(No Model.) 2 Sheets—Sheet 1.

DE WITT C. HOOVER.

PHOTOGRAPHIC PRINTING MACHINE.

No. 462,382. Patented Nov. 3, 1891.

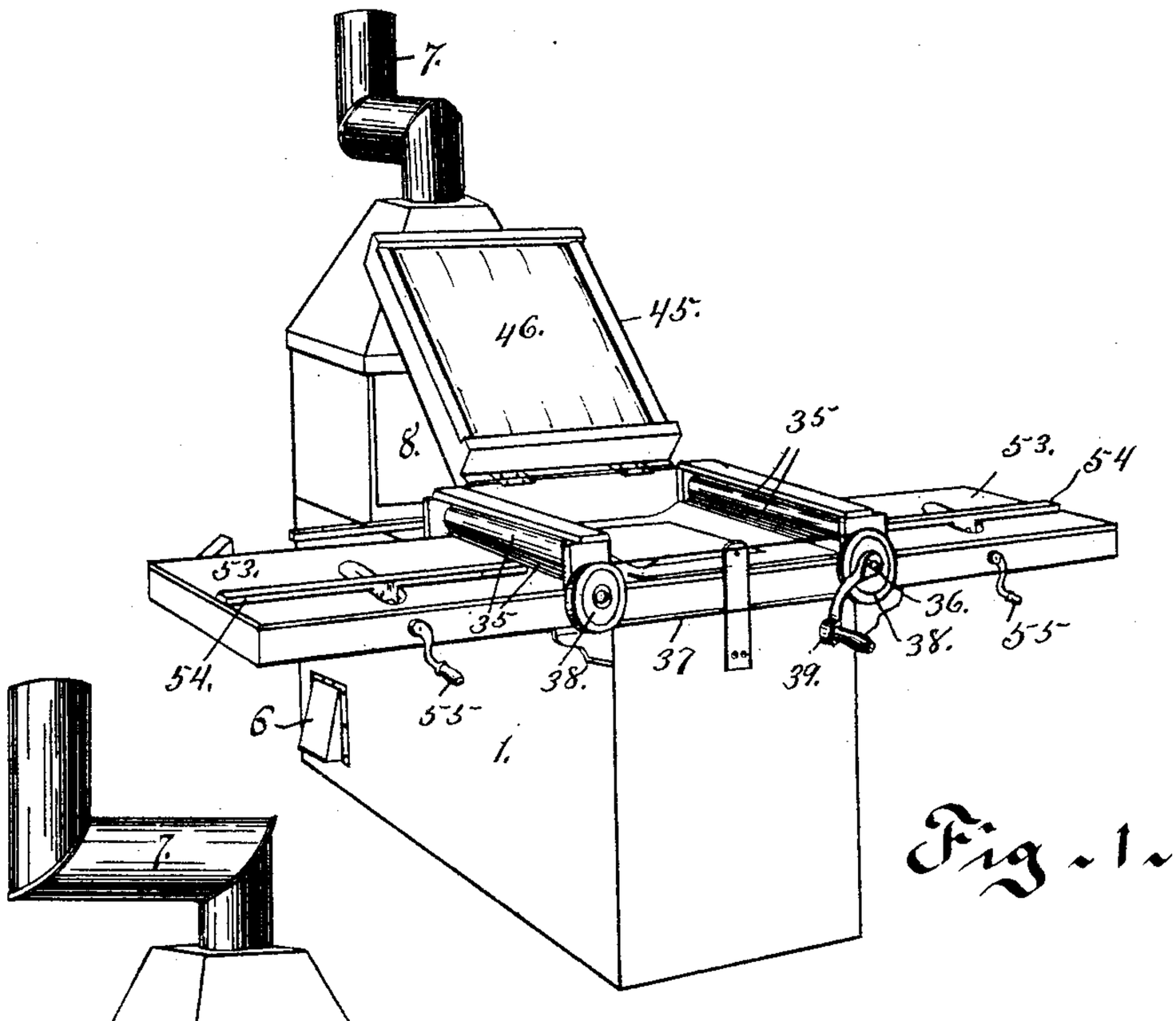

Fig. 1.

