

(No Model.)

2 Sheets—Sheet 1.

H. SACK.
PHOTOGRAPHIC PRINTING FRAME.

No. 563,888.

Patented July 14, 1896.

Fig. 1.

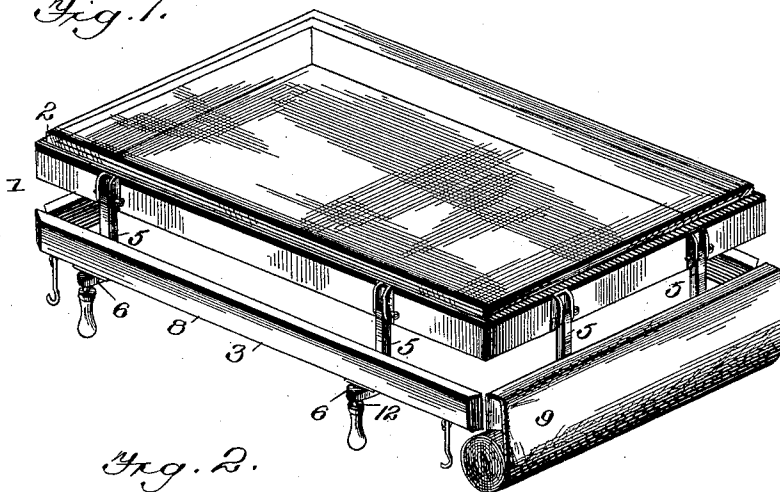


Fig. 2.

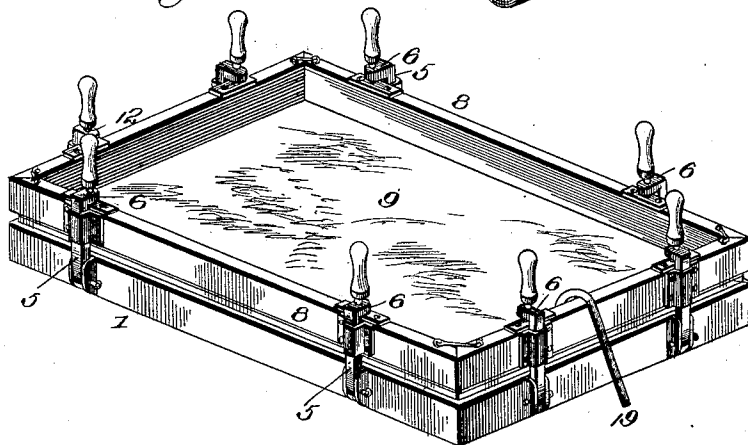
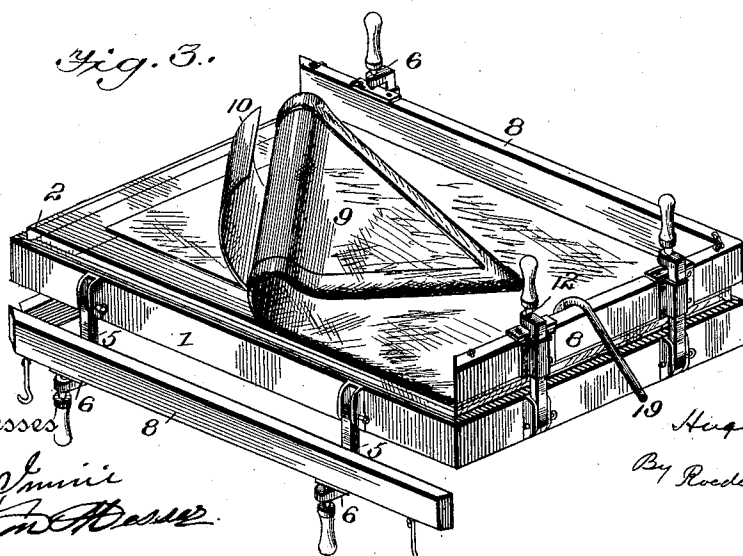


Fig. 3.



