

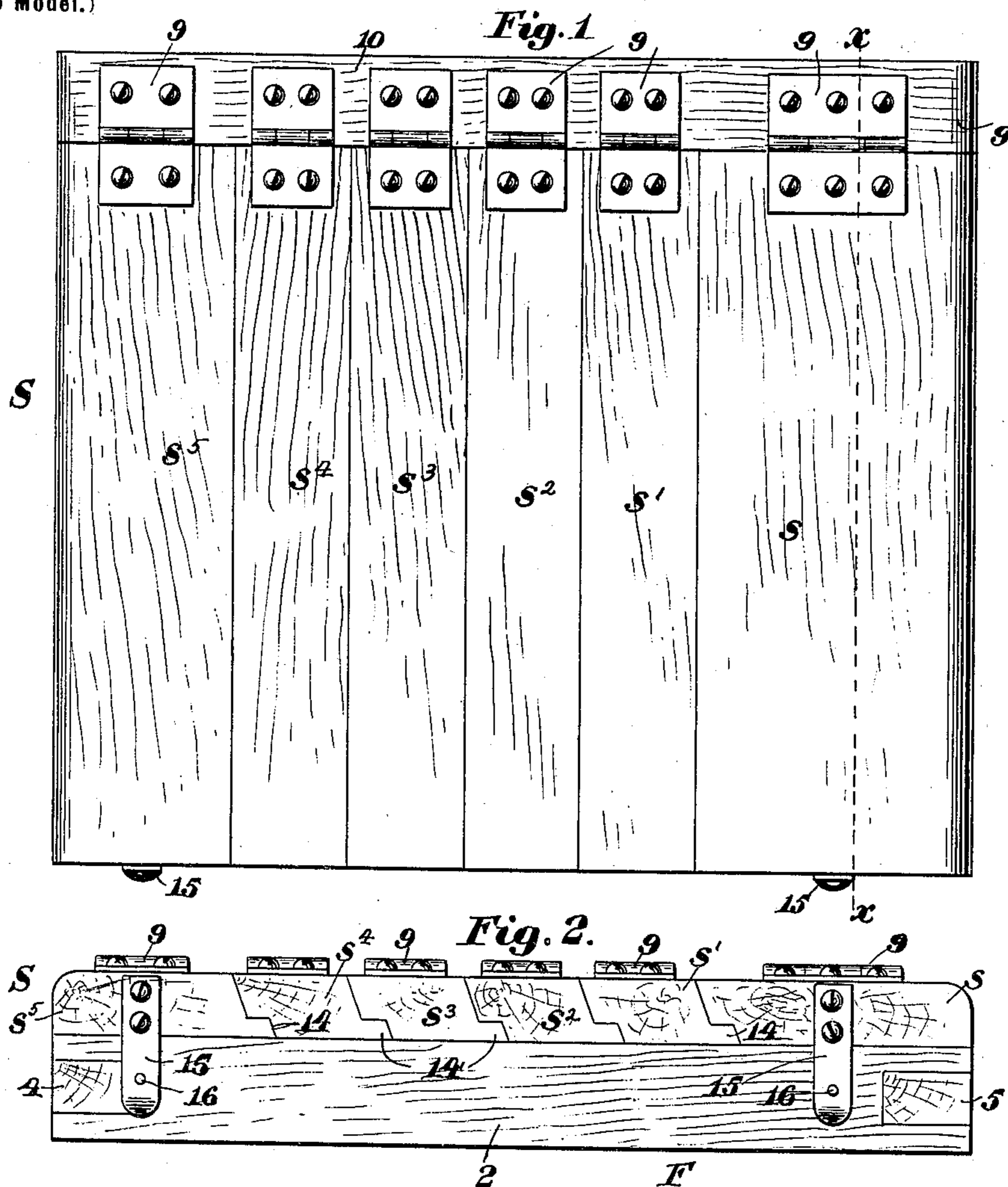
No. 655,159.

Patented July 31, 1900.

W. S. PEPPERELL.
PHOTOGRAPHIC PRINTING FRAME.

(Application filed May 14, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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PHOTOGRAPHIC-PRINTING FRAME.

SPECIFICATION forming part of Letters Patent No. 655,159, dated July 31, 1900.

