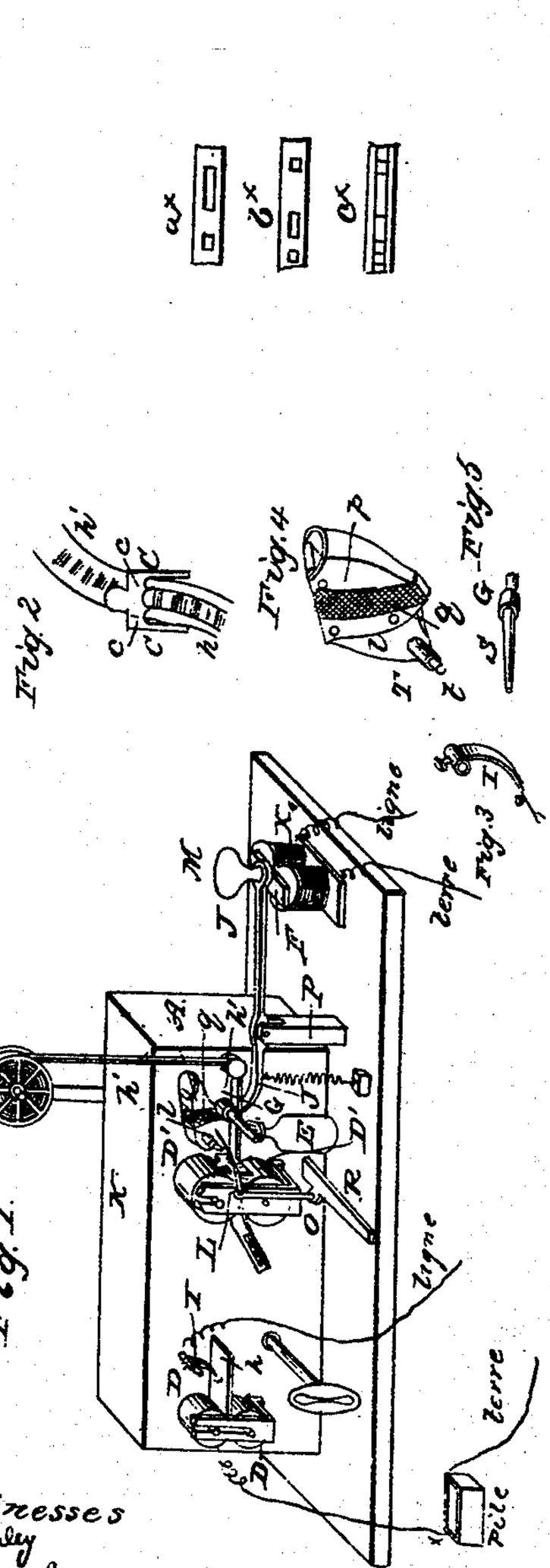
CHAUVASSAIGNES & LAMBRIGHT.

Automatic Telegraph.

No. 80,452. Patented July 28, 1868.



UNITED STATES PATENT OFFICE.

PAUL ANTOINE MARIE CHAUVASSAIGNES AND JACQUES PAUL LAMBRIGOT,
OF PARIS, FRANCE.

IMPROVEMENT IN TELEGRAPH-INSTRUMENTS.

Specification forming part of Letters Patent No. **80,152,** dated July 28, 1868.

To all whom it may concern:

Be it known that we, PAUL ANTOINE MARIE CHAUVASSAIGNES and JACQUES PAUL LAMBRIGOT, of Paris, in the Empire of France, have invented certain new and useful Improvements in Working Electric Telegraphs, and in the construction of the instruments and composition of the material employed; and we hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings.

Our system of automatic and electro-chemical telegraphing comprises, first, an instrument for the preliminary notation or inscribing of the telegrams by means of certain signals or characters traced on a band of tinned paper, and for the reproduction of these traced bands; second, a second instrument for the automatic transmission of the characters traced on the band and the automatic and electro-chemical reception of the signals transmitted; third, bands of tinned paper made in a peculiar manner for this system of telegraphing; fourth, the operation of the electric current in the two instruments above named.

The mechanical and chemical combinations which we have devised, in order to realize the four preceding features, will be readily understood by reference to the accompanying drawings.

The composing instrument or apparatus, Figure 1, consists of the following elements: First, the clock-work K, which actuates two sets of rollers, D D′, placed at a suitable distance from each other; second, an ink cup or receptacle, A; third, a platina point or trident, I; fourth, a lever or manipulator, with an armature, F, for the impression by hand of signals on the tinned paper band *h*, or for the formation of such signals or characters by means of an electro-magnetic current; fifth, a gas or spirit burner for liquefying the ink contained in the ink-cup.