Witnesses

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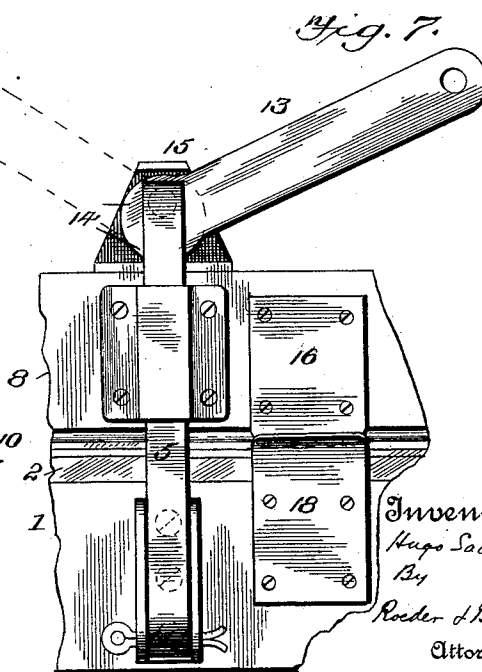
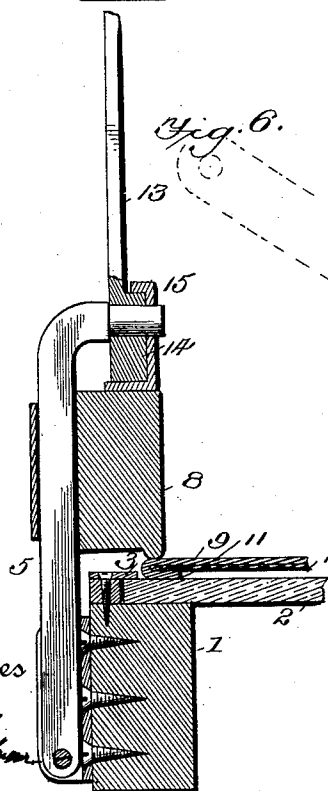
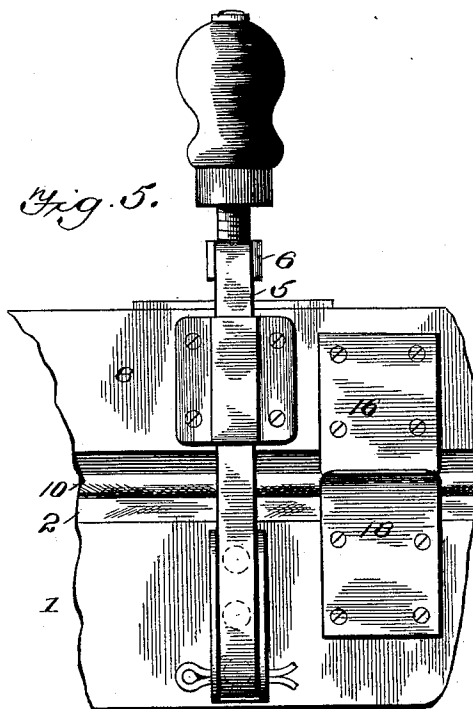
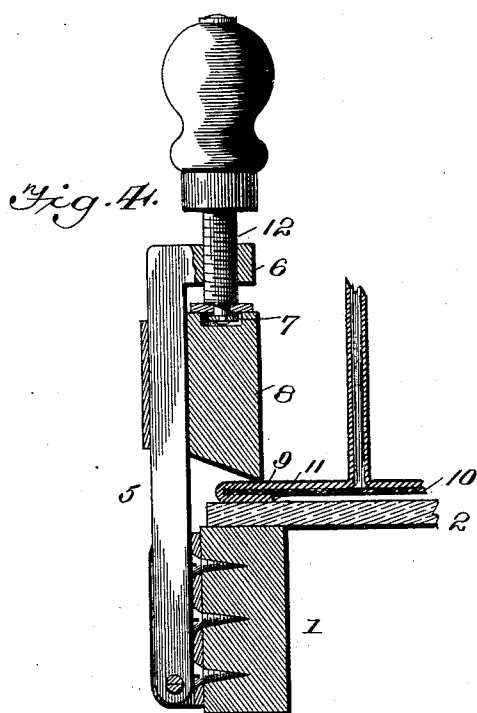
(No Model.)

2 Sheets—Sheet 2.

H. SACK.
PHOTOGRAPHIC PRINTING FRAME.

No. 563,888.

Patented July 14, 1896.



Witnesses
Hugo Sack
Robert Buesen

Inventor
Hugo Sack
By
Robert Buesen
Attorney.

UNITED STATES PATENT OFFICE.

HUGO SACK, OF DUSSELDORF, GERMANY.

PHOTOGRAPHIC-PRINTING FRAME.

