

L. KLENK.

PANTOGRAPH.

APPLICATION FILED JULY 2, 1906.

982,608.

Patented Jan. 24, 1911.

3 SHEETS—SHEET 1.

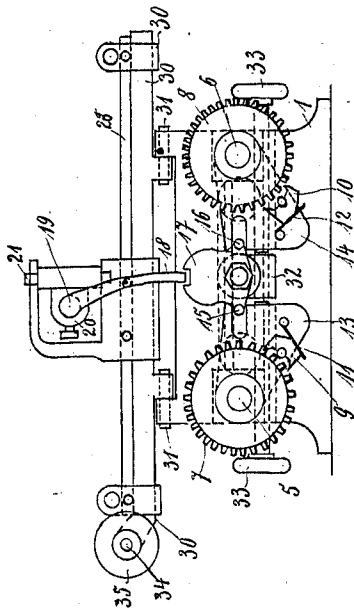


Fig. 1.

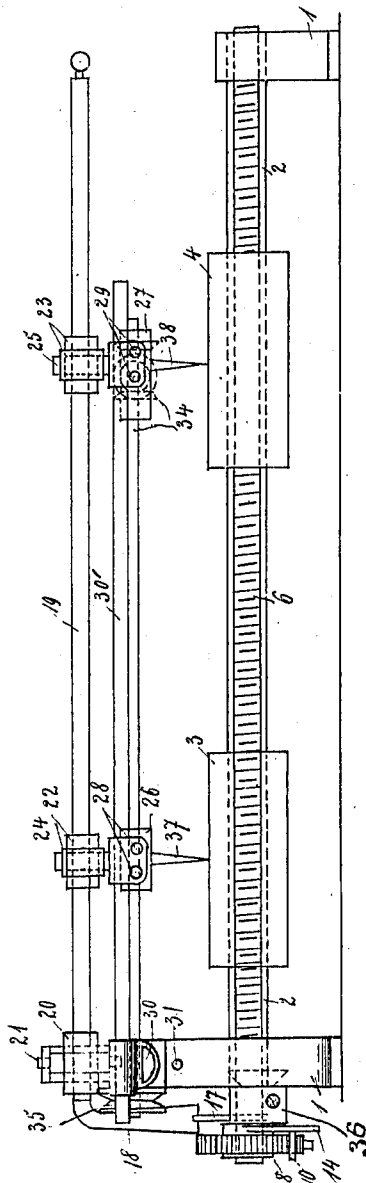


Fig. 2.

Witnesses.
Stanley Wood.
Frederick Collins

Inventor
Ludwig Klenk.
by
W. E. Conrad
Attorney.

L. KLENK.
PANTOGRAPH.

APPLICATION FILED JULY 2, 1906.

982,608.

Patented Jan. 24, 1911.

