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F. G. MORTELMANS ET AL
 APPARATUS FOR TRANSFERRING AND MULTIPLYING ON
 PHOTOGRAPHIC WAY IMAGES UPON PRINTING PLATES

Filed July 2, 1926

3 Sheets-Sheet 1

Fig. 1.

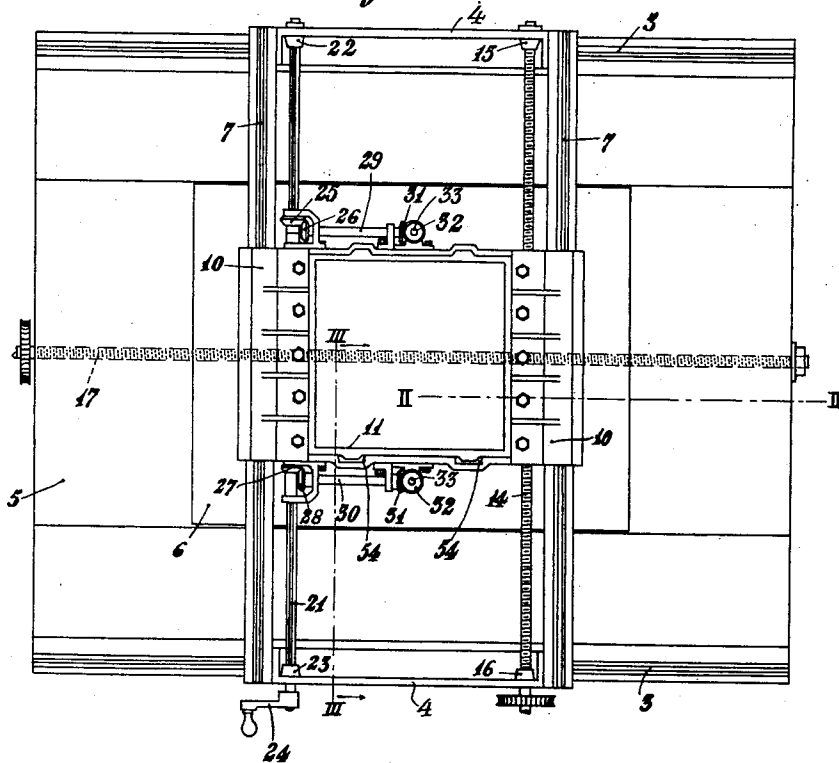
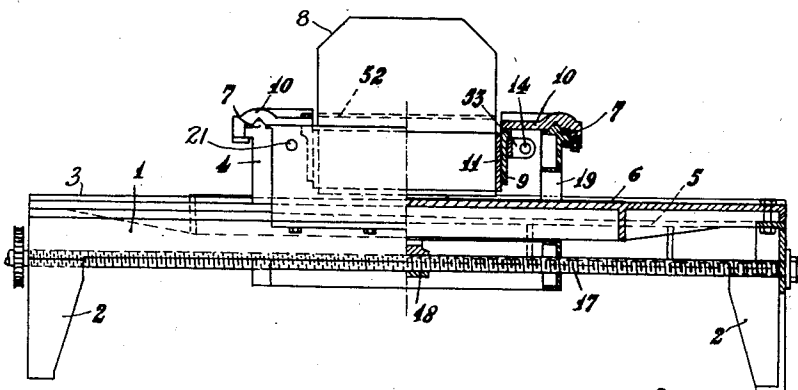


Fig. 2.



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3 Sheets-Sheet 2

Fig. 3.

