N. S. AMSTUTZ.

ILLUSTRATIVE TELEGRAPHY.

APPLICATION FILED SEPT. 12, 1901.

1,019,404. Patented Mar. 5, 1912.

Fig. 1.

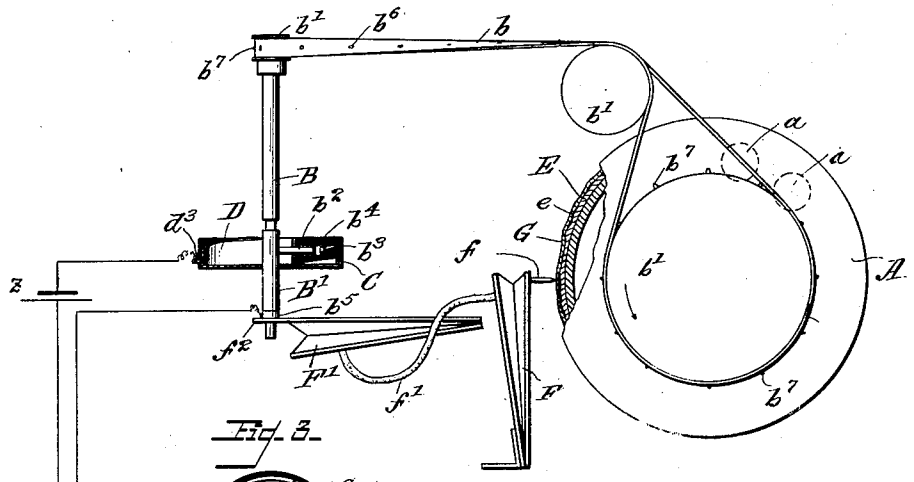


Fig. 3.

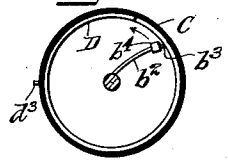
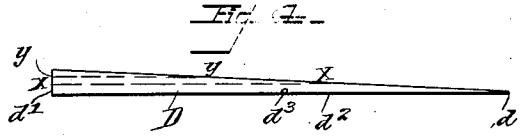


Fig. 7.



Z

Fig. 2.

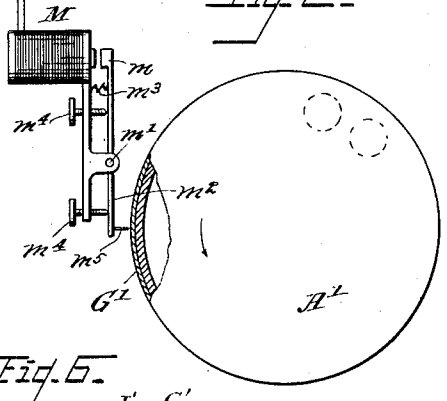


Fig. 5.

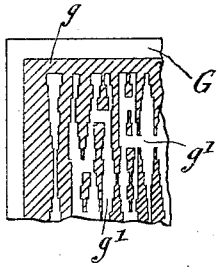
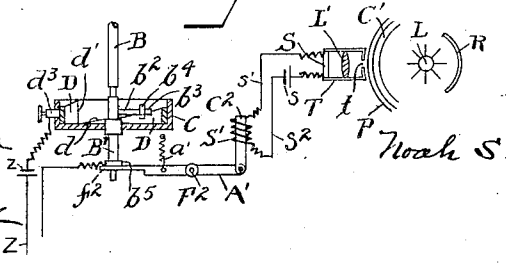


Fig. 6.



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ILLUSTRATIVE TELEGRAPHY.

1,019,404. Specification of Letters Patent. Patented Mar. 5, 1912.

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To all whom it may concern:

Be it known that I, NOAH S. AMSTUTZ, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Illustrative Telegraphy, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to the art of reproducing sketches, photographs, etc., either locally or at a distance and when my system is used in the latter connection it may be called illustrative telegraphy.

The object of the invention is to provide a simple method whereby an image may be rapidly transmitted and accurately received and reproduced.

In practicing this invention I may control by means of the subject, an electric current flowing in a circuit extraneous to the subject which is being transmitted; at the transmitting end of the circuit I perform certain operations which facilitate the transmission and at the receiving end my method makes it possible to reproduce the subject in such shape as to facilitate the subsequent reproduction thereof by printing etc.

The invention consists in certain operations whereby these results are accomplished, all of which will be more fully described hereinafter and more particularly set forth in the claims.

In the drawing I illustrate an adaptation of mechanism to the purposes of this invention.

Figure 1 is a diagrammatic representation of the transmitting device. Fig. 2 is a diagrammatic representation of the receiving or recording device. Fig. 3 is a plan of a detail of the transmitter. Fig. 4 is a developed view of a contact strip, also a detail of the transmitter. Fig. 5 is a developed view of a fragment of a received record. Fig. 6 is a diagrammatic view of a selenium form of transmitter.

