

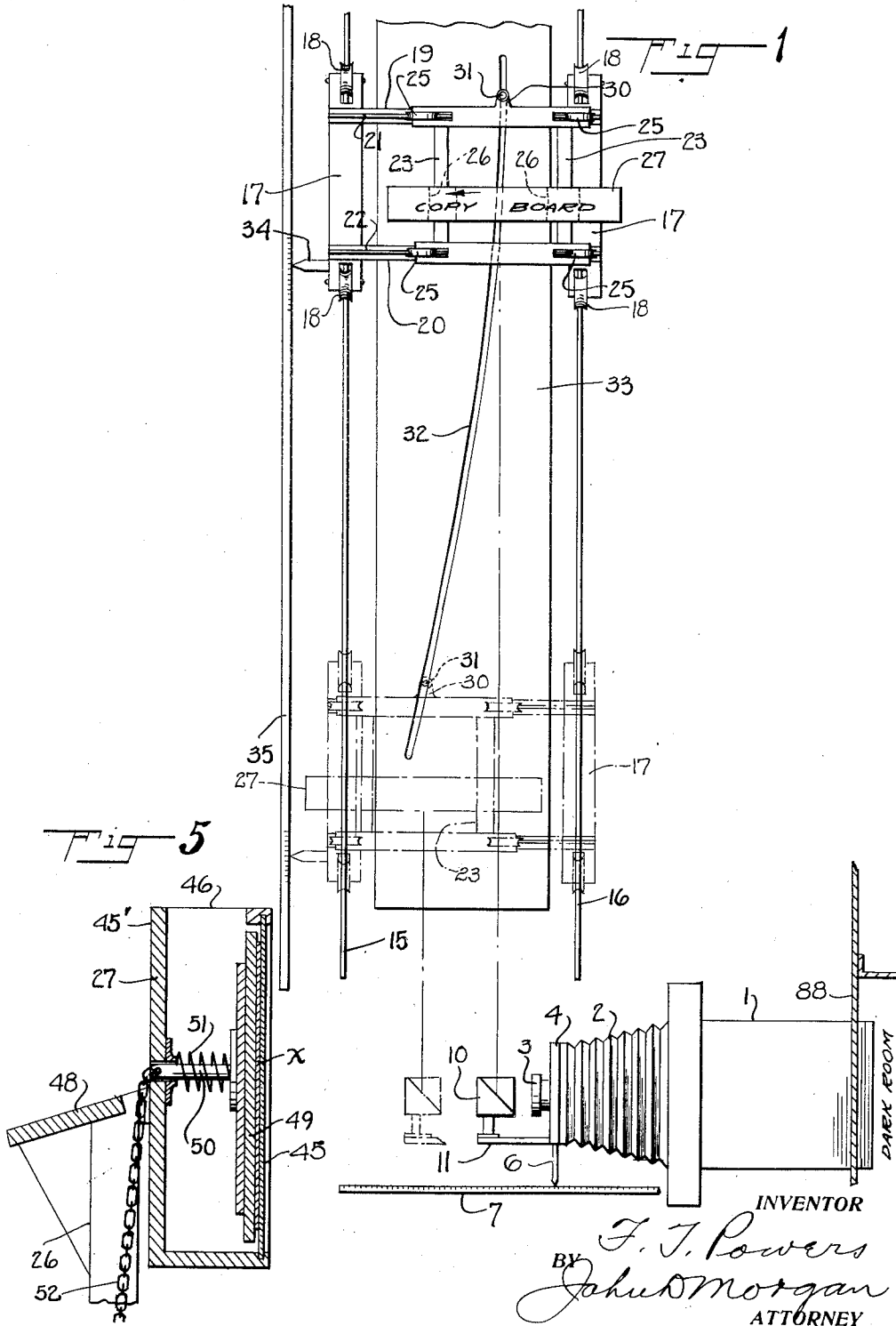
Jan. 4, 1927.