SPECIFICATION forming part of Letters Patent No. 563,888, dated July 14, 1896.

Application filed May 1, 1896. Serial No. 589,877. (No model.) Patented in Germany July 8, 1894, No. 83,219; in France April 1, 1895, No. 246,275; in Belgium April 1, 1895, No. 114,863; in England May 13, 1895, No. 9,437; in Austria June 27, 1895, No. 2,327, and in Hungary November 5, 1895, No. 4,301.

To all whom it may concern:

Be it known that I, HUGO SACK, a citizen of the German Empire, residing at Dusseldorf, in Rhenish Prussia, Empire of Germany, have made certain new and useful Improvements in Photographic-Printing Frames, (for which I have obtained patents in Germany, No. 83,219, dated July 8, 1894; in Great Britain, No. 9,437, dated May 13, 1895; in France, No. 246,275, dated April 1, 1895; in Belgium, No. 114,863, dated April 1, 1895; in Hungary, No. 4,301, dated November 5, 1895, and in Austria, No. 2,327, dated June 27, 1895,) of which the following is a specification.

My invention relates to improvements in pneumatic photo-printing apparatus for copying drawings, &c., by the heliographic process.

In the earlier form of pneumatic blue-printing frame invented by myself and disclosed in my English patent, No. 15,757, of November 29, 1884, I have described an apparatus whereby very close and uniform adhesion between the sensitive paper and the original to be multiplied was obtained by forcing both the sensitive paper and the original against the glass plate by means of atmospheric pressure. For this purpose there was provided a rectangular frame into the recess of which was set a glass plate, and upon which was hinged an inner frame carrying a rubber cover. There was also provided means for exhausting the air between the cover and the glass, whereby said cover and glass were pressed together with extremely great force by the atmospheric pressure on the external surfaces of the cover and glass. Experience has shown that there are several difficulties and defects attendant on this form of apparatus. These I have obviated in my improved apparatus, in the description of which the drawbacks attendant on my former construction and the manner in which they have been removed in my present apparatus will be specified in detail.

In the accompanying drawings, Figure 1 is a perspective view of the apparatus ready for use. Fig. 2 is a similar view showing the apparatus closed. Fig. 3 is a similar view to show the arrangement for inspecting a single

corner of the sensitized paper. Fig. 4 is a section of one side of the device on an enlarged scale. Fig. 5 is a side view, also on an enlarged scale, of one of the pressure devices. Figs. 6 and 7 are views similar to Figs. 4 and 5 of a modification.

1 represents the main frame of the apparatus, rectangular in form, on the top of which is laid the glass plate 2, secured to the frame by strips 3, as clearly shown in Fig. 6. Upon each side of the frame are pivoted arms 5, two or more in number, which terminate in portions 6, overhanging the plate when the arms are turned up, and on said arms are mounted slides 7, which carry rails 8. To the under side of one of said rails is secured a rubber sheet 9, beneath which is preferably cemented a sheet 10, of canvas or other like material, for the purpose of providing a vacuum-chamber between the rubber sheet 9 and the glass plate. Said sheet 9 has also a lower rubber facing 11 along its edges to insure perfect tightness against the glass.

In order to firmly press the rails down upon the rubber sheet and secure an air-tight contact at the edges, I provide pressure devices such as are shown in Figs. 4, 5, 6, and 7, that shown in Figs. 4 and 5 comprising a screw 12, working in a screw-threaded aperture in the portion 6 of the arm 5, and secured to the rail 8 so as to raise or lower the same as the screw is screwed up or down. The device disclosed in Figs. 6 and 7 comprises a lever 13, pivoted on the overhanging portion 6, and terminating in a cylindrical eccentric bearing 14, working in a socket 15, secured to the rail 8. It is clear that a turn of the lever from the position shown in dotted lines to that shown in full lines will depress the rail.

In order to hold together the rails after the pressure devices have been operated, I may make use of hooks on one rail engaging eyes on the adjacent rails at the corners, as shown in Fig. 2, but I prefer to employ the device shown in Figs. 4 and 6, in which a lug 16, depending from the rail 8, passes within a lug 17, rising from the frame 1, when the rail and slide are depressed.

For exhausting the air between the rubber

sheet and the glass plate I provide a rubber tube 19, which is secured to the sheet, as shown in Fig. 4. Through this tube the air may be exhausted and a vacuum created by
5 any suitable air-pump.