The clock-work imparts a uniform motion to the two sets of rollers, D and D′. The former rollers are intended for transmitting the signals formed upon the band or ribbon *h*. By means of the latter rolls the necessary marks or characters are either formed by hand upon the metallic band *h′*, or obtained through the medium of the electro-magnet X placed under the armature F.

In order to impress the marks by hand, the end of a roll of tinned paper is inserted between the drawing-rollers D′. The tin is upon the upper surface of the band, and presents a flat horizontal surface to the rollers, being held in proper position by suitable guides, which assume its uniformity while passing between the rollers. Midway between the edges of the band, and in advance of the point where it passes to the rollers, is a narrow roller, G, the horizontal axis of which is attached to the clock-work in such manner as to be revolved in a direction opposite to the movement of the band, which takes place from right to left. Under this metallic band is the curved extremity of a lever, J, which is pivoted to a standard, P. Upon the other end of the lever is a knob or handle, M, and an armature, F. By pressing upon the knob, the opposite end of the lever will be raised, so as to lift the band and bring it in contact with the roller G. When pressure is removed, the spring under the shorter arm of the lever will draw it down, and thus allow the paper to drop from contact with the roller.

The electro-magnet underneath the armature F is intended receive to the electric current transmitted over the wire from a distant point, which current, by exciting the magnet, will cause the latter to attract the armature, and thus act upon the lever in the same manner as would be done by hand.

The roller G, which is about half as wide as the metallic band, is placed in such manner as to be midway between the sides of the band. If the roller be kept constantly covered with black coloring matter, there will be produced on the band, by reason of the rotation of the printing-roller and the lifting of the band, a black line, which will be continuous or broken, according to the action of the lever J. During this operation, which is that required for the composition or notation of a dispatch, a drawing-pen, C, Fig. 2, can be used for the purpose of framing or inclosing on each side the characters produced by the action of the printing or marking roller upon the band, for it may be desired to indicate the signals or

characters either by the marks made by the coloring matter or by the spaces between the marks. For instance, in order to obtain in white the signals indicated in black in diagram $a^{\times}$, it will, of course, be necessary to operate in an inverse manner the lever J, so as to produce the figures indicated in diagram $b^{\times}$; but as the white characters in this form would be difficult to distinguish, it is much preferable to frame them, as shown in diagram $c^{\times}$, by means of the forked drawing-pen C, which straddles the band in the manner indicated in Figs. 1 and 2.

The teeth of the pen, which are at distance from each other proportionate to the width of the marks, will take up a part of the ink and draw a line on each side of the characters, as indicated in Fig. 2.

The band is, of course, not covered with ink throughout its whole breadth, in order that the metallic border on each side of the marks may afford the necessary contact for the passage of the electricity at the time of the passage of the band between the metal drawing-cylinders.

The first set of drawing-cylinders D is intended to effect the automatic transmission of the characters or signals produced by the instrument D′. To this end a platina or iron point, I, falling obliquely on the tablet placed in front of the rollers, presses on the middle part of the metal band, which is drawn between the rollers from right to left. The electric current in communication with the rollers and the conductor terminating in the metal point I, will produce electric emissions each time the point meets that portion of the surface of the band which is not covered by the insulating-ink. The point I, Fig. 3, which is thus employed to effect the emission and cessation of the current, is composed of three branches, *i i i*, so as to better assure the required contact.

By means of this instrument and the rollers D we are enabled to transmit the characters produced by the rollers D′, in conjunction with the lever J and electro-magnet X.

In order to cover the printing-roller with insulating-ink we employ an ink cup or receptacle, A, Fig. 4, composed of the following elements:

First, the part *l*, in which the pin is inserted which holds and maintains the cup in position. This part is made of wood or ivory, in order to prevent the heat from spreading.

Second, a copper case or reservoir, *p*, provided with openings in its top and bottom, the one for the introduction of the fusible coloring matter, the other for the escape of the same.

Third, a diaphragm, *q*, of a material commonly known as silk ribbon, which passes around the cup and is stretched over the lower opening in the copper case.

Fourth, a sleeve, T, which traverses the wooden part *l*, and fits with a slight fr ction, so as to constitute a hinge-joint on a horizontal pin, *t*, which extends out from the clock-work frame K.

The copper roller G carries at its outer end a long pin, S, which is heated by means of a gas or spirit jet or lamp, E. The roller is thus heated, and, in order to spread the ink on its surface, the ink-receptacle is placed as indicated in the drawings, so that by its own weight its lower end, which is covered by the diaphragm *q*, will press upon the heated roller. The resinous matter contained within the cup will thus become heated, and, passing through the ribbon *q*, will be deposited upon the surface of the roller, which, as above explained, has a rotary movement imparted to it by the clock-work.