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F. T. POWERS

PHOTOGRAPHIC APPARATUS

Original Filed Feb. 19, 1918 2 Sheets-Sheet 1



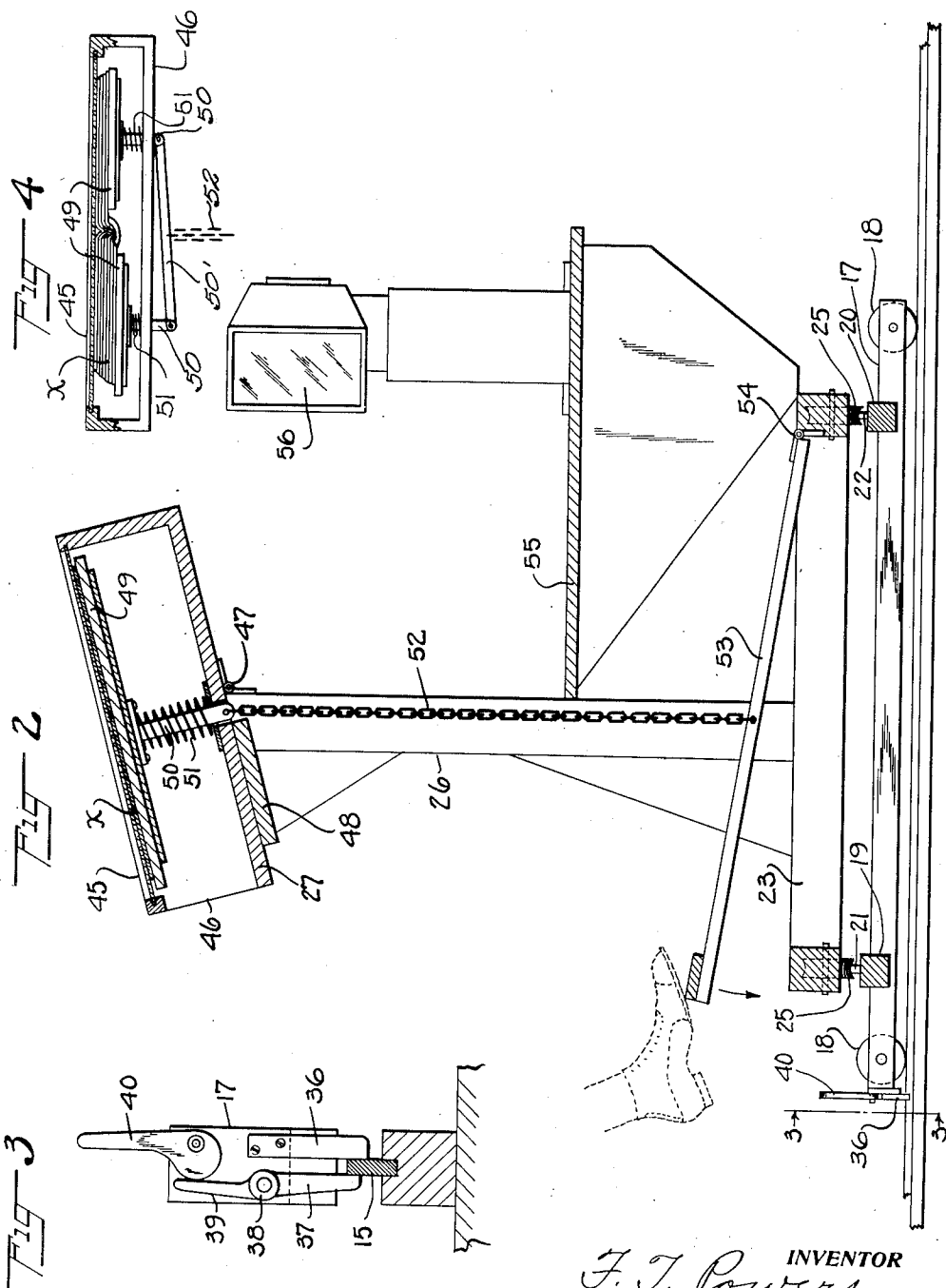
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F. T. Powers INVENTOR
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UNITED STATES PATENT OFFICE.

