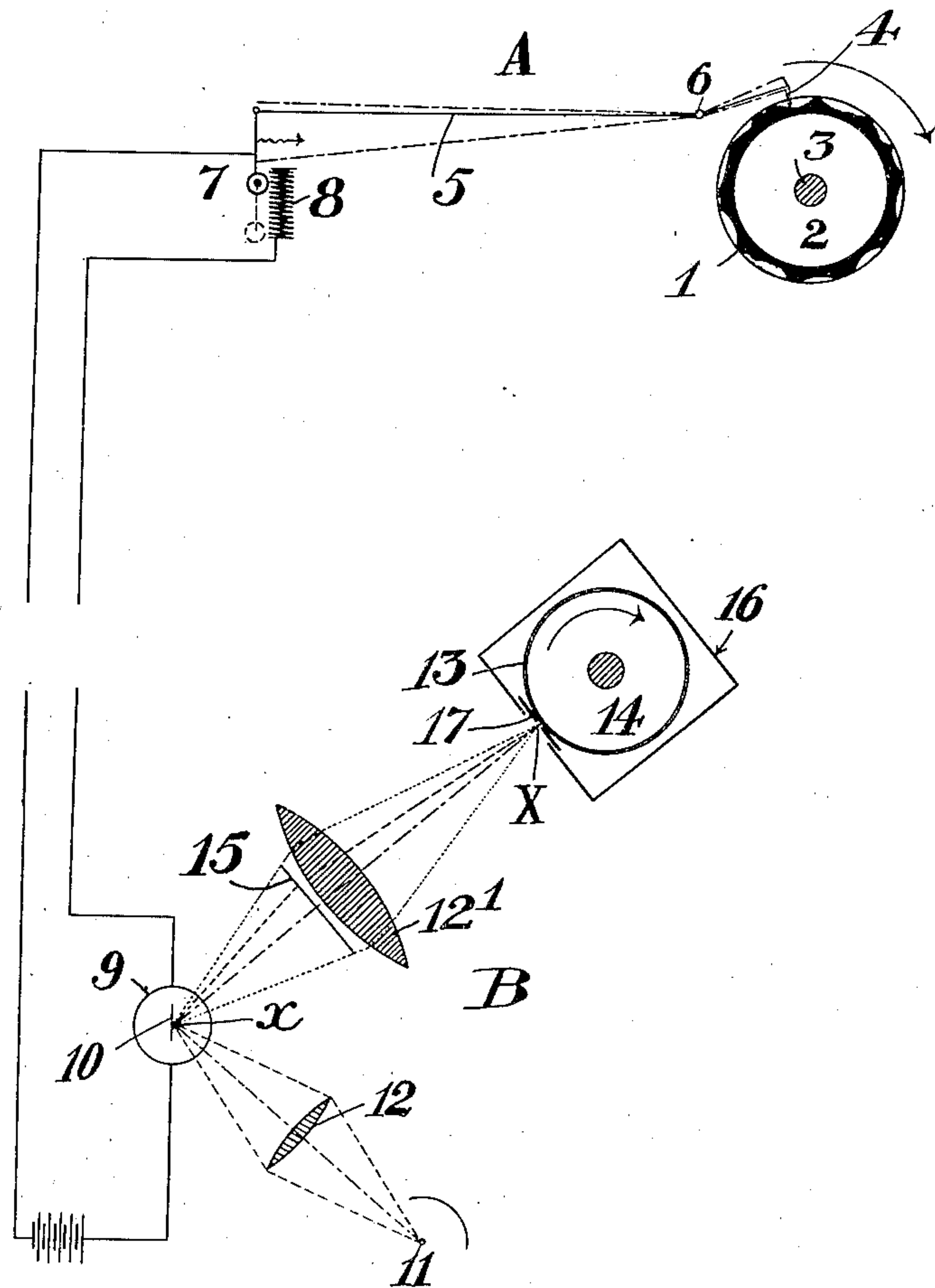


E. BELIN.
TELAUTOGRAPH.

APPLICATION FILED JAN. 17, 1908.