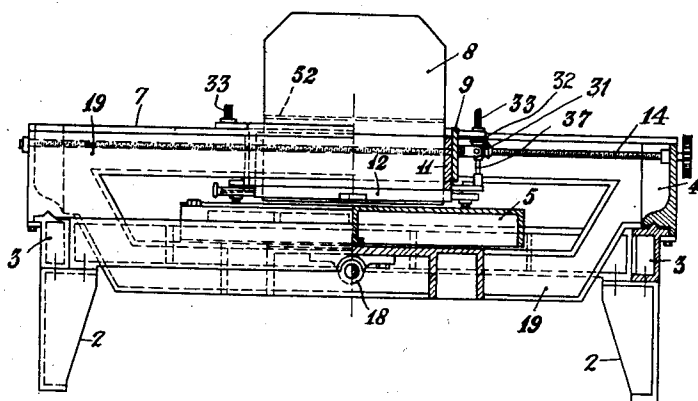
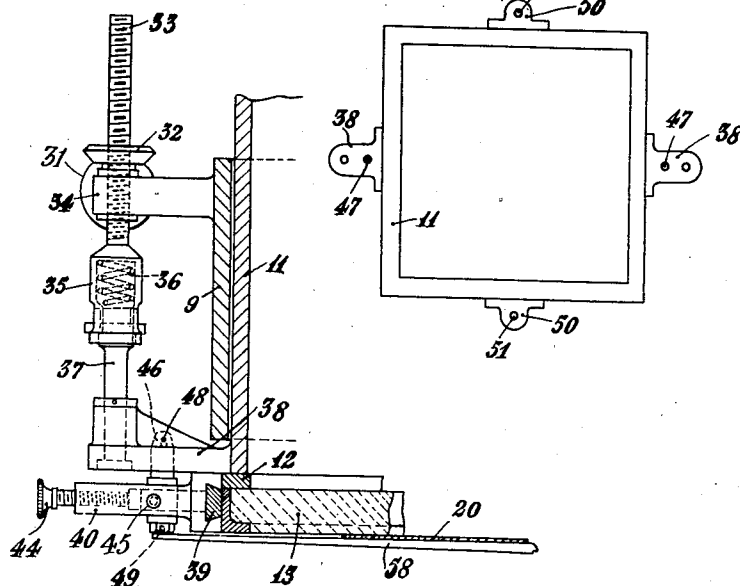


Fig. 5.

Fig. 4.



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Fig. 6.

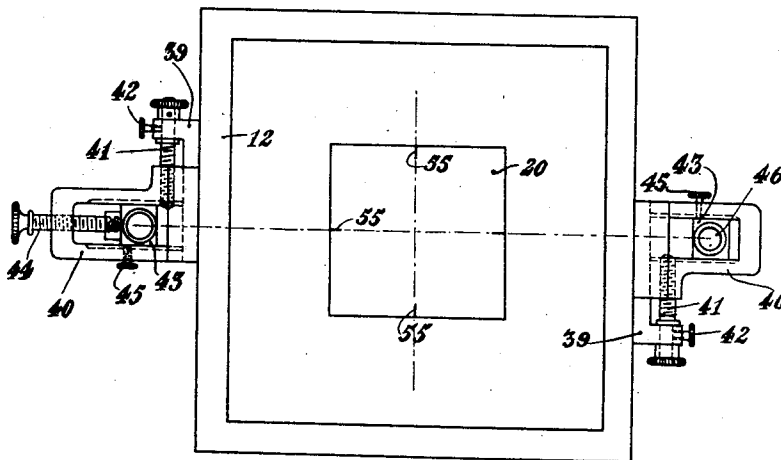
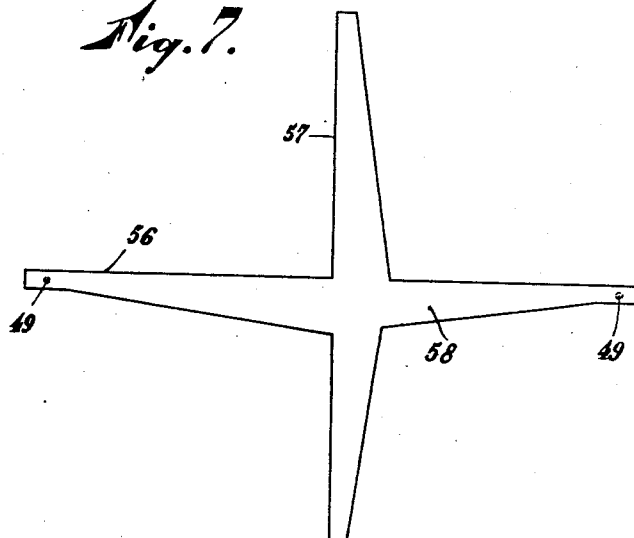


Fig. 7.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR TRANSFERRING AND MULTIPLYING ON PHOTOGRAPHIC WAY IMAGES UPON PRINTING PLATES.

Application filed July 2, 1926, Serial No. 120,189, and in the Netherlands July 3, 1925.

The invention relates to an apparatus for transferring images photographically to a printing plate of zinc or like material, provided for this purpose with a sensitive layer, and for multiplying said images by causing a relative displacement of the negative or other original, from which copies are to be made, and the plate, and making a photographic copy in any desired position of the negative.

Apparatus of this type are known. The main requirements are the following ones. The relative displacement of the negative has to be effected most accurately in order to obtain a perfect register of all the images when using a plurality of printing plates in color printing. The negative should be adjusted exactly by the square with respect to the directions, in which it is displaced. The contact between negative and printing plate should be very intensive during lighting.

The existing apparatus have objections as to all these features are of a complicated construction and exceedingly expensive. Therefore they are only within the reach of a few large printing offices, although numerous shops of moderate capacity could employ such an apparatus, but now are bound to the manual method by means of a suitable copying paper.