Application filed May 14, 1900. Serial No. 16,613. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SOUTHWOOD PEPPERELL, a citizen of the United States of America, and a resident of the city of Boston, county of Suffolk, and State of Massachusetts, have invented certain new and useful Improvements in Printing-Frames, of which the following is a specification.

This invention relates to what may be consistently termed a "combined printing-frame and exposure-meter"—that is, an apparatus capable for use as an ordinary photoprinting-frame or for use in determining under varying actinic conditions the proper length of time of exposure necessary to secure the best results in making photoprints, blue-prints, &c., or in making lantern-slides, transparencies, and similar plates.

In making various kinds of prints by exposure to the light or actinic rays, and especially in making a multiplicity of photoprints in which all should be of corresponding tone or density, considerable difficulty has been heretofore experienced and much time lost and material wasted on account of the inability of the operator accurately to determine the time length of exposure under varying conditions or intensities of light and by the "guess-work" methods heretofore generally employed.

One object of the present invention is to furnish an improved, simplified, efficient, and inexpensive printing-frame embodying means or instrumentalities whereby sensitized or developable papers or plates may have different portions thereof independently exposed to the light or actinic rays predetermined definite lengths of time for the purpose of producing a pattern, gage, or guide print or plate having a plural number of separate and distinct portions of relatively-different densities, tones, or shades, according to the differences in the lengths of time of exposure of different portions, whereby to enable the operator to determine the exact length of time of exposure necessary to secure a desired result and also render it practicable to make an indefinite number of prints or plates, all of which will have substantially the same tone, shade, or density.

A further object of the invention is to provide a printing-frame having on the exposing

side thereof a plurality of shutter slats or strips, each of which is pivotally supported or hinged at one end and has one edge thereof in overlapping relation with the adjacent edge of the next shutter-slat, whereby said slats may be opened and closed successively or simultaneously.

With these objects in view the invention consists in certain details of construction and in the combination and arrangement of the several parts of the combined printing-frame and exposure-meter, substantially as hereinafter described, and more particularly pointed out in the claims.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan view of a combined printing-frame and exposure-meter embodying this invention in one of the preferred forms thereof. Fig. 2 is an end view of the same as seen from below in Fig. 1; and Fig. 3 is a section of the same, taken on the dotted line *xx* in Fig. 1, looking toward the left in said figure and showing one of the shutter slats or strips partly opened.

In the preferred construction and organization thereof illustrated in the accompanying drawings the combined printing-frame and exposure-meter comprises in a general way two essential elements—to wit, a print-frame proper (designated in a general way by *E*) and a multiplex or sectional shutter (designated in a general way by *S*) in pivotal connection with the frame at one end thereof and constructed as hereinafter described and connected to the frame, so as to be capable of covering a part or the whole of the front or exposing face of said frame.

The print-frame *F* may be of any suitable or desired construction, according to the use to which it is to be put, and is shown in the accompanying drawings of the same general construction as an ordinary photoprinting-frame and consists, in the form shown, of the two side rails 2 and 3 and the two end rails 4 and 5, connected at their ends to the side rails in the usual manner, and all of which rails are beaded at their upper inner edges to form the usual supporting-flange 6 for the glass *G*, which may constitute a fixed element of said frame, the backing or press-board 7 usually having its inner face covered with felt or a pad and having springs or fasteners 8

in engagement at their ends with the rail and holding the press-board with its pad in tight engagement with the glass or negative G.

It is distinctly to be understood that the invention is not limited to any particular construction or organization of the printing-frame proper, F, as this may be variously modified within the perview of this invention.

The multiplex or sectional shutter S, in the preferred form thereof shown in the accompanying drawings, comprises a multiplicity of shutter-slats or strips, shown as six in number and designated by s , s' , s^2 , s^3 , s^4 , and s^5 , respectively, and each of which is shown hinged at 9 to a strip 10, fixed to the outer face of the side rail 3, preferably by screws 12, (one only of which is shown in the drawings,) and which slat-supporting rail has its upper face projecting beyond the upper or exposing face of the frame F. Each slat is shown hinged to the strip 10 in such manner that when the slat is in its closed position the upper face thereof will be flush with the upper face of the strip 10. Furthermore, the inner face 12 of said slat will be shaped to correspond to the upper face of the frame F and glass. To insure a perfect contact between the shutter-slats and front face of the negative or glass, the inner face of each slat will preferably have a covering of some soft pliable material, such as felt, as shown at 13 in Fig. 3.