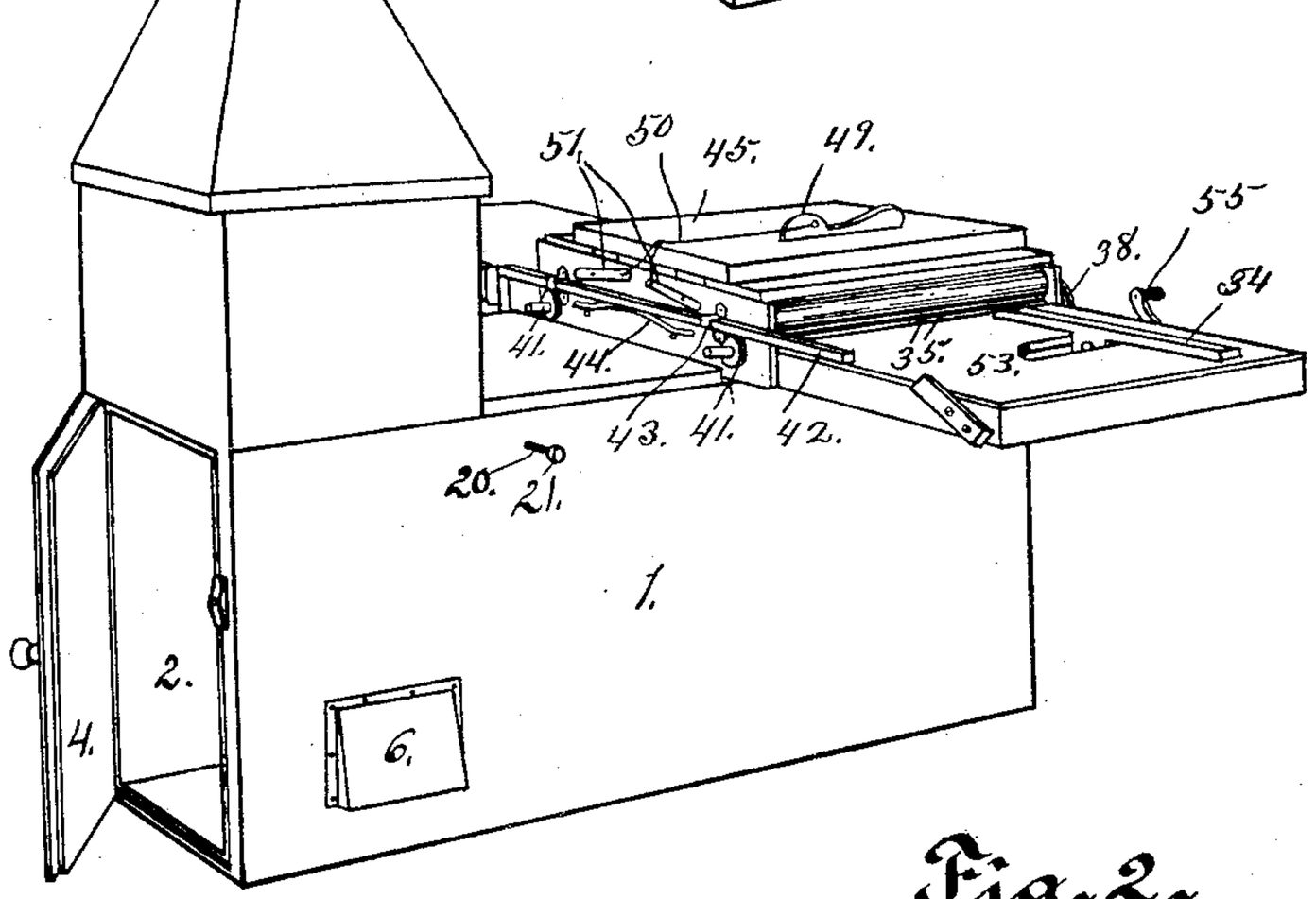

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

DE WITT C. HOOVER.

PHOTOGRAPHIC PRINTING MACHINE.

No. 462,382. Patented Nov. 3, 1891.