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PHOTOGRAPHIC APPARATUS.

Original application filed February 19, 1918, Serial No. 218,059. Divided and this application filed December 7, 1921. Serial No. 520,622.

The invention relates to photographic apparatus, and in certain respects more particularly to apparatus which is especially adapted for copying work.

5 Objects and advantages of the invention will be set forth in part hereinafter, and in part will be obvious herefrom, or may be learned by practice with the invention; such objects and advantages being attained
10 through the means and combinations pointed out in the appended claims.

The invention consists in the novel parts, construction, arrangements, combinations and improvements herein shown and described.

15 The accompanying drawings, herein referred to and constituting a part hereof, illustrate one embodiment of the invention, and together with the description serve to explain the principles thereof.

Of the drawings:—

Fig. 1 is a plan, largely diagrammatic, of a mechanism embodying the invention;

25 Fig. 2 is a view, partly in vertical elevation and partly in vertical section, on an enlarged scale, of the copy holding mechanism;

Fig. 3 is a fragmentary view, on a further enlarged scale, partly in elevation and partly in section, of the clamp or lock for the
30 copy holder, and is taken substantially on the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary detail showing the copy holder adapted to hold a book; and

35 Fig. 5 is a detached detail, corresponding to the upper part of Fig. 2, showing the copy holder in photographing position.

This application is a division of my co-pending application Ser. No. 218,059, filed
40 Feb. 19, 1918, allowed May 18, 1921, refiled July 24, 1923, Ser. No. 653,618.

In certain kinds of photographic work, and more especially in photographic copying for process and other reproduction, and for other kinds of work, it is essential that the
45 originals be enlarged or reduced with great accuracy and precision, that the work be exactly centered and that it be absolutely sharply focused. As ordinarily practiced these operations require much careful scrutiny, thought and labor and they consume a
50 great deal of time on the part of skilled and highly paid operatives, and frequently the performance of one operation disturbs the

arrangements or positioning previously made in effecting one of the others. By the present invention the foregoing functions or operations are simultaneously performed or effected by simply bringing the camera and copy holder to indicated and corresponding positions. The invention provides not only
60 for the rapid and certain performance of the functions just described in connection with the making of a single exposure, but provides also for rapid replacement or changes in the copy and in the sensitized surface
65 within the camera, and thus provides for making successive exposures one after another with great rapidity, as well as expediting the time required for making a single exposure. Other advantages of the invention will be pointed out in part hereinafter,
70 the same cooperating with or flowing out of the foregoing, while other and further advantages will be obvious to those skilled in the art.

Referring in detail to the embodied form of camera, the camera body 1 is shown, having connected therewith the usual extensible and contractible bellows 2, the lens 3 being carried by a support 4 at the front end of the bellows. The lens supporting frame 4 is
80 slidable to and fro upon guideways 5, in a well-known manner, to focus the camera.

Means are provided for indicating the focus for different distances of the copy or other object to be photographed, and as embodied a pointer 6 is supported from the frame 4, the pointer cooperating with a scale 7 fixed to the stationary frame 8. The foregoing cooperates with the size indicating or determining means on the copy carrier in a manner which will be explained hereafter. In the embodied form the invention is shown with a reversing prism 10, carried on a suitable support 11, in either fixed or adjustable
95 relation with respect to the lens 3.

In the embodied form of copy holder, means are provided for expeditiously and accurately moving the copy holder toward and from the camera and for positioning it for any desired size of copy, and cooperating therewith means for automatically preserving the centering of the copy with respect to the camera at whatever distance it may be therefrom.

