

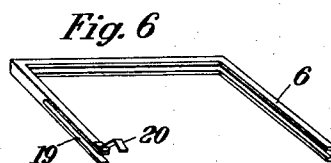
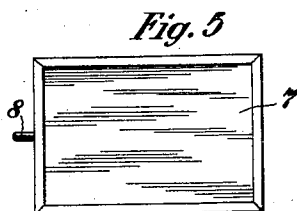
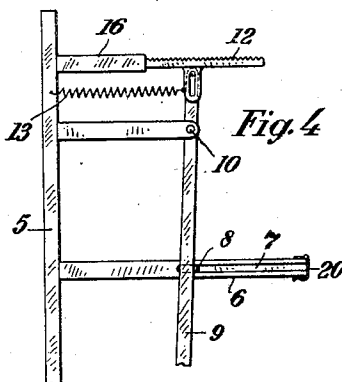
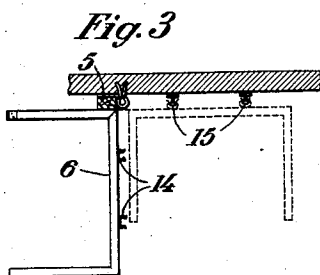
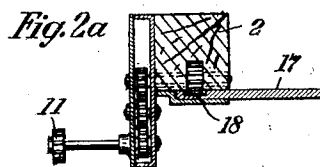
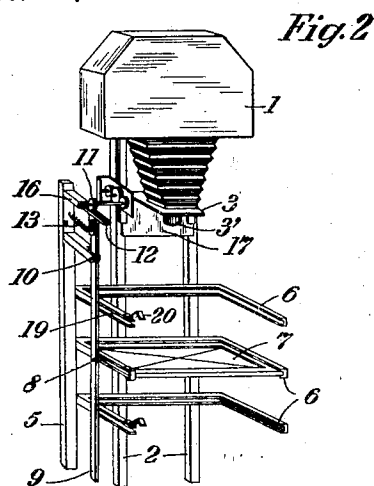
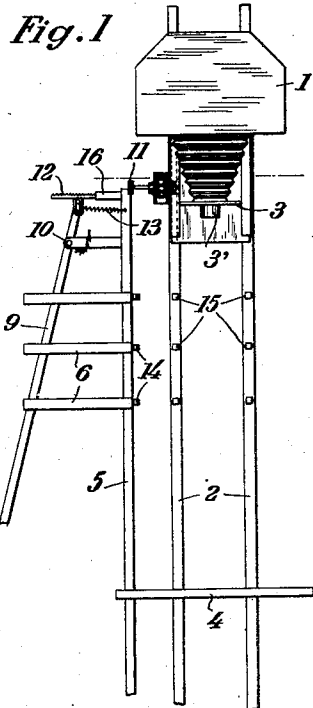
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H. WESTENDORP

1,950,533

FOCUSING MEANS IN PHOTOGRAPHIC ENLARGING APPARATUS

Filed Sept. 26, 1932



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## UNITED STATES PATENT OFFICE

1,950,533

## FOCUSING MEANS IN PHOTOGRAPHIC ENLARGING APPARATUS

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Application September 26, 1932, Serial No. 634,952  
In Germany September 26, 1931

## 1 Claim. (Cl. 88—24)

My invention relates generally to photographic enlarging apparatus, particularly to an enlarging apparatus with means for automatically focusing the objective to different degrees of enlargements.

The most important object of my invention consists in that the frames which are charged with the light-sensitive enlarging paper at the same time are used for focusing the objective.

One feature of my invention is that there is arranged parallel to the enlarging apparatus which is preferably suspended on the wall in a vertical direction, a bar to which several swiveling frame borders are fixed at certain distances from the objective.

Another feature of my invention is a paper carrier wherein the light-sensitive paper is placed and which is fitted in the different frames which must be chosen according to the degree of enlargement desired. The paper carrier is adapted to fit in all frames provided.

Further features of my invention are a stop provided on the frame and a control lever by which the focusing of the objective is effected which stop and control lever come in operation with one another when the frame is inserted into the frame border.