The invention has in view to provide for important simplifications, more specially in adjusting and pressing the negative and consists chiefly in that the original is mounted in a negative holding frame with pins perpendicular to the plane of the negative and adapted to be placed into holes of brackets attached to the lighting case, and means are provided for aligning the negative centre lines with the centre lines through the pins of the negative holding frame, before attaching said frame to the lighting case.

According to the invention there may be four brackets arranged in such a way that both lines connecting the centres of two oppositely located holes, are perpendicular to each other and the distances between said holes are equal to each other.

It is thereby possible to turn over 90° the negative holding frame without further adjustment.

The alignment of the negative may be ob-

tained by placing the pins of the negative holding frame in sliding blocks, which by means of set screws are adjustable in said frame in two directions perpendicular to each other.

The contact between the negative and the printing plate may be obtained in the following way. The lighting case is provided with a slidable inner portion having two or more laterally projecting cams or brackets each of which is engaged by a vertical pressure rod, resiliently connected to a vertical threaded rod, guided in an eye of the outer portion, whereas all of the threaded rods are adapted to be moved simultaneously by means of a gear or other transmission from a driving shaft.

On the accompanying drawing a device according to the invention is illustrated by way of example more or less diagrammatically.

Fig. 1 is a top-view of the entire machine.

Fig. 2 leftside is an elevation; rightside a section on the line II—II in Fig. 1.

Fig. 3 leftside is an elevation; rightside a section on the line III—III in Fig. 1.

Figs. 4, 5 and 6 are details on a larger scale.

Fig. 7 is a top view of a cross ruler.

The machine consists of a horizontal frame 1 supported at the corners by four supporting feet 2. The two longitudinal sides of the frame are at the top side constructed as guides 3, along which a support 4 can be shifted. This support then moves over a table leaf 5, supported at the two short sides of the frame and upon which the printing plate 6 may be clamped in some suitable way (e. g. by suction). The support 4 is in its turn provided with two guides 7, perpendicular to the guides 3 of the frame. Over these guides 7 a lighting case 8 may be shifted. This lighting case has a carriage or outer case 9 bearing by means of the slides 10, Figs. 1 and 2, upon the guides 7 and an inner portion 11, vertically slidable in the outer case 9.

Within the lighting case a glass plate 52, Figs. 2 and 3, is further arranged between the lighting lamp and the negative in order to prevent carbon particles from the arc lamp from falling upon the negative.

For guidance of the inner portion 11 in

the outer case 9 adjustable centring strips 54, machined slightly tapering, are provided.

The negative holding frame 12 is attached to the bottom of the lighting case in a way which will be described later on, while against the glass plate 13 of this negative holding frame the negative 20 itself may be glued.

The displacement of the lighting case 8 along its guides 7 is effected by means of a threaded shaft 14, bearing in the end walls of the support 4 at 15 and 16 and carrying a nut 53, attached to the outer case 9 of the lighting case.

The displacement of the support 4 along the guides 3 of the frame 1 is effected in a corresponding way by the threaded shaft 17. This shaft engages the support 4 in a nut 18, located below the table leaf 5 in a connecting piece between two beams 19 of the support, gripping around the table leaf.

In order to be able to control the displacement of the lighting case by the rotation of the threaded shafts 14 and 17 various devices may be applied.

As soon as the lighting case is adjusted, the negative may be pressed against the printing plate by a separate device, operated by a shaft 21.

This shaft 21 bears at 22 and 23 in the end walls of the support 4 and is provided with a crank 24 by means of which it may be rotated. The support slides along said shaft and is provided at its sides with two sets of bevel gear wheels 25, 26 and 27, 28. The gears 25 and 27 slide in a known manner along a key-way in the shaft, in such a way, that in any position by rotating the shaft, they drive the gears 26 and 28 and thereby the shafts 29 and 30. Each of these shafts carries again a bevel gear wheel 31 meshing with a wheel 32 provided with internal screw thread so that the vertical threaded rod 33 (Fig. 5) is moved up and down, as soon as the wheel 32 is rotated in one direction or in the other. The wheel 32 with its hub is rotatably, but non-slidably supported in a bracket 34 of the outer case 9. The threaded rods 33 are provided at their lower ends with a socket portion 35, enclosing a helical spring 36, pressing upon the head of a vertical rod 37. The rod 37 has its lower end enclosed in a bracket 38 of the inner portion 11 of the lighting case. By rotating the shaft 21 the inner portion 11 may in this way be lowered and the negative pressed against the printing plate. The spring 36 then acts as a buffer so that a gradual pressing is warranted.