In the embodied form of the foregoing de-

scribed means, two tracks 15 and 16 are provided preferably in fixed relation to the focal plane of the camera, that is, to the sensitized surface within the camera upon which the picture is taken. Mounted to run on the tracks 15 and 16 is a carriage 17, provided with wheels 18. The carriage 17 is provided with cross frames 19 and 20, upon which are tracks 21 and 22. Mounted on the carriage 17 is a cross carriage 23, provided with wheels 25, running on the tracks 21 and 22. The carriage 23 is provided with uprights 26 which support the copy holder 27.

In the embodied form of centering means for the copy holder there are provided means cooperating with the mechanism just described and traveling or moving the copy board transversely in either direction simultaneously with its movement toward or from the camera, thereby keeping the copy always centered in the camera notwithstanding the movement of the lens and prism for focusing. Referring to the embodied construction in detail, the carriage 23 is provided with a bracket 30, which extends outwardly and downwardly. Bracket 30 is preferably provided with a roller 31, engaging with suitable guiding means, such as a slot 32 formed in a board or other suitable member 33 extending longitudinally between the tracks 15 and 16.

Means are provided for indicating the positions of the copy board for the various desired sizes of reproduction. In the embodied form thereof, a pointer 34 is fixed on the carriage 17, and cooperates with a scale 35, extending along beside the tracks 15 and 16. The scales 7 and 35 will be correspondingly or cooperatively marked. That is, if a reduction to one-eighth is desired, this figure or other equivalent mark, is made at the proper point on both the scales 7 and 35, and by bringing the respective pointers 6 and 34 to these positions, the copy will be correct in size and will be in focus and absolutely centered without any examination or adjustment of the image or of the mechanism by an operator.

Means are provided for holding the copy at the desired point, and in the embodied form thereof there is provided on the carriage 17 a locking device engaging and disengaging with one of the tracks 15 or 16. As embodied, a fixed jaw 36 extends down from the carriage 17 on one side of the track 15, and on the other side of the track is a cooperating jaw 37, which is pivoted at 38 upon the carriage 17. The jaw 37 is provided with a tail 39, with which cooperates a camming lever 40 (Fig. 3). When the lever is thrown in one direction, the jaws 36 and 37 are opened, and when thrown in the other direction, to the position shown in Fig. 3, the jaws bite the track and

hold the carriage 17 firmly and accurately in the desired position.

Referring to the embodied construction, the copy holder is pivotally supported upon the uprights 26, to rock between the copy receiving and discharging position, and the exposing or photographing position. A glass or other transparent surface 45 is mounted in the frame 46 of the pivoted copy holder, the copy *x* being pressed against the glass 45 when in the exposure or photographing position. The copy holder has a fixed back plate 45'. The frame of the copy holder is cut away at one side, at the top as shown in Fig. 5 for permitting the insertion and removal of the copy. The support for the copy holder is shown as one or more hinges 47. Upon the uprights 26 there is preferably provided an inclined, horizontally disposed shelf 48, whereon the copy frame 46 rests when swung back into position to receive and discharge copy. The copy holder may be rocked after the copy has been inserted, from this full line position shown in Fig. 8 to the dotted line position shown in the same figure, to be photographed, and is rocked back to the full line position for the removal of the used copy and the presentation at the glass 45 of the new copy.

Means are provided for yieldingly holding the copy firmly in position, such means being readily retractable, preferably by the foot of the operator or otherwise, so as to leave both hands free to handle the copy. As embodied, a plate 49 is fixed upon a stem 50, a helical spring 51 being coiled about the stem. Attached to the stem 50 is a chain or other suitable connection 52 to a foot lever 53, which is pivoted at 54 upon the carriage frame 23. The operator can place his foot upon the lever 53, as shown in Fig. 8, and the plate 49 will be retracted against the pressure of the spring 51, when the copy *x* will be removed and fresh copy inserted. Thereupon the operator removes his foot and spring 51 will press the copy firmly and smoothly against the glass 45. The point of juncture of the stem 50 and connection 52 is kept substantially at or closely contiguous to the pivot point of the copy holder, so as to avoid putting such strain on the spring 51 as to disturb the copy between the time of its insertion and its removal through the use of the lever 53.