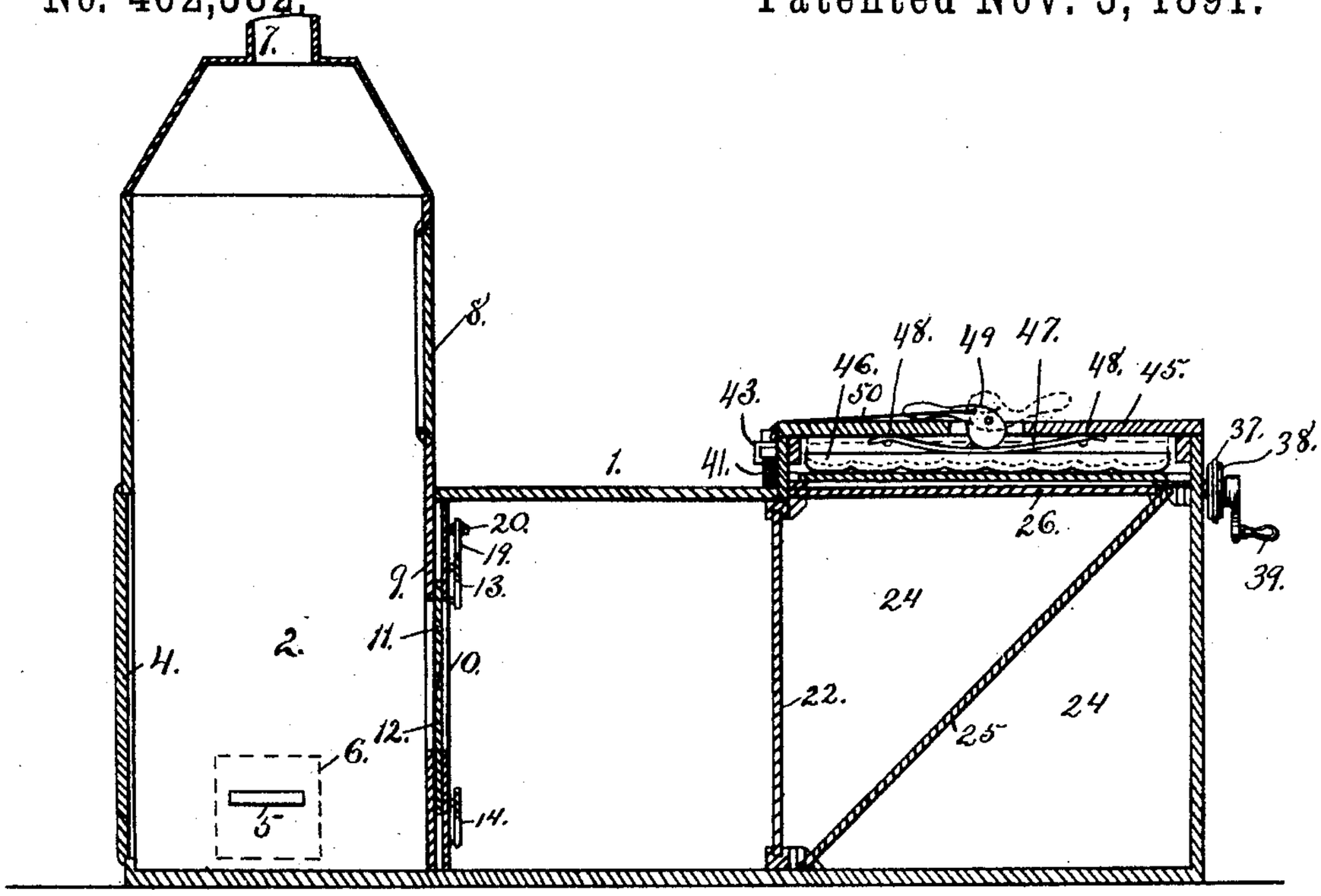

Fig. 3.