3 SHEETS—SHEET 2.

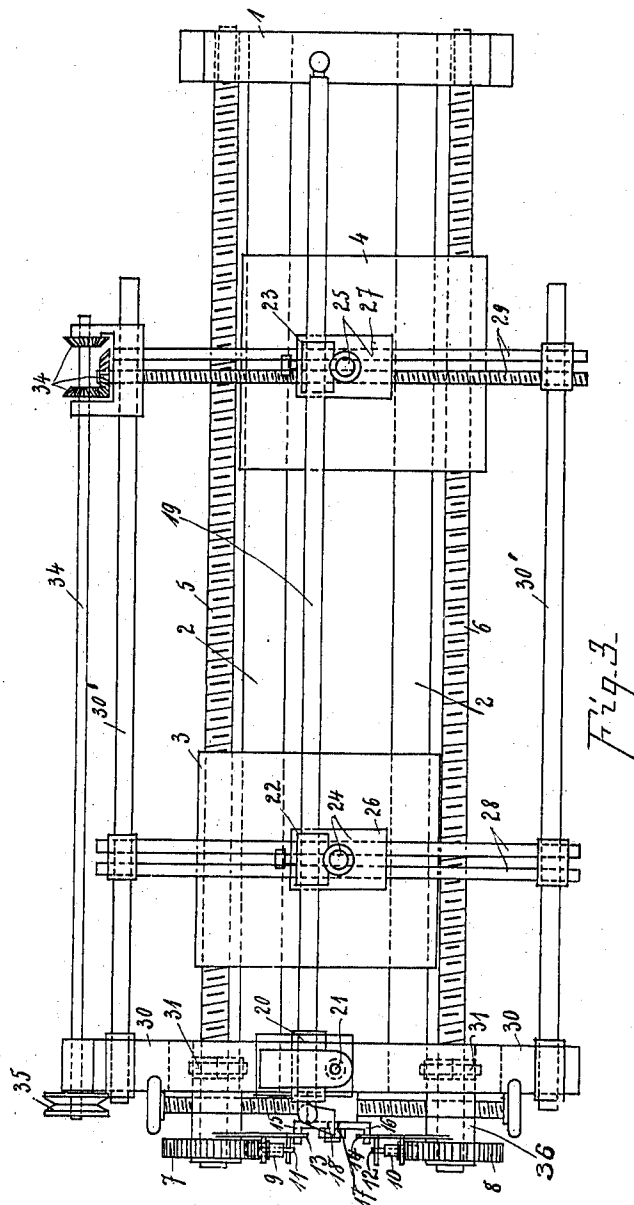


Fig. 2.

Witnesses
Stanley Wood.
Frederick Collins

Inventor
Ludwig Klenk
by
W. S. Evans
Attorney

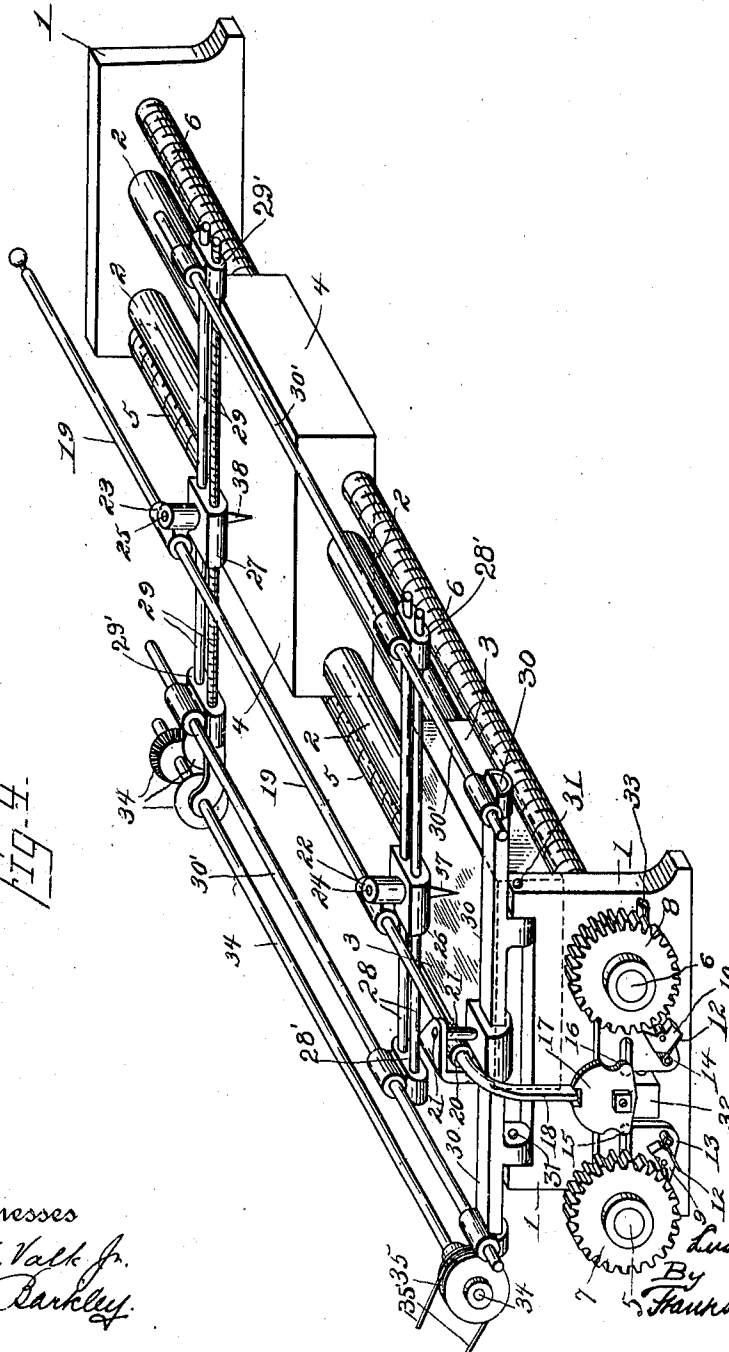
L. KLENK.
PANTOGRAPH.

APPLICATION FILED JULY 2, 1906.

