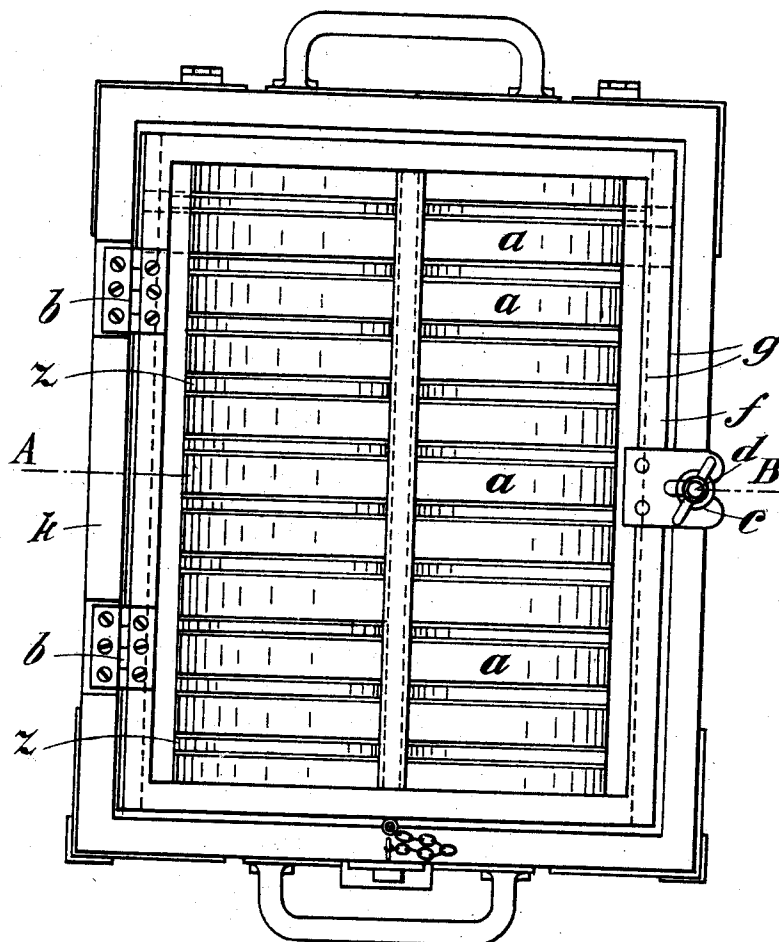


978,261.

E. ALBERT.
COPYING FRAME.
APPLICATION FILED JULY 13, 1909.

Patented Dec. 13, 1910.
2 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
D. V. Perpoint
M. H. Gates.

Eugen Albert
Inventor
per Delbert W. Decker
Attorney

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2 SHEETS—SHEET 2.



C. A. Coggeshall.

By Delbert T. Decker
Attorney

UNITED STATES PATENT OFFICE.

EUGEN ALBERT, OF MUNICH, GERMANY.

COPYING-FRAME.

978,261.

Specification of Letters Patent.

Patented Dec. 13, 1910.

Application filed July 13, 1909. Serial No. 507,362.

To all whom it may concern:

Be it known that I, EUGEN ALBERT, a subject of the Emperor of Germany, residing at Munich, in the Kingdom of Bavaria and Empire of Germany, have invented certain new and useful Improvements in Copying-Frames, of which the following is a specification.

This invention relates to the construction of a copying frame for copying negatives and the like, and it is more especially applicable to the copying of negatives on to sensitized surfaces on metal.

It is well known that greater pressure is invariably required in copying on to metal with sensitized films than for ordinary copying on to paper, and the like; this is because the metal surface does not yield at all and on account of the fact that the planes of the adjoining surfaces are not always exactly parallel. To obtain sufficient pressure copying frames with a large number of screws have heretofore been employed, which screws have been tightened to give the necessary pressure. Difficulty has however been experienced in getting the screws all tightened to the same degree of pressure and unless this is done, obviously, one tightened more than the rest will take the pressure from them. To get the minimum of pressure required over the whole of the surface the screws have been tightened much more than there was any necessity for if the pressure was equally distributed. Notwithstanding this it is a frequent experience to find portions of the negative under copied, especially in the case of large plates owing to the unequal distribution of pressure. Moreover this excessive pressure causes particles of dust which may adhere to the negative while drying to be forced into the metal producing white holes in the finished plate.

The object of this invention is to obviate these disadvantages and especially to insure regular distribution of pressure over the contacting surfaces.

I attain this object by the mechanism illustrated in the accompanying drawing in which:—

Figure 1 is a plan of the copying frame with the back uppermost; Fig. 2 is a section of the machine through the line A B of Fig. 1 and Fig. 3 is a like section showing a modified arrangement of springs.

