as a plate is pushed up by the springs G′ until it abuts against the inner face of A opposite the aperture *c*, and directly in line with the shutter E, the latter when pushed in will drive the plate in front of it out of the box B² into the box B′.

To enable the plate so transferred to enter the receiver B′ in front of the false bottom, or in front of its predecessors in the receiver, the inner surface of board A is countersunk so as to form a well, *h*, at the side farthest from that at which the plate enters the receiver B′, and the springs G′ are set toward the same side of the box, so that the false bottom of said box, and any plates in front of it, will be canted sidewise, as shown in Fig. 7, and the leading edge of the entering plate will come in front of the said false bottom and the plates, which will thus be forced backward as the entering plate is slid into the box. Other means of making the plate assume this oblique position may, however, be adopted.

A cover, I, is provided for each box B′ B². It corresponds exactly in thickness to the shutter E, so that it can pass through the mortise in which the latter works, and has rabbeted edges, which slide in grooves *i* in the upper and lower side of the box. A bolt, H, or other fastener is provided at the left-hand end of the box to lock the said cover in position. The plate A is hinged at D to the side of the camera, so that it may either be brought close against the back of the camera, as in Figs. 3 and 4, this being the position for exposure, or be readily swung back, as in Figs. 1 and 2, to allow of the focusing-screen F being quickly brought into position for focusing, this screen F being hinged to the top or bottom of the camera, as is frequently done. It will, however, be obvious that the plate-holder might be hinged to either side or to the top or bottom of the camera, the screen F being arranged accordingly. In any case the focusing-screen is so adjusted that when in position for focusing the picture the plane of the ground-glass screen will exactly coincide with the plane of the next plate P to be exposed, when said plate is pushed by the springs against the inner surface of the board A on the shutter E being drawn out. The plate-holder is locked in position for exposure by a spring-catch at *k*. (Not shown.)

The *modus operandi* is as follows: The flap *f* being opened and the shutter E being drawn out, a box filled with—say, half a dozen dry plates (each incased in a protective sheath, to be hereinafter described) and closed by its cover I—is slid into the position B² in the base-plate A. An empty box, without its cover, is then placed alongside it at B′. The shutter E is then pushed in, thus forcing the cover of B² into the corresponding grooves of B′, from which it can be easily withdrawn, after which flap *f* is closed and locked. The shutter now closes the aperture *c*, and the plate-holder can be swung back to the position Figs. 1 and 2, for the purpose of focusing the picture, after which it is returned to the position shown in Figs. 3 and 4. The lens having been capped or closed by its instantaneous shutter, the shut-

ter E is drawn out, whereupon the front plate in the container B^2 is pressed up to the aperture *c* in position for exposure, as in Fig. 7. After exposing in the usual way, the shutter E is pushed in, thereby forcing the plate which has just been exposed into the receiver B′, where it passes in front of the spring-bottom, and any plates already in the receiver (as shown in Fig. 7) taking therein an oblique position to allow the next plate in turn to come in front of it. When all the plates have in like manner been successively exposed and transferred to the receiver, the shutter E is wholly withdrawn by unscrewing the screw which limits its motion, and the cover I is passed through the same mortise into the grooves of the container B^2. The flap *f* having been thrown back, the shutter E is then replaced, pushing before it the cover I into the grooves of the receiver B′, (now full of exposed plates,) which is thereby closed light-tight, and may be removed from the board A and put on one side for subsequent development, &c., of the exposed plates in the usual way. The now empty box B^2 is also removed, and a full one being put in its place the empty one now takes the place of the receiver, and the same operations are repeated.

For outside work, a convenient number of full boxes and an empty one are all that are needed besides the camera and the usual accessories.

The plate-holder may be readily detached from the camera for convenience of transport, the hinges D being of the kind known as "half-hinges" or "lifting-hinges," so as to be readily separable.

In Figs. 10, 11, 12, and 13, B′ B^2 are compartments of the same box, framed in one with board A, before described, B′ being permanently closed at front, and the aperture *c* being opposite B^2, which is provided with a shutter, E, as before. The two compartments are provided with hinged covers *m* at back, closing light-tight, and locked by bolts, at which the plates may be inserted and withdrawn. There is a passage for the plates to pass from one compartment to the other, as before, by the operation of the shutter E, and the compartment B′ has a well or countersunk cavity at front, and both are provided with spring-bottoms, as before described. This double box is fitted to slide between rabbeted guides *n* along the top and bottom edges of the back of the camera, which is prolonged sufficiently at one side to allow of the double box being slid along out of the way of the focusing-screen F, as shown in dotted lines in Figs. 10 and 11.

x is an ordinary spring-latch to lock the box and focusing-screen, respectively, in position for exposure or focusing.