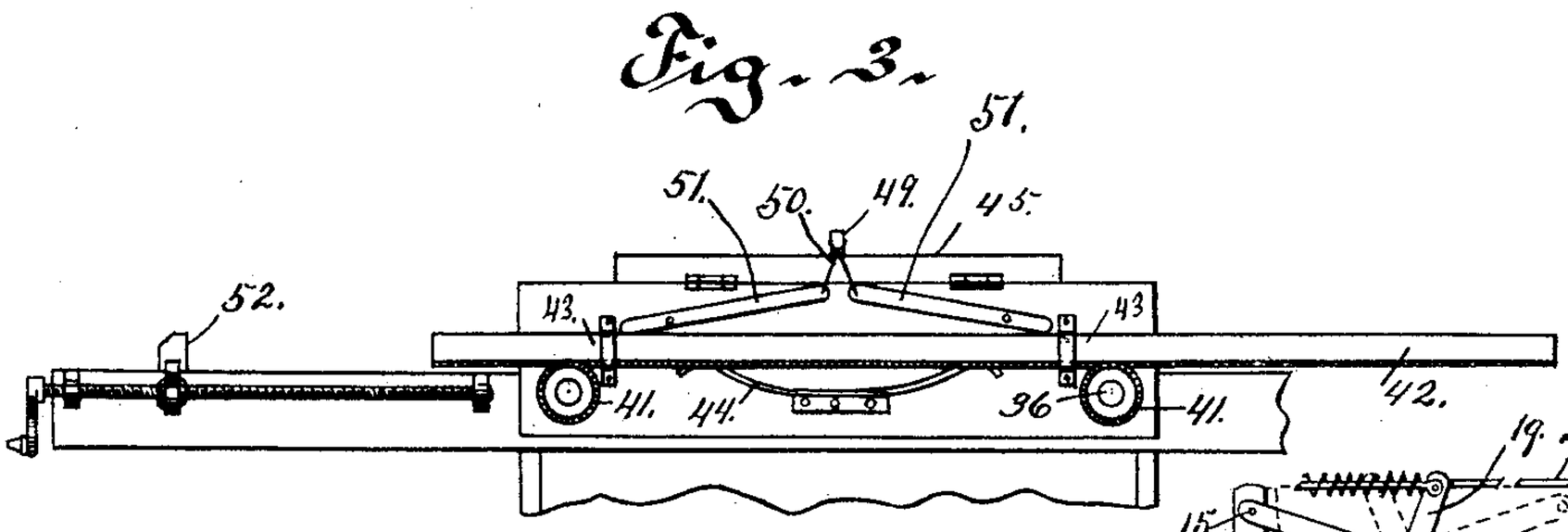

Fig. 4.

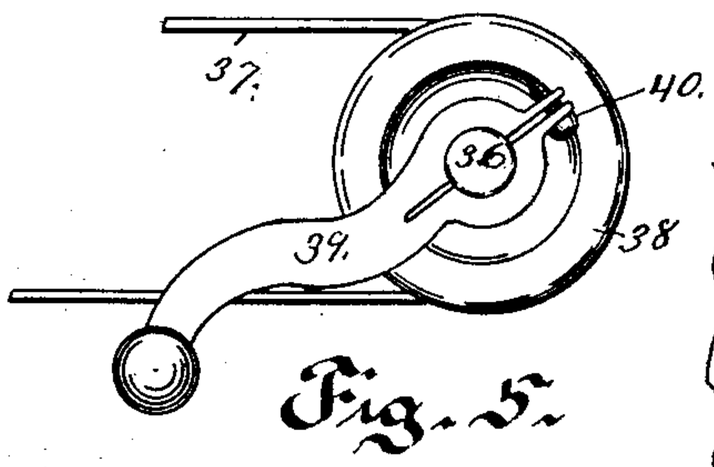

Fig. 5.