Referring to the parts by letter and especially to Fig. 1, A, represents a transmitting drum which may be of common form and provided with clamping rolls a, a which are adapted to secure the ends of a sheet such as of paper which has been wrapped about the drum. A vertical spindle B is provided which may be driven at a high rate of speed from the drum A by means of the belt b and belt pulleys b'. If desired the number of rotations per minute of the spindle B may be an even multiple of the number of revolutions of the drum A and some means may be provided for maintaining exactly constant speed rates between the two. When a belt is used this may be done by providing the belt with perforations b^6 and forming small spurs b^7 on the driving and driven pulleys which engage them; slidably mounted on the spindle B but feathered thereto is a sleeve B′ which carries a radial contact arm b^2 which arm may carry a small weight b^4. This arm rotates within a short cylindrical box C of insulating material and the weight b^4 operates by centrifugal force to hold its tip b^3 in proximity to the cylindrical wall thereof. On the inner side of the cylindrical wall of the box C is held a contact strip D, it consists as shown developed in Fig. 4 of a triangular plate; and it is disposed around the inner wall of the box C as shown in Fig. 1, its length being such that when so placed its tip d is just in contact with its edge d', or if desired a space may be left between these ends; its lower edge d^2 may rest on the bottom of the box C. Evidently, now if the tip b^3 were rotated at a height corresponding to the position of the line X—X the tip would form contact with the contact strip D for a period proportional to the height of the line X—X, and if the tip were rotated in a higher plane the contact would be made for even a shorter period as indicated by the line y—y; further, if the arm b^2 were depressed to its lowest possible plane, contact between the tip b^3 and the contact strip D might be maintained throughout an entire revolution of the spindle B. A binding post d^3 on the strip D affords means for attaching one terminal of an electric circuit Z, which circuit may include a battery z, and a collar b^5 on which the sleeve B′ rests; now so long as the tip b^3 is in contact with the strip D this circuit will be closed, and when not in contact the circuit will be open. Hence the rotation of the arm b^3 operates to produce an intermittent or impulsive current in the circuit and evidently the duration of the impulses will vary with the height of the rotating arm b^3. This arm is caused to change its plane of rotation according to the variations in light and shade of the subject, as will appear later.

Upon the drum A is secured, face outwardly, a relief representation E of the subject such as a common "carbon print", and

the variations in the character of the profile thereof which are incident to variations in light and shade, I have indicated by the wavy line *e*. Outside of this print may be wrapped a protective sheet G of yielding material such as celluloid, gelatin, etc.; a stylus *f* which may be mounted upon a sensitive bellows F presses against the surface of this protective sheet and as it passes over it, presses the sheet into conformity with the surface of the relief-print. This bellows F communicates with a similar one F′ through the air-hose *f′* and the bellows F′ may be provided with an extension f^2 fixed to its freely moving side, upon which extension rests the collar b^5 already referred to. The drum A being rotated while the stylus is "fed" longitudinally of the same in the well known manner, the stylus will pass successively above all parts of the surface of the print E, and the movement of the stylus incidental to the undulations thereof, operating through rarefactions and condensations within the bellows, will raise or lower the extension f^2; in this manner the height of the plane of rotation of the arm will be automatically affected, producing variations in the duration of the impulses in the circuit Z in the manner already described.

The protective sheet G, I consider desirable to preserve the relief surface intact; by guarding it against being scratched by the tracing point.

It is obvious that a positive photo with a given arrangement of the triangular strip would record a negative and a negative photo, a positive, a relay inserted in circuit would enable the operator to receive either a positive or negative result from a positive photo or vice versa.

My invention is also applicable where the transmitting agent is not a relief-representation of the subject but a "transparency" of the same; in this case a selenium cell is used in connection with a suitable magnet which directly affects the height of the plane of the rotating arm in a similar manner to that described above. The principles of this alternative feature are illustrated in diagrammatic form in Fig. 6. They comprise a transparent cylinder, C′, inclosing a source of illumination, L, and reflector, R. A selenium cell S supported in a tube, T, which has a lens, L′, and a diaphragm, *t*, is progressively moved lengthwise of the cylinder, C′, which carries the photographic film, P. The selenium cell, S, is connected with the solenoid, S′, by wires, *s′*, s^2 and batter, *s*, and on account of the variable current produced in the circuit through the variation in lights and shades of the photograph, B, projected onto the cell from the lamp, L, through aperture, *t*, and lens, L′, the solenoid, S′, attracts the core, C^2, more or less in opposition to a spring, *a′*, which is secured to the arm, A′, pivoted at F^2, and connected to the core, C^2, at one end and through an extension f^2, to a sleeve, b^5, on the spindle, B′. This spindle carries the contacting brush, b^2, shown in Fig. 1, which engages the triangular strip, D, for variable portions of succeeding revolutions according to the position of B′, on the driving shaft, B, determined by the solenoid S′.