Means are provided by the invention for using books in the copy holders, and in Fig. 4 the plate 49 is shown bi-partite, at 49' with independent spring mountings and actuating means therefor at either side to accommodate different thicknesses on either side of the book, as will be clearly understood from Fig. 4. A bar 50' is connected to the stems 50 and is actuated by chain 52 connected thereto. In turning from one

page of the book to another, it will not be necessary to remove the book, but merely to ease back the plates 49 with the foot lever 53, insert a blade or other convenient device between the leaves of the book, and by movement thereof shift the intervening leaf or leaves across and permit the plates 49' to again press the book against the glass 45.

10 Means are provided by the invention for keeping the illuminating means in definite relation to the copy notwithstanding changes in position of the latter, so as to maintain a uniform intensity of illumination, and thus retain accurate control of the time of exposure. As embodied, a support 55 for a lamp or lamps 56 is provided upon the carriage 23, the lights being thus always at a desired or predetermined fixed distance from the copy α throughout all changes in position both longitudinally and transversely of the copy holder.

In accordance with one feature of the invention, the interior of the camera communicates preferably permanently with the dark room, thereby obviating and avoiding the employment of plate or roll holders, and the transporting of the light sensitive rolls or plates to and from the dark room and camera before and after exposing. As embodied, see Fig. 1, the camera body 1 opens at the rear through the wall 88 of the dark room. Thus no closure is required for the end of the camera, which may be always open, and always accessible to the operator, who may remove the exposed roll 85 in whole or in part, and may carry it to the developing apparatus without any covering or protection, and just as the condition or exigencies of the work in the dark room may permit or require. If the use of a plate or plates at any time is requisite or convenient, they may be placed in the camera in the dark room and removed after exposure in the same free and unguarded manner as the strip or web γ and developed in the dark room. It will be understood that the term "prism" will include any suitable reversing device.

50 The invention in its broader aspects is not limited to the precise constructions herein shown and described, nor to any particular details of construction, but changes may be made therein without departing from the principles of the invention, and without sacrificing its chief advantages.

What I claim is:—

1. An apparatus for enlarging or reducing by photography including in combination a camera, a copy holder frame, the axes of the camera and the frame not being coincident, a transparent surface fixed therein, a resiliently pressed plate carried by the frame for pressing the copy against the transparent surface, and means for moving

the copy-holder toward and away from the camera and for simultaneously automatically centering the copy with respect to the camera.

2. An apparatus for enlarging or reducing by photography including in combination a camera, a copy holder frame, the axes of the camera and the frame not being coincident, a transparent surface fixed therein, a resiliently pressed plate carried by the frame for pressing the copy against the transparent surface, means for retracting said plate, means for moving the copy holder toward and away from the camera and means for automatically moving the copy holder in another direction for maintaining it in proper centered-relation to the camera.

3. An apparatus for enlarging or reducing by photography including in combination a camera, a copy holder frame, the axes of the camera and the frame not being coincident, pivoted to move between photographing and copy changing positions, a transparent surface fixed therein, a resiliently pressed plate carried by the frame for pressing the copy against the transparent surface, and means for moving the copy-holder toward or away from the camera, and means for automatically maintaining it centered as it is moved towards and away from the camera.

4. A copy holder for enlarging or reducing by photography including in combination a transparent surface, a plate resiliently pressed toward said transparent surface, means for pivotally supporting the copy holder, and foot operated means for retracting the plate.

5. A copy holder including in combination a fixed transparent element, two plates cooperating therewith, a spring associated with each plate for pressing it against the transparent element, and foot operated means for simultaneously compressing the springs for retracting the plates.