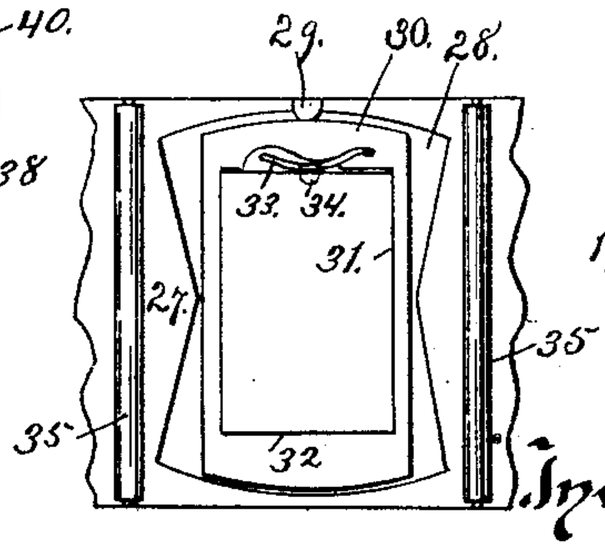

Fig. 7.

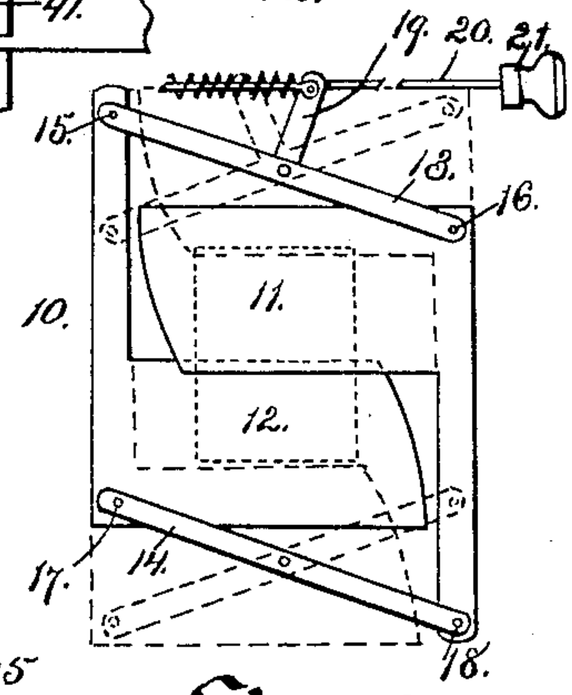

Fig. 6.

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UNITED STATES PATENT OFFICE.

DE WITT C. HOOVER, OF BUFFALO, NEW YORK.

PHOTOGRAPHIC-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 462,382, dated November 3, 1891.

Application filed May 5, 1890. Serial No. 350,672. (No model.)

To all whom it may concern:

Be it known that I, DE WITT C. HOOVER, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Photographic-Printing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in photographic-printing machines, and more particularly to that class of printing-machines with which prints may be taken from a negative upon sensitized paper, properly prepared, without the aid of sunlight.

Its object is to produce a photograph-printing machine in which the light employed is entirely under the control of the manipulator.

It also consists in the arrangement of its feed mechanism by means of which the sensitized paper of any desired length may be fed into the machine on one side, passed over the negative, light admitted through a shutter, and the exposure made. The sensitized paper is then continued on its course, passing over the negative, so as to expose the adjoining space on the paper to that just printed, and so on, necessitating no waste whatever of the sensitized paper.

My invention further consists in the detail of its construction, all of which I will now proceed to definitely describe and claim.

In the drawings, Figure 1 is a perspective view showing the forward end of my improved photographic-printing machine. Fig. 2 is a perspective view of the same, taken from the rear. Fig. 3 is a central longitudinal section of my improvement. Fig. 4 is a rear view of the negative-box. Fig. 5 is a detail view of the operating-lever employed. Fig. 6 is a detail view of the shutter employed, by means of which the light for exposure is regulated, and Fig. 7 is a detail view of the negative secured in its retaining-frame.

Referring to the drawings, 1 is the body of the printing-machine, the rear of which is divided into the compartment 2, as seen in Fig. 3, in which a light is placed through the door 4. In the lower side walls of this compartment are the openings 5 for the admission of air, which passes out through the stack 7, thus giving sufficient oxygen to the burning light. Two caps or hoods 6 are placed over the openings 5 to confine the light within the compartment, as the machine is operated in what is known as a "dark-room." In the upper part of the compartment 2 is placed the colored light 8, facing the forward end of the machine. This glass is preferably of a ruby color.