At the receiving end of the line or circuit Z, I may provide a receiving drum A′ which is substantially similar to the transmitting drum A. On the face of the drum a receiving or recording sheet G′ which may be of transparent material such as cellulcid, gelatin, etc., is secured, the outer side of this sheet being covered with a light easily removable coating *g* (Fig. 5) of an opaque substance such as deposited carbon. This may be effected by "smoking" near a protected flame. Near this drum A′ the electric circuit Z includes an electro-magnet M, the armature *m* of which is pivoted at *m′* and carries an extension arm or lever m^2 whose movement is controlled by stop screws m^4. One extremity of the lever m^2 is provided with a recording point m^5, and by means of the screws m^4 it may be accurately adjusted with respect to the recording surface or sheet G′, so that it may contact with the same when the armature *m* is attracted by the electro-magnet. A light spring m^3 normally holds the armature so that the recording point m^5 is out of contact with the receiving sheet G′ as will be readily understood.

Now by any of the well known means the drums A, and A′, are rotated synchronously, so that the stylus *f* and the recorder m^5 pass successively over their entire areas, respectively; as this takes place the duration of the impulses in the circuit Z will be shortened or lengthened, by the stylus *b* as it alternately passes an elevation, or a depression in the relief-representation G, and successively affecting the circuit in this manner, will energize the electro-magnet M and actuate its connected parts, so that the point m^5 will be first held in contact with the sheet G′ and then withdrawn from it. The point m^5 is in this way caused to delicately remove the deposited carbon selectively in amounts depending upon the arrangement and configuration of the undulations, or lights and shades of the subject transmitted and the sheet G^1 after the operation is completed will be a fac-simile or record of the print G, the light and shades being represented, however, by variable sized portions or spots *g′* of the plate G^1 exposed by removal of the carbon coat *g*. What remains of the carbon coating of this plate G^1 is now permanently fixed to it by any means such as dipping it in varnish, shellac or any other similar sub-

stance and when the plate is of transparent substance such as that mentioned above, I can make an engraved image directly from it, by exposing it to the light while held before a copper plate in a photo-printing frame, the copper plate being first properly sensitized with a coating such as fish-glue and bichromate of ammonia. The light will affect the coating on the metal plate only at points where it can pass through the plate G^1, where the carbon has been removed and the metal plate is then washed in water to remove the unaffected glue and, after the remaining glue is fixed by heat it can then be immediately placed in an acid bath where it will be etched; and this etched plate will evidently then constitute an engraving from which likenesses of the subject may be reproduced as desired, upon ordinary printing presses.

I arrange the feed, or lateral movement of the recorder so that in one revolution it is substantially equal to the width of the recording point; hence the spaces cleared of carbon in adjacent paths of travel, will unite and the coating after the operation is complete will present an appearance somewhat as illustrated on a large scale in Fig. 5, where the hatched portion represents the remaining opaque coating *g*. This figure also serves to illustrate the outline of the surface of the resulting engraved plate.

If the record be made with ink upon a plate such as aluminum I may print directly therefrom as from the stone used in lithographic processes.

Heretofore it has been found difficult to record rapidly enough with the present class of receiving machines, on account of the mechanical work necessary to do the recording; with my present system, I avoid all the usual mechanical effort as my recording surface is so easily scraped off, that no appreciable effort is necessary. Another advantage of my system is found in the quick production of a printing plate from my received record without the intervention of cumbrous, and time consuming photographic methods such as camera, negative, etc., and separate printings, if the received record is made on an opaque surface. With my received record, I can at once proceed to photographic printing without any delay whatever.

What I claim is:—

1. The method of reproducing sketches, photographs, or representations thereof, which consists in causing the propagation of electrical impulses independently of a subject, and causing the subject to control the duration of said impulses without varying their periodicity, and suitably recording the same.

2. The method of reproducing sketches, photographs, or representations thereof, which consists in subjecting a device to the characteristics of a subject, causing a displacement between the device and the subject, independently propagating electric impulses at a uniform rate, causing the characteristics of a subject to vary the duration of said impulses, and suitably recording the same.

3. The method of reproducing sketches, photographs, or representations thereof, which consists in causing a movable member to pass at a pre-determined distance from the face of a relief subject while under the control of said subject, in controlling an electric circuit by means of said member, whereby a suitable record of the subject is produced.

4. The method of reproducing sketches, photographs, or representations thereof, which consists in causing a subject to automatically vary the duration of impulses in an electrical circuit by changing the relation between axial and rotary movements of translating members, and suitably recording the same.

5. The method of reproducing sketches, photographs, or representations thereof, which consists in causing continuous unidirectional movement in a primary translating member, and a variable reversible movement of a second coöperative translative member, in causing a pictorial subject to control the variable reversible movement to confirm to the characteristics of said subject, in transmitting the same electrically, and in suitably recording the same.

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

NOAH S. AMSTUTZ.

Witnesses:
F. D. AMMEN,
E. L. PARDEE.