915,154.

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Witnesses

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TELAUTOGRAPH.

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To all whom it may concern:

Be it known that I, EDOUARD BELIN, a citizen of the Republic of France, residing at Paris, in the Republic of France, engineer, have invented certain new and useful Improvements in Telautographs, for which application has been made in France, January 24, 1907, and August 1, 1907; in Austria, December 14, 1907; in Switzerland, December 24, 1907; in Luxembourg, 7197, December 30, 1907; in Denmark, January 3, 1908; in Hungary, January 3, 1908; and in Sweden, December 31, 1907.

The apparatus, to be distinguished by the name of "telestereograph", has for its object to reproduce at a distance an original photograph, by another photograph which is a copy of the first. It allows of this reproduction being made of the same size, or enlarged or reduced, as a positive or negative, or stronger or weaker, at will.

The "telestereograph" also allows of any drawing, writing or like tracing being reproduced by photo-chemical means, provided that such originals have at the start some relief however low.

The name of "telestereograph" has been given to this apparatus because it reproduces pictures the tints of which are shown at the start by proportionate reliefs.

The "telestereograph" does not comprise like other apparatus previously suggested, any chemical agent possessing variable properties, such as selenium. It works like a telegraph apparatus by mechanical movements.

Like all transmitting apparatus of this kind, the "telestereograph" necessitates two stations, the one, a transmitter, at the sending place, the other, a receiver, at the place of arrival. These two stations possess parts which must be animated with strictly synchronous movements and this result is obtained by an arrangement analogous to those employed in telegraphy, correction being able to be made, for instance at each turn.

The accompanying drawing shows diagrammatically the "telestereograph" apparatus, the practical construction of which is capable of numerous variations as regards forms and dimensions.

A is the transmitting station and B the receiving station.

It is well known that colloidal bichromate preparations (gelatin and alkaline bichromates) are sensitive to light and that the layer formed is the less soluble the more intense the light has been; by development in hot water a relief is obtained, the heights of which are strictly proportionate to the luminous intensities. It is this well known property which forms the basis of "photoglyphy" and the "Woodbury type" process. Assuming then that a suitable photographic process block be reproduced on bichromated gelatin, and that, after the proof 1 in relief thereby obtained has been placed on a roller 2 at the transmitting station A having a rotary movement around a fixed pin 3 so as to impart to it a translation movement, it is traced by means of a stylus 4 fixed on a lever which is only movable in its plane around an axis 6, it is evident that the part of the lever 5 opposite the stylus 4 will be angularly displaced and its extremity will describe arcs of a circle the length of which will be proportionate to the reliefs of the proof. At this extremity of the lever 5 a commutation piece 7 is fixed forming a slider adapted to be displaced along a fixed resistance 8 or a row of contacts insulated one from another, and respectively connected with bobbins forming a resistance box. Under these conditions it is quite evident that if the resistance or resistances 8 and the slider 7 in series complete an electric line circuit of constant voltage, and constant external resistance, the absolute intensity indicated by any suitable galvanometer introduced in this circuit will vary according to the position of the slider 7 and consequently according to the relief of the proof 1 moving under the stylus 4 at the transmitting station A. Under these conditions a very sensitive mirror galvanometer such for instance as a bifilar one, or an oscillograph, is arranged at the receiver station B. Under the action of the variable line current the said mirror will thus turn about its point of suspension.

If a convergent fixed luminous bundle of rays emanating from a suitable source 11 be projected on the mirror 10, passing through a lens 12 arranged in such a way that the rays emanating from the source 11 are brought to a focus on the said mirror, this latter considered in its turn as a luminous source gives

rise to a reflected pencil which is displaced simultaneously with the mirror and in a plane at right angles thereto, these displacements always corresponding to the variations of the line current and consequently to the deflections of the galvanometer 9.