To obviate the possibility of entrance of light between adjacent edges or slats when said slats are in their closed position and also to facilitate the opening and closing of said slats singly or independently in successive order or all simultaneously, the inner adjacent faces of said slats are beveled or rabbeted, as shown at 14, so that each slat will have one edge thereof in overlapping relation with the adjacent edge of the next succeeding slat and will have its opposite edge in underlapping relation with the adjacent edge of the next preceding slat. For instance, the slat s will overlap the adjacent edge of the slat s' and the slat s' will overlap the adjacent edge of the slat s^2 , and so on throughout the series, so that said slats may be opened successively and independently in the order of their enumeration and may be closed successively and independently in reverse order. By constructing the slats with overlapping adjacent edges, as described, the entire series of slats may be simultaneously opened by throwing the left-hand slat s^5 to an open position and may be simultaneously closed by throwing the right-hand slat s to a closed position, thus saving considerable time in this operation. It will be further obvious that two or more slats may be simultaneously opened by an opening movement of the second, third, or other successive slats of the series.

As a convenient means for holding the slats in their closed position locking means will be provided in connection with the free ends of

one or more of said slats, said locking means consisting, preferably, of a reactionary catch 15, such as a spring-plate secured to and depending from the free end of said slat, and which plate will have at the lower end thereof an opening to receive the outer end of a pin 16, projecting outward from the side rail 2 of the frame, the lower end of said spring-plate preferably being curved outward to permit the operator to readily withdraw the plate from engagement with said pin, and as a convenient and simple means for facilitating an automatic opening movement of the slats on the release of the catch automatically-operative slat-opening means will be provided in operative relation with the free ends of the slats, said means consisting, preferably, of a lifting-spring 17, secured to the under face of the free end of the slat in any suitable manner and bearing against the upper face of the side rail 2 when the slat is in its closed position, said spring being of sufficient rigidity or efficiency as to insure a complete opening movement of the slat upon a release of the catch.

In practice it will be preferable to provide each slat with locking means for retaining the same normally in a closed position; but for convenience only two locking devices are shown in connection with the two end slats.

It is not desired to limit this invention to any particular construction or organization of locking means or automatically-operative slat-opening means in connection with said slats, as these are subject to various modifications without departure from the invention. Furthermore, I do not wish to limit myself to the particular construction of hinged connection between the slats and the frame F shown in the drawings, as this is also subject to some modification.

In the operation of making photographic prints with my improved combined printing-frame and exposure-meter, so that each print will have the required tone or density and so that a plural number of prints may be produced of substantially the same shade, tone, or density, two operations are required—one for making a pattern or guide print having a plurality of separate and distinct portions of relatively-varying degrees of density or shade for the purpose of enabling the operator to select a portion having the required shade or density for the subsequent finished prints and to determine accurately the length of time under the existing light conditions required to secure this selected shade or density in said subsequent prints and next making the subsequent print, using the pattern as a guide for timing the exposure thereof.

To make the pattern or guide print, a piece of the required sensitized or bromid paper is placed under the glass negative G and secured in place by the backing or press-board in the usual manner. Then all of the shutter-slats are closed and locked to exclude the light from the exposing face of the negative, after which the successive slats, beginning with the

slats s , are released and opened in successive order at predetermined intervals of time—that is, slat s' may be opened at the expiration of five seconds after the opening of the slat s , slat s^2 at the expiration of the next five seconds, and so on at corresponding intervals throughout the series, so that each successive portion of the paper under each shutter-slat, beginning with that portion under slat s' , will be exposed to the light five seconds less than the next preceding portion, or, in other words, that portion under slat s^5 will have been exposed to the light (there being six slats) five seconds less than that portion under slat s^4 and twenty-five seconds less than that portion under slat s , that portion under slat s^5 having been exposed five seconds and that portion under slat s having been exposed thirty seconds. After that portion under slat s^5 has been exposed five seconds or a predetermined length of time corresponding to the length of time of exposure of each preceding portion all of the slats will be simultaneously closed and the pattern or guide print removed and developed, after which the operator will select a portion of the required density meeting his requirements and make all subsequent prints to correspond in density selected by exposing said prints a length of time corresponding to the lengths of time of exposure of the selected portion of the pattern-print, for which last-mentioned operation the operator can use the same apparatus by leaving all of the shutter-slats open, as will be readily understood.