In Figs. 1 and 2 the springs are shown arranged in three rows, that is to say the leaf

springs *a* which extend over the entire width of the frame and which transmit the pressure mainly at their middle part, and then two rows of springs *z* each of which extends over one half of the width of the frame. The first row of springs is supported by the sheet metal strips *g, g*, provided on both sides of the frame *f*, while the springs *z* rest in an angular recess *s* in the frame *f* on the one hand and in a groove in the strip *t* arranged longitudinally in the middle of the frame *f* on the other hand. In the example here illustrated the frame carrying the leaf springs is hinged to the copying frame proper by means of hinges *b* and the pressure is given by means of a wing nut *c* and pivoted screw *d*. The only essential point is that the leaf springs which are arranged horizontally at a small interval one from the other, should present approximately the same tension, so that the pressure exerted may be as far as possible equal everywhere. When the metal plate *h* is pressed, the leaf springs which are held curved in tension, rest upon the india rubber sheet *i* stretched on the underside of the clamping frame *k*. In order to render the operation perfectly clear it may be explained that *l* is the lower frame which is provided with a thick india rubber layer *m* for the copying glass *n*. The ruled screen *o* rests upon the glass, and the negative *p* upon the screen contacting with the prepared metal plate *h* on its opposite face.

The leaf springs act in the following manner: At first only the summit of the curve of the springs bears against the india rubber cloth but as the pressure increases, a larger part of the spring gradually presses against this cloth whereby the pressure exerted on the wing nut is distributed over a larger area. The pressure applied should not be excessive however, as otherwise the middle of the spring might be lifted or buckled which would react prejudicially upon the efficiency of the apparatus. In the case of copying frames of very large size it is not desirable to employ leaf springs extending over the entire width of the frame as the pressure would not be sufficiently distributed. In such cases the several rows of springs as shown in Fig. 3 are arranged in such a way that they bear alternately against the supports or stops, a larger number of which are provided as shown at *u* and *v*. Thus, for example, the first row of springs *x*

will rest against the first and third supports, the second row *y* against the second and fourth supports, and so forth, by which means the contact or pressure faces of the springs are distributed over the whole of the copying frame in such a manner that an adequate and uniform pressure is obtained everywhere. By this means only the necessary pressure is required to be exerted by the nut *c* to give an equally distributed pressure over the whole surface of the frame; the excess pressure heretofore employed is entirely obviated, and there being only one tension nut to be operated much increased speed of working is obtained.

What I claim as my invention and desire to secure by Letters Patent is:

1. The combination in a copying frame, of a negative and plate holding frame, a pressure frame hinged thereto and having on each side thereof a spring support, flat leaf springs with a small downward curvature located by their ends in said supports and each spring adapted to act through its intermediate curved portion upon the plate independently of the other springs, thereby producing an even effectual pressure over the entire plate.

2. The combination, in a copying frame, of a pressure frame having on each side thereof a projecting spring support, with a series of flat leaf springs located by their ends in said supports and extending across the frame with a small downward curvature, a flexible shield spanning said frame and engaged by the bows of said springs, a frame for holding the negative and the plate upon which it is to be copied, and means for moving the pressure frame so as to cause said springs to exert a uniform pressure upon said shield at the back of the plate.

3. The combination, in a copying frame, of a pressure frame having on each side thereof a projecting spring support, flat leaf springs with a small downward curvature located by their ends in said supports, a frame for holding the negative and plate independently of the pressure frame, hinges on one side of the pressure frame connecting it to the negative and plate holding frame, a bracket on the opposite side of the pressure frame and a bolt and wing nut connected to the negative holding frame and coacting with the said bracket to draw the two frames together, whereby to press said springs uniformly upon the back of the

plate, substantially as and for the purpose set forth.

4. The combination, in a copying frame, of a pressure frame having shouldered spring supports on each side thereof, intermediate spring supports extending longitudinally of same, a plurality of flat leaf springs extending between two of the said supports and positioned in staggered relation to adjoining springs, and means for drawing together the pressure frame and the negative holding frame, substantially as described herein.

5. The combination, in a copying frame, of a negative holding frame, a pressure frame having shouldered spring supports on each side thereof, a central intermediate shouldered spring support extending longitudinally of same, a plurality of flat leaf springs with a small downward curvature extending between the spring supports on the sides of the pressure frame, a plurality of flat leaf springs with a downward curvature, extending between one of the spring supports on the side of the pressure frame and the intermediate spring support, and means for drawing together the pressure frame and the negative holding frame, substantially as described herein.

6. The combination, in a copying frame, of a pressure frame having shouldered spring supports on each side thereof a central intermediate shouldered spring support extending longitudinally of same, a plurality of flat leaf springs with a small downward curvature extending between the spring supports on the sides of the pressure frame, a plurality of flat leaf springs with a downward curvature, extending between one of the spring supports on the sides of the pressure frame and the intermediate spring support, a negative holding frame, hinges on one side of the pressure frame connecting it to the negative holding frame, a bracket on the opposite side of the pressure frame and a bolt and wing nut connected to the negative holding frame and co-acting with the said bracket to draw the two frames together, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

EUGEN ALBERT.

Witnesses:

ABRAHAM SCHLESINGER,
LOUIS MUELLER.