In the path of the reflected luminous pencil a converging lens 12¹ is mounted in such a way that the point of reflection of the mirror 10 always falls on its principal axis. If these conditions are exactly fulfilled, an image of the point *x* will be obtained at X, always at the same point of the principal axis whatever may be the angle of reflection. At this point or conjugate focus of the luminous pencil traversing the lens 12¹, the receiving sensitive surface 13 is placed (a photographic film for instance) wound on a cylinder 14 having a rotary motion and an identical translation movement, superior or inferior to, but always synchronous with, that communicated to the cylinder 2 carrying the proof 1 at the transmitting station A.

A scale 15 of colors strictly graded extending from black to white is arranged on the path of the luminous pencil reflected by the mirror 10, before or behind the lens 12¹, or even on this latter. By this arrangement the intensity of the luminous pencil emitted by the mirror 10 will vary like the different points of this scale according to the position which the line current traversing the galvanometer 9 will cause it to assume and consequently according to the variations of the relief which pass under the stylus 4 at the transmitting station A. Under these conditions it is evident that the luminous pencil reflected by the mirror 10 will make a more or less energetic impression on the sensitive surface 13, always proportionate to the reliefs of the original image 1.

By reversing the scale 15 of colors, that is to say, by causing it to turn through 180°, the image recorded will be changed; it will then be positive if the proof 1 at the transmitting station is negative and vice-versa, further by substituting for a normal scale of colors, scales of exaggerated or insufficient gradation, the prints recorded will be then strengthened or weakened.

The foregoing specification shows clearly how the various parts of the "telestereograph" are arranged and operate, and it is evident that the form and dimensions of the apparatus in practice may give rise to numerous modifications. This practical apparatus may also comprise parts for supporting the essential devices, which parts have nothing to do with the working of the apparatus. The receiving station is also completed by a dark room 16 inclosing the cylinder 14, this chamber having a single opening closed by a diaphragm 17.

It is hereinbefore stated that the cylinder

14 at the receiving station B may have a rotary movement and an identical synchronous translation motion, which movements are superior or inferior to the movements of the cylinder 2 of the transmitting station A. Evidently if these movements are identical the print at the receiving station will be of the same dimensions as the original. But in the other two cases either an enlarged print or a reduced print will be obtained. Of course in these two cases there must be correlation between the translating and the rotary movement so as to avoid any deformation of the picture and similarly the opening of the diaphragm 17 will be modified in a suitable manner in each case.

The original print 1 has hereinbefore been considered as a photograph taken on bichromated gelatin treated in a suitable manner, but it must be evident that this original print may consist of any drawing, writing or the like obtained in relief or in intaglio on any kind of foundation.

In order to obtain a scale 15 of normal tints I operate as follows:—A circular screen perforated with an aperture arranged on a radius and such that the different points of the plate receive quantities of light arranged according to the geometrical progression of ratio 2,—2, 4, 8, and the like is displaced in front of a bromid of silver photographic plate. Under these conditions the capacity of the photographic layer developed is proportionate to the logarithms of the quantities of light.

The strengthening and weakening scales are made in the same way but according to other ratios and they may thus be varied indefinitely. A series of these scales may be placed on the same disk so as to change them by a simple rotation of the latter. It will suffice in this case that the central region of the various scales has the same value.

I declare that what I claim is:—

1. Apparatus for transmitting to a distance by telegraphic or telephonic methods any graphic representation having a surface in relief to a slight extent, comprising means for translating the variations in the relief into variations in electric intensity, means for transmitting said electrical variations to a distance, means for translating said electrical variations into variations of light intensity, and means for recording the last mentioned variations.

2. Apparatus of the kind set forth comprising a stylus, means for bringing said stylus successively into contact with different parts of the representation to be transmitted, means for translating the movement of the stylus due to variations in the relief of the representation into variations of electrical intensity, means for transmitting said electrical variations, means for translating said

electrical variations into variations of light intensity and means for recording the last mentioned variations.

3. Apparatus of the kind set forth comprising a stylus, means for bringing said stylus successively into contact with different parts of the representation to be transmitted, an electric transmission circuit, means, controlled by the movement of the stylus due to variations in the relief of the representation, for varying the current intensity in said circuit, means for translating said current variations into variations of light intensity and means for recording the last mentioned variations.