6. A copy holder for enlarging or reducing by photography including in combination a transparent surface, two plates independently spring pressed for pressing the copy against said surface, and foot operated means for simultaneously retracting the plates.

7. A copy holder for enlarging or reducing by photography including in combination a frame pivoted to move between photographing and copy changing positions provided with a transparent surface fixed therein, two plates independently spring pressed for pressing the copy against said surface, and foot operated means for simultaneously retracting the plates.

8. The combination with a camera, of a copy holder movable between photographing and copy changing positions and movable toward and from the camera, and a light

illuminating the copy holder and maintained in definite position with respect to the copy holder during said movement thereof.

9. The combination with a camera, a frame movable toward and from the camera, a copy holder movable between photographing and copy changing positions and movable with the frame toward and from the camera, and a light illuminating the copy holder and carried by said frame and maintained in constant position with respect to the copy holder during said movement thereof.

10. The combination with a camera in fixed position, of a copy holder movable between photographing and copy changing positions and movable toward and from the camera, and a light illuminating the copy holder and maintained in definite position with respect to the copy holder during said movement thereof.

11. The combination with a camera, of a copy holder having a carriage with a plurality of motions to change the size of copy and to keep the copy holder centered, and a light mounted to move with the copy holder to maintain the same illuminative relation between the light and the copy.

12. The combination with a camera, of a copy holder having a carriage with a plurality of motions to change the size of copy and to keep the copy holder centered and to position at photographing and copy changing positions, and a light mounted to move with the copy holder to maintain the same illuminative relation between the light and the copy.

13. The combination with a camera, a copy holder having movement toward and from the camera and also transversely thereto, and a light mounted to move with the copy holder in all said movements to maintain the same illuminative relation between the light and the copy.

14. The combination with a camera, a copy holder having movement toward and from the camera and also transversely thereto and also between photographing and copy changing positions, and a light mounted to move with the copy holder in the first two mentioned movements to maintain the same illuminative relation between the light and the copy.

15. The combination with a camera, with its back end in fixed relation and its lens movable for focusing of a copy holder movable to and from the camera and in a transverse direction to change the size of the picture and to keep it centered, of a light for

the copy moving with and in fixed relation to the copy holder to maintain a desired illuminative relation.

16. A copy holder mechanism including in combination a member traveling in one direction for focusing, a second member mounted thereon to travel therewith, means causing said second member to automatically travel in another direction an amount varying in accordance with the focusing movement of the first member, and a copy holder mounted on said second member.

17. A copy holder mechanism including in combination a member traveling in one direction, a second member mounted thereon to travel therewith and in another direction thereon, a copy holder mounted on said second member, and a lamp carried on said second member to move with said copy holder to maintain them in the same illuminative relation.

18. A copy holder for enlarging or reducing by photography including in combination a frame, a transparent surface fixed therein, a back plate fixed therein, and a resiliently pressed plate carried by the frame for pressing the copy against the transparent surface, one side of the frame being cut away so that the copy may be inserted and removed at that side between the transparent surface and back plate.

19. A copy holder for enlarging or reducing by photography including in combination a frame pivoted to move between photographing and copy changing positions, a transparent surface fixed therein, and a resiliently pressed plate carried by the frame for pressing the copy against the transparent surface, one side of the frame being cut away so that the copy may be inserted and removed at that side.

20. In an apparatus for enlarging or reducing by photography the combination of a camera, a copy holder, means for mounting the copy holder for movement toward and away from the camera, and foot controlled means for holding the copy in place in the copy holder.

21. In an apparatus for enlarging or reducing by photography, the combination of a camera, a copy holder, spring means for holding the copy in place in the copy holder, foot operated means for retracting said spring means, and means for mounting the copy holder for movement toward and away from the camera.

In testimony whereof, I have signed my name to this specification.

FRANK T. POWERS.