In Fig. 13 the box is shown empty, and is made rather shallower than the other arrangement; but it may be of any convenient depth in either case, according to the number of plates it is to hold. It will be obvious that this double box, instead of sliding in guides, as just described, might be hinged to the camera as in the first-described arrangement, and that the board A of the first arrangement, instead of being hinged as described, might be made to slide in guides *n*.

To enable the forcible displacement of the plates in transferring them from one box or compartment to the other to be effected without injury to the sensitive film, each plate is incased in an envelope or sheath of sheet metal or vulcanite, S, Figs. 14 and 15, which covers the back of the plate, and has flanges *s* at top and bottom, which embrace two of its edges, said flanges projecting from the front surface of the plate, so that they alone come in contact with the back of the plate next in front or with the board A. The sheath is also provided with a turned-up edge or flange, *s*′, forming a stop, against which one edge of the plate abuts, as shown. This sheath or envelope fits the plate spring-tight, it being slightly buckled, as shown in Fig. 15, so as to press against the back of the plate, which may thus be readily inserted and withdrawn. The same sheaths are thus adapted to receive plates of slightly-varying thickness. In the case of sensitive films upon a support of paper or other thin material the sheath would be quite flat instead of being buckled, and the grooves beneath the flanges *s* at top and bottom would be of a size to receive the material. The inner surface of this sheath is preferably coated with a non-actinic varnish or paper for the purpose of diminishing the effect of halation due to reflection from the back surface of the plate.

The dry plates may be put in the sheaths and packed in the boxes of the holder by the makers.

What I claim as my invention is—

1. The combination, with a photographic camera, of a double or twin receptacle for containing the plates or films before exposure, and for receiving them after exposure, the said receptacles adjoining and communicating by a passage for the plates, and provided with means for bringing the plates successively into position for exposure without removing them from the receptacle, and for transferring the plates from the one receptacle to the other, substantially as hereinbefore shown and described.

2. A receptacle for holding and exposing plates or films in the photographic camera wherein a series of plates or films placed in front of one another are exposed in succession by the foremost one, after exposure, being moved edgewise from in front of the next, and the remainder being moved forward collectively toward the position for exposure, these two motions being effected alternately in the manner and by the means substantially as herein specified.

3. A double or twin plate holder provided with means for bringing the plates successively into position for exposure and for transferring

them from one receptacle to the other, substantially as described, the said holder being hinged to the camera so as to swing into and out of position, substantially as and for the purpose specified.

4. In a plate holder and changer for photographic cameras, the combination of the twin boxes or compartments juxtaposed and communicating, the base plate or board provided with the opening for exposures, and the slide acting both as a shutter and as a means of propelling the exposed plate from one box or compartment to the other, substantially as and for the purpose shown and described.

5. In a plate holder and changer for photographic cameras, the combination of the duplicate boxes or compartments B′ B², communicating as described, the board A, formed with the opening *c* and the well *h*, the springs G′, and the shutter E, for operation substantially as shown and described, for the purpose specified.

6. In a plate holder and changer for photographic cameras, constructed of two boxes or compartments, as described, the combination of the springs G′ with the countersink or well *h*, for canting the plates in the receiver, substantially as and for the purpose specified.

7. In a plate holder and changer for photographic cameras, the boxes B′ B², juxtaposed and communicating, as described, and fitted to slide in guides *a* in the board A, formed with openings *c*, and provided with shutter E, substantially as and for the purpose specified.

8. A protective sheath or envelope for photographic plates, consisting of a spring-plate of sheet metal or vulcanite, S, provided with the top and bottom flanges, *s*, to form grooves to receive and embrace the edges of the plate, and with the flange *s′*, to form a stop for the edge of the plate, substantially as herein shown and described.

9. The combination, with a plate holder and changer for photographic cameras constructed of two compartments or boxes juxtaposed and communicating, as described, of a series of two or more protective sheaths constructed as described, and incasing as many photographic plates or films, and placed in front of one another, as and for the purpose specified.

The above specification of my invention signed by me this 16th day of August, 1883.

THOMAS SAMUELS.

Witnesses:
JOHN DEAN,
HERBERT E. DALE,
Both of 17 *Gracechurch St., London.*