In the partition 9 (which divides the light-giving compartment 2 from the rest of the machine) is arranged the shutter 10, a detail of which is shown in Fig. 6. This shutter consists of two metallic plates 11 and 12, which are secured by pivoted joints to the levers 13 and 14, as at 15, 16, 17, and 18, the pivoted lever 13 having the upwardly-extending arm 19, to which are secured the shutter-operating arm 20 and knob or button 21. The shutter is shown in full lines in its closed position, the operating-arm 20 extending beyond the side wall of the machine, as seen in Fig. 2. As the button 21 is forced inward the plates of the shutter separate, as shown in dotted lines. Just before this shutter 10 is placed the ground glass 22, forming a compartment 24 at the forward end of the machine. In this compartment is placed a mirror 25 at an angle of forty-five degrees, and from which the light entering the compartment through the ground glass 22 is reflected up through a ground glass 26, placed in a horizontal position and at right angles to the ground glass 22.

Just above the ground glass 26 is the negative-box, at the bottom of which is secured the frame 27, a detail of which is shown in Fig. 7. In this frame 27 is cut the recess 28 for the reception of the negative-holding frame 30, the frame 30 being held from displacement by an elastic cushion 29, the negative-frame 30, having the opening 31, into which the negative is placed, resting on a rabbet cut in said opening. One of the edges 32 of the opening is cut on a bevel, and when the negative is to be placed in position it is first placed upon the rabbet and shoved against the short spring 33, passing under the small projection 34, integral with the spring.

This spring 33 acts against the edge of the negative and presses it against the beveled edge 32 of the opening, thus securing the negative in position. Under this negative-frame and over the ground glass 26 may be placed the usual material or sheets for printing vignettes, which when employed are held in position by a mat secured to the under side of the negative-frame.

At each side of the frame 27 are mounted a pair of horizontal rollers 35, running parallel with each other, the upper rollers of which are suitably mounted in spring-pressed bearings forming friction-rollers with the rollers directly under them, for feeding the sensitized paper to the machine. This paper is fed into the machine through the friction-roll 35 above referred to by a hand gear or lever 39, mounted on the shaft 36, with one of the lower friction-rollers. These lower rollers are connected by a continuous belt 37, passing over suitable pulleys 38, mounted on the same shafts with the rollers, and located on the outside of the machine. The operating-lever 39, mounted on the shaft 36, is fitted over the end of the shaft through a split opening in the operating-lever 39, the expansion and contraction of this opening being regulated by a tension-screw 40.

To the opposite ends of the stationary shafts 36 are mounted the milled or ratchet-wheels 41, (also on the outside of the machine,) as seen in Figs. 2 and 4. A rack-bar 42, which rests in brackets or guides 43, is held slightly above and out of engagement with the milled or ratchet wheels 41 by the spring 44, and is pressed down into engagement with the milled or ratchet wheels 41 when desired, as will be hereinafter described.

A cover 45, hinged at one end, is secured over the negative and frame when the machine is in operation. On the inner surface of this cover 45 is secured the pad or cushion 46 by a metallic spring 47, (shown in Fig. 3,) the cushion being centrally secured to the spring, as shown, and the ends of the spring secured to the inner surface of the cover by pins 48, passing through elongated slots cut in the spring. Centrally pivoted in the cover 45 is the cam 49. This cam, when brought in the position shown in full lines in Fig. 3, presses the sensitized paper against the negative, which pressure, by means of the centrally-pivoted cushion 46, is equally distributed over the entire negative. To this cam 49 is also secured a flexible connection 50, which is subdivided at its other end, as seen in Fig. 4, and secured to the ends of the levers 51, which (when the cam is turned to the position shown in dotted lines in Fig. 3) causes the opposite ends of the levers 51 to press down on the rack-bar 42, bringing it into engagement with the milled or ratchet wheels 41. This rack-bar is employed to regulate the width of the paper used for each exposure, and its movement is regulated by the adjustable stop 52. (See Fig. 4.)

At the outer sides of the feed-rollers 35 I have constructed the platforms 53, having guides 54, secured to a threaded shaft and operated by crank-arms 55. These guides are employed for directing the paper into the machine on a line with the negative, as desired, as it is being fed between the rollers.