The attachment of the negative holding frame 12 to the inner portion 11 of the lighting case is effected in the following way.

To the metal frame enclosing the glass plate 13, the pieces 39 are attached at two

opposite sides. These pieces are dovetailed shaped and along the same the sliding straps 40 may be shifted to and fro by means of the screws 41, Fig. 6. The small set screws 42 are adapted to lock the screws 41 and to fix the straps 40 in a predetermined position. In the straps 40 the sliding blocks 43 are slidable to and fro. One of the sliding blocks is provided with a screw 44 for the reciprocation, and by means of the clamping screws 45, the sliding blocks may be fixed in a predetermined position.

In the sliding blocks pins 46 are secured exactly fitting into corresponding holes 47 Fig. 4 of the brackets 38 of the inner portion 11 of the lighting case. The pins 46 may be slightly tapered at their ends to contribute to an easy entrance into their holes 47. By means of keys 48 the pins are prevented from falling out and the negative holding frame 85 is secured to the inner portion of the lighting case.

Instead of the keys 48 other means may be provided, to attach the negative holding frame to the lighting case.

In order to adjust a negative one operates as follows. The frame 12 is entirely removed from the lighting case and laid upside down. The negative 20, provided with registering marks 55 indicating the two centre lines, is glued to the glass plate 13 as exactly as possible by sight. Thereupon one takes a cross ruler 58 Fig. 7 one leg of which is provided with projections 49, fitting into recesses in the lower face of the pins 46 and at a distance apart equal to that of the holes 47 of the inner portion of the lighting case. One places the ruler 58 with the projections into the pins and in general it will appear that the two sides of the ruler do not tally with the centre lines of the negative. Now, by turning the screws 41 one aligns first the horizontal side 56 (Fig. 6) of the ruler with the horizontal centre line of the negative and locks the sliding straps 40 by means of the clamping screws 42. Thereupon one aligns the perpendicular side 57 (Fig. 6) of the ruler with the corresponding centre line of the negative. This is effected by turning the screw 44, whereby the righthand pin 46 with its sliding block is carried along by the ruler itself. Then the blocks 43 are clamped in the sliding straps by means of the screws 45 and the ruler is taken off.

Now, if the negative holding frame is placed upside down with the pins 46 into the holes 47 of the inner portion 11 (see Fig. 4, representing a bottom view of this inner portion) one can be sure that the displacements of the lighting case over the printing plate will occur exactly parallel to the centre lines of the negative.

Instead of providing only one of the sliding blocks 43 with a set-screw, both blocks may be provided with a set-screw 44. The

heads of the screws may have a toothed edge and springs may be arranged determining the rotation of the screws so that it is possible to turn both screws always the same angles:

In order to turn the negative 90°, without needing any further adjustment, the inner portion 11 of the lighting case is provided with two brackets 50 having holes 51, the distance between which is exactly the same as that between the holes 47 and the connecting line which is perpendicular to the connecting line of the holes 47.

Having now particularly described and ascertained the nature of this invention and the manner in which the same is to be performed we declare that what we claim is:

1. In apparatus for printing negatives on sensitized printing plates; a lighting case and a detachable negative holding frame therefor, in combination with centering pins on the frame, means on the case into which said pins enter and means on the negative holding frame to adjust said pins with respect to the negative.

2. In apparatus for printing negatives on sensitized printing plates; a lighting case and a detachable negative holding frame, in combination with brackets on the sides of the case having pin-receiving holes, a line connecting the centers of the holes on one pair of sides of said case being disposed rectangularly to a line connecting the centers of the holes on the other pair of sides, and means on the frame to adjust the pins with respect to the negative center while maintaining the distance between said pins.

3. In apparatus for printing negatives on sensitized printing plates; a lighting case and a detachable negative holding frame, in combination with brackets on the lighting case having holes therein, pins on the frame for entering said holes, and means for adjusting said pins in rectangular directions while maintaining their distance apart.

4. In apparatus for printing negatives on sensitized printing plates; a lighting case, means to support the case including means to move the case in rectangular directions horizontally, in combination with a negative holding frame, pins on the frame detachably connecting the frame and case, means to center the pins with respect to the center of the negative in the frame, and means to lower the case onto a sensitized printing plate, said lowering means including resilient cushioning means.

5. In apparatus for printing negatives on sensitized printing plates; a horizontal support having guides thereon, beams having guides thereon mounted on said former guides for traverse, a carriage traversible on said latter guides, a lighting case vertically movable in said carriage, brackets on two pairs of sides of said case having holes therein, a negative frame, pins on the frame for entering said holes, and means to adjust said pins with respect to said negative frame in rectangular directions without changing the distance apart of said pins.

In testimony whereof we affix our signatures.

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