982,608.

Patented Jan. 24, 1911.

3 SHEETS—SHEET 3.



Witnesses
Wm. E. Valk Jr.
L. C. Barkley.

Inventor
Ludwig Klenk,
By
Hans Hallman
Attorney

UNITED STATES PATENT OFFICE.

LUDWIG KLENK, OF FRANKFORT-ON-THE-MAIN, GERMANY.

PANTOGRAPH.

982,608.

Specification of Letters Patent.

Patented Jan. 24, 1911.

Application filed July 2, 1906. Serial No. 324,330.

To all whom it may concern.

Be it known that I, LUDWIG KLENK, a subject of the Emperor of Germany, and a resident of Frankfort-on-the-Main, Germany, have invented a new and useful Pantograph, of which the following is the specification.

The present invention relates to pantographs and has for its object to provide a machine for reducing, enlarging, reversing and changing the proportions of pictures, embossed work and the like. Its principle is in part the same as that of all similar machines, in that a tracer and a tool are oscillated around a fixed point, the movements of said tracer and tool being in such proportion to each other as the copy to be reproduced is to have with the original.

The present machine differs from other known machines by the said tracer and the tool being not only attached directly to the customary lever, but also moving in guides and able to be moved in these by the customary lever. It further differs from other known devices in the peculiar device by means of which the advance of the slides, on which the original and the copy rest, can be varied at will. By these two improvements the capacity of the machine in accordance with the present invention is considerably increased above that of other machines for the same purpose.

In order that the invention may be clearly understood reference is made to the accompanying drawings in which one embodiment is represented by way of example and in which:

Figure 1 is an end elevation of the machine showing the transmission mechanism between the oscillating lever and the driving spindles; Fig. 2 is a side elevation showing the relative positions of the oscillating lever and the tables; Fig. 3 is a plan showing the parallel guiding mechanism and its connection with the driving device. Fig. 4 is a perspective view of the machine.

Similar reference numerals denote similar parts in all views.

In the side frames 1 the guide rods 2 are rigidly secured, and the slides or tables 3 and 4 driven by means of screw spindles 5 and 6 move on these rods 2. On the ends of said screw spindles there are fitted gear wheels 7 and 8 with which the double acting pawls 9 and 10 engage under action of springs 11 and 12. Said pawls and their respective springs are fitted in suitable manner

on plates or disks 13 and 14, the latter moving on the ends of the spindles 5 and 6, and being oscillated by means of pins 15 and 16 provided on plate or disk 17 and moving in suitably provided slots in disks 13 and 14. Disk 17 is driven by means of an arm 18 forming the rear end of the customary lever or rod 19. The latter is adjustable in a socket 20, said socket pivoting horizontally around an arbor 21, so that rod 19 can be adjusted longitudinally and oscillated horizontally. On rod 19 there are adjustably arranged the transverse sockets 22 and 23 through which arbors 24 and 25 pass in a vertical direction, said arbors being attached to slides 26 and 27. These slides move on the parallel guides 28 and 29 attached to frame 30. This frame consists of its end member 30, and two side rods 30' attached firmly thereto, the member 30 rocking on pivots 31 journaled in the support 1. Bushes 28' and 29', to which the guides 28 and 29 are respectively attached, are slidable on the rods 30'. Now it is seen that together with the slides 26 and 27 the arbors 24 and 25 also have a rectilinear and not a circular motion; the proportion of their respective distances from their center of oscillation remains the same, but their absolute distance varies when they are moved. Therefore one of the sockets 20, 22, 23 can be rigidly fixed in any suitable manner to rod 19, but the other two sockets must remain adjustable. In order to avoid having to oscillate the rod 19 by hand, one of the rods 29 is made as a screw spindle and is driven by means of a reversible gearing 34 of any suitable design by aid of a cord drive or the like as at 35, 35'.

The frame 30 with its slides 26 and 27, sockets 22 and 23 and rod 19 can oscillate up and down around the pivots 31. Disk 17 is supported in a block 32 guided in a dovetail groove in the frame 1 or in any other suitable manner, and it is movable and adjustable in a lateral direction by means of screw 33 passing through the same and journaled in bearings 36 on the end support 1. When said block is situated in the center, the pins 15 and 16 will give disks 13 and 14 an equal stroke, the spindles 5 and 6 an equal rotation in the same sense, and the tables 3 and 4 an equal advance in the same direction. If block 32 is moved more toward spindle 5, disk 13, wheel 7, spindle 5, table 3 will have a greater motion than disk 14, wheel 8, spindle 6, and table 4 and vice versa.