The term "printing-frame" as employed in the claims may or may not include a glass or negative generally used in connection with the other elements of the frame when printing.

I claim—

1. An apparatus of the character specified consisting of a printing-frame; and a series of separately-movable shutter-slats each shiftably connected at one end to said frame, and the two end slats of which have their inner side edges in overlapping and underlapping relation, respectively, with the adjacent edges of the next adjoining slats, and each intermediate slat of which has one side edge in overlapping relation with the adjacent side edge of the next succeeding slat and its other side edge in underlapping relation with the next preceding slat, whereby the slats may have full opening movements independently and in successive order, or whereby two or more slats may have opening movements simultaneously.

2. An apparatus of the class specified including a printing-frame; and a plurality of shutter-slats in hinged connection at one end with said frame and having their adjacent side edges rabbeted and in overlapping relation.

3. An apparatus of the class specified consisting of a printing-frame; a series of shutter-slats each of which is shiftably connected

at one end of the frame for opening and closing movements independent of the others and the two end slats of which have their inner side edges in overlapping and underlapping relation, respectively, with the adjacent side edges of the adjoining slats, and the intermediate slats of which have opposite side edges in overlapping and underlapping relation with the adjacent side edges of the next preceding and succeeding slats respectively; and locking means in connection with one or more slats.

4. The combination with a printing-frame of a plurality of parallel shutter-slats in hinged connection with the upper or exposing face of said frame and having their adjacent side edges beveled so that each slat will, when in a closed position, overlap the edge of the next adjacent slat; and means for locking one or more of said slats, normally, in closed position with relation to the frame.

5. An apparatus of the class specified including a printing-frame; a plurality of shutter-slats each in hinged connection at one end with said frame and having their adjacent side edges in lapped relation; locking means in connection with said slats and frame; and automatically-operative slat-opening means in connection with said slats.

6. An apparatus of the class specified comprising an open frame including means for supporting a glass or negative; a backing or press-board removably secured to the back side of the frame in position to bear against one side of the glass; a sectional shutter secured to the front side of the frame in position to bear against the other side of the glass and including a series of shutter-slats each of which has an independent pivotal connection at one end with the frame and are adapted to have successive or independent opening and closing movements.

7. The combination of the slat-carrying strip adapted to be secured to one rail of a printing-frame; and a series of shutter-slats each pivotally connected at one end to said rail and the two end slats of which have their inner side edges in overlapping and underlapping relation, respectively, with the adjacent side edges of the next adjoining slats, and each intermediate slat of which has one side edge in overlapping relation with the adjacent edge of the next succeeding slat and its other edge in underlapping relation with the next preceding slat, substantially as and for the purpose set forth.

8. The combination, with a printing-frame, of a plurality of shutter-slats pivotally connected to said frame in position to cover a part or the whole of the exposing face thereof and having their side edges in overlapping relation; a covering of soft pliable material on the under face of said slats; and locking means in connection with the frame and slats and effective for holding the slats, normally, in their closed position.

9. An apparatus of the class specified in-

cluding an open print-frame having a glass-supporting flange; a glass supported on said flange; a backing or press-board removably secured to bear against the back of the glass; 5 and a series of shutter-slats, each pivotally connected at one end to the frame in position to cover a part or the whole of the front of the glass and each slat having one or both side edges thereof rabbeted and in lapped relation with the side edge or edges of the next 10 adjacent slat or slats; locking means in connection with one or more slats and the frame; and resilient slat-opening means in connection with each slat.

15 10. An apparatus of the class specified consisting of a rectangular open frame having an inwardly-projecting glass-supporting flange;

a glass supported on said flange; a press-board or backing secured in the frame and bearing against the rear face of said glass and adapted 20 for removal; a plurality of independent shutter-slats each of which is in hinged connection at one end with the front face of said frame and is adapted to cover a portion of the front face of the glass; and locking means in con- 25 nection with the frame and the free ends of said slats and effective, normally, for holding said slats in closed position.

Signed by me at Boston, Massachusetts, this 12th day of May, 1900.

WILLIAM SOUTHWOOD PEPPERELL.

Witnesses:

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