4. Apparatus of the kind set forth, comprising a stylus, a cylindrical support for the representation to be transmitted, means for producing relative movement between said stylus and the said support so that the line of contact passes in a helical course along the cylinder, an electric transmission circuit, means, controlled by the movement of the stylus due to variations in the relief of the representation, for varying the current intensity in said circuit, means for translating said current variations into variations of light intensity, and means for recording the last mentioned variations.

5. Apparatus of the kind set forth, comprising a stylus, means for bringing said stylus successively into contact with different parts of the representation to be transmitted, an electric transmission circuit, means, controlled by the movement of the stylus due to variations in the relief of the representation, for varying the resistance of said circuit, means for translating the current variations thereby produced into variations of light intensity, and means for recording the last mentioned variations.

6. Apparatus of the kind set forth, comprising means for translating the variations in the relief of the representation to be transmitted into variations in electric intensity, means for transmitting said electrical variations to a distance, and means for translating said electrical variations into variations of light intensity, said last mentioned means comprising a mirror adapted to be angularly displaced by the said electrical variations, means for projecting a pencil of light on to said mirror, means for directing to a fixed point the pencil of light reflected from said mirror means for varying the intensity of said reflected light according to the angular position of the mirror, and means for recording the last mentioned variations.

7. Apparatus of the kind set forth, comprising means for translating the variations in the relief of the representation to be transmitted into variations in electric intensity, means for transmitting said electrical variations to a distance, and means for translating said electrical variations into variations

of light intensity, said last mentioned means comprising a mirror adapted to be angularly displaced by the said electrical variations, means for projecting a pencil of light on to said mirror, means for directing to a fixed point the pencil of light reflected from said mirror, a screen of graduated transparency inserted in the path of the reflected pencil and producing variations in the intensity of said pencil according to the angular position of the mirror, and means for recording the last-mentioned variations.

8. Apparatus of the kind set forth, comprising means for translating the variations in the relief of the representation to be transmitted into variations in electric intensity, means for transmitting said electrical variations, means for translating said electrical variations into variations of light intensity and means for recording the last mentioned variations, said last-mentioned means comprising a chamber, a support for a sensitive surface located in said chamber, and means for moving said support relative to an aperture in the wall of said chamber.

9. In apparatus of the kind set forth, the combination with a transmitting apparatus comprising a stylus, means for bringing said stylus successively into contact with different parts of the representation to be transmitted, and means controlled by the movement of the stylus due to variations in the relief of the representation, for varying the intensity of the electric transmission current; of a receiving apparatus comprising means for translating the variations in the transmission current into variations in the intensity of a pencil of light directed upon a fixed point, a support adapted to hold part of a sensitive surface at said point, and means for moving said support to bring different parts of the sensitive surface to the said point.

10. In apparatus of the kind set forth, a receiving apparatus comprising a mirror galvanometer connected with a transmission line, an optical system upon which the pencil of light reflected by the mirror is received and by which it is reflected to a fixed point, a screen interposed in the path of the pencil of light, said screen being of graduated transparency and serving to vary the intensity of the reflected pencil, a dark chamber in the wall of which there is an aperture located at the point to which the reflected pencil is directed, a support for a sensitive surface located behind said aperture, and means for moving said support so as to bring different parts of the sensitive surface in succession under the influence of the light passing through the aperture.

11. In apparatus of the kind set forth for use in transmitting representations devoid of half tones, means for translating the variations in the relief of the representation into

variations in the transmission current, said
variations being produced by the opening
and closing of an electrical circuit, means for
transmitting said variations, means for
5 translating said electrical variations into
variations of light intensity, and means for
recording the last-mentioned variations.

In witness whereof, I have hereunto signed
my name this 6th day of January 1908, in
the presence of two subscribing witnesses.

EDOUARD BELIN.

Witnesses:

ANTONIN MONTEILBET,
H. C. COXE.