There are many important advantages attained in the apparatus herein described. In the first place, the structure whereby the glass plate is placed on the top of the main
10 frame instead of in a recess therein is of great practical importance.

In my former apparatus the glass plate was let down into a recess in the frame. These frames are made of large size, from four to
15 ten feet long, and are much exposed to the sun and weather. Hence they are liable to warp.

If pressure is applied to the glass plate when it is placed in a warped frame, the glass
20 will be broken. Hence it is of great importance to discover at once if there is any warping of the frame, and to correct it if found. With my old style of frame it was extremely difficult to detect this warping, and also diffi-
25 cult to bring the frame to a proper level, for this could only be done by a chisel, not by a plane; also with the old construction it was not possible to see if there was an air-tight contact at all points between the rail and the
30 rubber sheet. This had to be done by pouring in water and seeing whether it would pass between the two. Again, dirt would accumulate in the corners of the frame and prevent the hermetic closure. It will readily
35 be understood how all these defects are eliminated by placing the glass plate on the uppermost plane of the frame.

Other important advantages result from the structure, whereby the sides of the rubber
40 sheet are held to the plane by four independent rails.

In the old structure, wherein the rubber sheet was secured to a four-sided frame, one side of which was hinged to the plate-frame,
45 there was great liability of fracture of the glass or of the rubber by reason of the heavy rubber frame slipping from the hands. As the outer edge of the rubber frame would in such a case fall through a distance of several
50 feet it is readily seen that much damage could be done. Moreover, it frequently happened that one of the pressure-levers on the hinged side of the frame would be inadvertently left
55 locked when the frame was opened, in which case said lever would be damaged. Again, the arrangement of a heavy frame swinging from its side on another heavy frame was clumsy and awkward to handle, and with the
60 larger sizes required two men to handle it.

My present arrangement of a rubber sheet secured along one edge to one of the rails I find to be a very advantageous one. The rubber does not support any weight but its own, and thus the danger of making a hole
65 in it, which existed when the rubber was contained in a wooden frame, whether hinged or not, is minimized. The rubber sheet is light

and requires no exertion to handle, and can be readily operated by a boy. Again, it is very advantageous in that in rolling out the
70 sheet of rubber the creases in the drawing or tracing are straightened out, whereas in the old construction they were liable to be inclosed by the frame and rubber cover, which gave an imperfect print.
75

Having thus fully described my invention, what I claim is—

1. In a pneumatic photographic-printing frame, the combination with the main frame and the glass plate supported thereon, of a
80 hermetically-closing cover for the glass, said cover being flexible and free to be rolled up when not in use, rails, detached from the cover, for pressing the free edges of the cover on the glass plate, means for exerting pres-
85 sure on the rails to obtain an air-tight contact at said edges between the cover and glass plate, and an air-exhaust pipe leading from the space between the cover and plate, substantially as described.
90

2. In a pneumatic photographic-printing frame, the combination with the main frame, and the glass plate supported thereon, of a flexible hermetically-closing cover, as of rubber, for the glass plate, said cover being se-
95 cured at one of its edges to the corresponding edge of the frame and being free at its other edges, a rail for each side of the frame, independently pivoted at its own side of the frame and adapted to rest on the corresponding edge
100 of the cover, means for exerting pressure on the rails to obtain an air-tight contact between the cover and glass plate at the edges, and an air-exhaust pipe leading from the space between the cover and plate, substantially
105 as described.

3. In a pneumatic photographic-printing frame, the combination, with the rectangular main frame, and the glass plate supported thereon, of a hermetically-closing cover for
110 the glass plate, said cover being flexible and free to be rolled up when not in use, means, independent of each other, for obtaining an air-tight contact between the cover and glass at each side of the cover, and an air-exhaust
115 pipe leading from the space between the cover and plate, substantially as described.

4. In a pneumatic photographic-printing frame, the combination with a main frame having a plane upper supporting-surface, of
120 a glass plate laid thereon so as to be wholly above said frame, a flexible hermetically-closing cover adapted to rest upon said plate, means for securing an air-tight contact between the cover and glass at the edges, and
125 an air-exhaust pipe leading from the space between the cover and plate, substantially as described.

In witness whereof I have hereunto set my hand this 30th day of April, 1896.

HUGO SACK.

Witnesses:

T. M. WRIGHT,
W. F. BENNETT.