Other objects and advantages in details of construction and operation will be apparent from the following description, reference now being had to the figures of the accompanying drawing wherein like reference numerals indicate like parts.

In the drawing:—

Fig. 1 is a front view of the enlarging apparatus with the means for focusing the objective, the frame carriers being moved out of operative position,

Fig. 2 is a detail perspective view of the device, the frame carriers being placed in operative position,

Fig. 2a is a detail plan view of the tooth-gearing which transmits the motion from the control lever to the focusing means,

Fig. 3 is a detail plan view of one of the pivoting frame carriers,

Fig. 4 is a detail side view of the control lever with its rack-and-pinion mechanism for focusing the objective,

Fig. 5 is a view of the frame charged with paper for enlarged pictures,

Fig. 6 is a perspective view of one of the frame carriers.

The printing device is movably mounted on guide-rails 2 that are vertically fixed to the wall. By a bellows the objective carrier 3 is connected with the casing 1 for the source of light, which

casing is provided with a negative holder not shown in the drawing. The bellows permit the known mode of focusing the objective. At a fixed distance beneath the objective there is a projection surface 4 for supporting the light-sensitive paper in the case of normal enlargements.

Near the guide-rails 2 and parallel thereto there is a bar 5 on which are mounted the frame carriers 6. This bar 5 is hinged to the wall and the carriers on it are at certain distances from the objective 3.

The particular frame carrier 6 into which the frame 7 is to be inserted is chosen according to the degree of enlargement required. There are several frames 7 each provided with a pin 8, the distance of the pins from the corners of the frame depends on the degree of enlargement for which that frame is to be used.

When the frame is inserted into its appropriate carrier 6 which is then in the position shown in Fig. 2, the pin 8 engages the control lever 9 and moves it into the position necessary for focusing the objective for sharp reproduction.

The frame 7 contains the light-sensitive paper which may be exchanged without the frame being necessarily removed from the carriers. The control lever 9 is pivoted at the point 10; one of its arms is in connection with the rack-and-pinion mechanism 11 while the other arm is engaged by the pin 8 provided on the frame 7.

The frame 7 is pushed into the corresponding carrier 6 until the fastener 20 can be turned into the position shown in Fig. 4. As the frame moves in, the pin 8 extending through by the slit 19 engages the lower arm of the control lever 9 and moves it against the stress of the spring 13 into a position which depends on the distance of the pin 8 from the corners of the frame 7 the distance being such that the objective 3' is automatically focused for the intended degree of enlargement.

The focusing is due to the engagement of the upper end of lever 9 with the rack 12 by a slot and pin connection. The rack 12 slides in a socket 16 fixed to the bar 5. When the bar 5 is turned into the position shown in Fig. 2 the rack 12 engages with the pinion 11 the rotation of which focuses the objective 3' through the intermediary of gear wheels and a rack 18 fixed on the base board 17 of the enlarging camera.

When there is no frame 7 in a carrier 6 the spring 13 draws the control lever 9 into its initial position and the objective 3' is automatically focused by means of the rack-and-pinion gear to the fixed projection surface 4.

The frames 6 have clamps 14 which, when the frame carriers are in their operative position, that is to say, when they are under the objective,

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engage with pins 15 and in this way secure the frames 6 in position. In the production of a number of similar enlargements the frame need not be removed from the carrier after each exposure to light, the printing paper being simply exchanged for another paper.

With the apparatus according to this invention printing can be effected with a considerable saving of time. In addition, any normal printing device can be employed, and, in combination with the device according to my invention, may be converted into a universal enlarging apparatus or large-size printing apparatus.

What I claim is:

15 In a device for automatically focusing the ob-

jective of an enlarging apparatus in operative combination a frame for supporting the printing paper, a pin laterally projecting from the frame, a pivotally mounted frame carrier, frame borders rigidly connected to the frame carrier, a control lever pivotally connected to the frame carrier and engaging with said pin, an enlarging camera comprising a lamp casing with a negative holder, an objective attached to a base board by means of an objective carrier and a rack-and-pinion gear translating the movement of the controlling lever in a focusing movement of the base board.

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