In operation the machine is placed in a dark-room, a light being arranged in the compartment 2, the door of which compartment is closed, excluding all light from the operating-room except through the colored glass 8, by which light the manipulator is enabled to operate the machine. The negative is then placed in the frame. In case the negative should be slightly out of line with the opening of the second frame 27, referred to, the negative-frame with the negative may be turned in the recess 28 of the frame 27, and any unevenness of the negative proper upon the glass may be overcome by this arrangement. Sensitized paper is then fed between the rollers to cover the negative, and the cover brought down and secured in place. The cam 49 is then turned to the position shown in full lines, pressing the cushion down upon the paper, thus giving a close contact to the paper and glass.

The exposure is made by pressing the knob or button 21 of the shutter 10, the light passing through the shutter and ground glass 22, where it is reflected from the mirror 25, up through the ground glass 26 and negative, to the sensitized paper. When the exposure is complete, the button 21 is released, the shutter closing by the action of the spring and the light excluded from the negative and paper. The operation is continued by turning the cam 49 into the position shown in dotted lines in Fig. 3, thus releasing the cushion from the pressure of the cam and pulling the flexible connections 50, which, being secured to the ends of the pivoted levers 51, presses the rack-bar 42 into engagement with the milled or ratchet wheels 41. The operating-lever 39 is now turned, feeding the sensitized paper to the machine, and the rack-bar 42, being in engagement with the milled or ratchet wheels 41, is caused to travel in the same direction as the paper, the adjustable stop 52 being so placed as to prevent any loss of the paper between the exposures and the operating-crank 39, being loosely mounted upon its shaft thereon when the resistance of the rack-bar 42 against the stop 52 is to be overcome, thus indicating that sufficient paper has been fed to the machine for the next print or exposure, which is made by repeating the above operation.

It will be seen that in arranging my rollers as above described I am enabled to print on any flat material, such as stiff card-board, celluloid, &c., as the material in passing through the machine is always held in a horizontal position and is not necessarily flexible.

I claim—

1. In a photographic-printing machine, a

frame in which the negative is removably secured, said frame being adjustably held in place within a second frame resting above a ground glass, a compartment for the reception of a suitable light, the rays of which pass through an opening and shutter in the wall of said chamber and through a diffusing or ground glass, a mirror set at or about at an angle of forty-five degrees, which receives and reflects the rays of light, a ground glass through which the reflected rays pass and over which the negative is placed, and means for feeding sensitized paper over the film side of the negative, and an automatic device for limiting the feed for each exposure or print, substantially as set forth.

2. In a photographic-printing machine, an automatic feeding and measuring device consisting, essentially, of two pairs of friction-rollers running parallel with each other on each side of the negative-frame, said rollers being mounted directly over each other, one of each pair being spring-pressed and the lower two being mounted in stationary bearings, a rack-bar traveling back and forth over milled or ratchet wheels, and suitable mechanism for throwing the bar into and out of engagement with said wheels, an adjustable stop for limiting the play of the rack-bar, and a tensioned hand-lever secured to one of the stationary shafts of said rollers, which are connected by a continuous belt suitably arranged, substantially as and for the purpose stated.

3. In a photographic-printing machine, an automatic feeding device consisting, essentially, of two pairs of friction-rollers running parallel with each other on each side of the negative-frame, said rollers being mounted directly over each other, one of each pair being spring-pressed, a tensioned lever-arm mounted on the shaft of one of the rollers and so arranged as to transmit no motion to the rollers as the resistance of such rollers is increased, substantially as shown.

4. In combination with a photographic-printing machine for making positive prints, an automatic feeding device consisting, essentially, of two pairs of horizontal rollers running parallel with each other, one pair being located on each side of the negative-holding frame, said rollers being so mounted that the paper passing through them is carried over the negative, the roller being connected by a continuous belt, substantially as shown.

5. In a photographic-printing machine, an adjustable negative-holding frame resting within a recess cut within a second frame and adjustably held within such recess by a rubber cushion or washer, substantially as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DE WITT C. HOOVER.

Witnesses:

OTTO E. HODDICK,

LOUIS H. FRICK.