If one of the pawls 9 or 10 is reversed, the tables 3 and 4 will have a motion in the opposite sense. To slides 26 and 27 there are attached the tracer 37 and the tool 38 respectively. By adjusting the position of the block 32, therefore, and oscillating the tracer over the table 4, the tables 3 and 4 can be moved into various positions as required at any time.

10 The operation of the machine is as follows:—For reducing, say to one third, the original is placed on slide 4, and the blank from which the copy is to be made is placed on the slide 3. For enlarging they are placed
15 vice versa. The slides 26 and 27 and with them sockets 22 and 23 are then adjusted on rod 19 in proportion to the desired reduction, say 1 to 3, and block 32 is adjusted so that at each stroke of disk 17 the spindles 5
20 and 6 will oscillate in proportion to the respective reduction, say 1 to 3; whereupon rod 19 is moved either directly or by means of gearing 34 and 35. Now when the tracer is moved over the original, a vertical motion
25 will be imparted to the tool corresponding to the outline of the original, the slide 3 will be advanced only one third as far as slide 4, and the tool 37 will have only one third as great a horizontal and vertical
30 stroke as the tracer 38, thus the copy on slide 3 will be in all dimensions only one third as large as the original on slide 4.

If the original is symmetrical, only half such an original is required. The operation
35 is the same as if the original were whole, and after the half has been copied, the motion of the slide 3 or 4 on which it lies is simply reversed by reversing the pawl 9 or 10 respectively, and work proceeds as before.

40 If for the advance of slides 3 and 4 another proportion is chosen than that for the distance of pins 37 and 38 from their centers of oscillation, the copy will be a distorted reproduction of the original.

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

1. A machine for reducing, enlarging, reversing, distorting and changing the proportions of pictures, embossed work and the
50 like, comprising in combination a frame, two slides movable longitudinally thereon, means for driving said slides, a second frame revoluble vertically on the former frame above said slides, a tracer over one slide movable
55 rectilinearly longitudinally and transversely on the latter frame, a tool over the other slide movable rectilinearly longitudinally and transversely on the latter frame, and a lever mounted to oscillate horizontally on
60 the latter frame movably connected with said tracer and said tool, and adapted to engage and drive said means for driving said slides, as set forth.

2. A machine for reducing, enlarging re-

versing, distorting and changing the proportions of pictures, embossed work and the like, comprising in combination a frame having rectilinear guide-rods, two slides movable on the latter, two spindles mounted
65 revoluble in said frame for driving said slides, pawl and ratchet mechanism, substantially as shown, for operating said spindles, a second frame revoluble vertically on the former frame above said slides, a tracer
70 over one slide movable rectilinearly longitudinally and transversely on the latter frame, a tool over the other slide movable rectilinearly longitudinally and transversely on the latter frame, and a rod mounted
75 to oscillate horizontally on the latter frame, movably connected with said tracer and said tool, and adapted to engage and drive said pawl and ratchet mechanism, as set forth.

3. A machine for reducing, enlarging reversing, distorting and changing the proportions of pictures, embossed work and the like, comprising in combination a frame having rectilinear guide rods, two slides
85 movable on the latter, two spindles mounted revoluble in said frame for driving said slides, reversible pawl and ratchet mechanism, substantially as shown for operating said spindles, a second frame revoluble
90 vertically on the former frame above said slides, a tracer over one slide movable rectilinearly longitudinally and transversely on the latter frame, a tool over the other slide movable rectilinearly longitudinally and transversely
95 on the latter frame, and a rod mounted to oscillate horizontally on the latter frame, movably connected with said tracer and said tool, and adapted to engage and drive said pawl and ratchet mechanism, as set forth.

4. A machine for reducing, enlarging reversing, distorting and changing the proportions of pictures, embossed work and the like, comprising in combination a frame, two slides movable longitudinally thereon, means
100 for driving said slides, a second frame revoluble vertically on the former frame above said slides, two pairs of rods arranged transversely on the latter frame, a lever mounted to oscillate horizontally on the latter
105 frame adapted to engage and drive said means for driving said slides, two sockets movable along said lever, and two slides connected with said sockets and movable along said two pairs of rods, one of the latter slides carrying a tracer and the other
110 carrying a tool above and adapted to contact the former slides, substantially as shown.

LUDWIG KLENK.

Witnesses:

FRIEDRICH VON ROESPEY,
JEAN GRUND.