The coloring matter in the ink-receptacle is composed of the following ingredients: Yellow wax, one hundred grams; rosin, two hundred grams; bitumen of Judea, one hundred grams; tallow or suet, ten grams. These substances are melted together, and the mass, when cold, is reduced to a powder.

By raising, as above explained, the band of paper under the roller the required signals or characters will be produced.

When the apparatus is not being used it becomes necessary, for obvious reasons, to remove the ink-cup from contact with the roller. In order to accomplish this without the direct intervention of the operator we employ a pedal or brake, R, which is capable of being vibrated horizontally, so as to check or arrest the clock-work movement. To this brake is attached a hook or shoulder, O, which, when the brake is moved to arrest the clock-mechanism, strikes against the lower arm of an angle-lever, L, whose upper end, placed beneath the ink-cup, will, in such case, lift the cup away from the printing-roller. When, on the contrary, the brake is moved so as to set free the clock-work, the hook O will move back from the lever and the cup will again drop into position upon the roller.

In Fig. 6 is represented an instrument for effecting the rapid transmission and automatic reception, by electro-chemical means, of characters or signals formed on metallic bands. This instrument is composed of the following parts:

First, the clock-work K.

Second, two sets of rollers mounted on the same axes. The first set, D′, serves to receive dispatches transmitted from a distance; the second, D, to transmit messages marked on the metallic bands.

Third, a basin containing the moistening-roller and the chemical bath for the production of the signals.

The first set of rollers, D′, draw between them from right to left, a band of unsized white paper. This band, before passing to the rollers, rubs over the surface of a roll, V, which turns freely in bearings formed in the sides of the basin U, filled with a liquid capable of being decomposed by the passage through it of a

positive current of a pile. In rubbing upon the roll, which is thus caused to turn freely and to take up the required quantity of liquid, the band is moistened in its center, the roll being much narrower than the band, and there is, consequently, a moist line formed on the paper which passes between the rolls. This moist line which traverses the paper and renders it transparent, is capable of being decomposed and turned black by an electric current produced by the contact of an iron point, B, Fig. 7, in which terminates the positive pole of a voltaic pile. The paper band passes over a metal tablet. The iron point B falls of its own weight, so as to rest constantly on the moist part of the paper, and, as the latter is in contact with the tablet which communicates with the negative pole of the same pile, an alternate emission and cessation of the electric current will cause the band to be marked with the required characters. The iron point B, through which the electric current passes, is held tightly between two rollers coated with silver, which are hung in an arm provided with a sleeve which fits on a horizontal rod projecting over the tablet.

By turning the rollers in the required direction the metal point can be projected or retracted so as to adjust it to properly perform its work.

The liquid contained by the basin U is composed of the following ingredients: Azotate of ammonia, one hundred grams; distilled water, one hundred grams; gallic acid, five grams; white sugar, five grams.

The second set of rollers, D, is intended for the rapid transmission of messages marked on the metallic bands. The lower cylinder is much larger than the corresponding cylinder of the set D′, which is mounted on the same axis. This difference in size, which produces the more rapid movement of the bands, is adopted for this apparatus in order to impart greater rapidity to the transmitting than to the receiving instrument. At the point where the metallic band enters between the rollers is a horizontal tablet similar to that employed in connection with the rollers D′. A trident, I, is arranged in the same manner to produce the same results, as already described in the case of the composing instrument hereinbefore mentioned.

The only difference between the two transmitting-instruments is the difference in the size of the rollers in the one represented in Fig. 6. The emissions of the electric current will be reproduced upon an electro-chemical band instead of a metallic band by means of the roller G and lever J, oscillated by means of its armature and the electro-magnet X.

The apparatus represented in Fig. 6 is intended to do a greater amount of work than can be obtained from the apparatus in Fig. 1, and can be employed on lines of great length, while that represented in Fig. 1 may be employed either for the notation of dispatches by hand, or for the reception of dispatches transmitted from a distance, or for any other suitable purpose.

As the peculiar kind of metallic paper required under this system of telegraphing is not an article of commerce, the following description is given of the manner in which it may be made:

Two sheets of tin-foil, such as is known as "chocolate-paper," are taken with ordinary roll-paper of the same width as the foil. A coat of paste is spread over the paper, on which the sheets of tin-foil are placed, care being taken that their contiguous ends overlap so as to preserve a continuous metallic surface. The foil should be carefully spread without a wrinkle, and the metallic surface is then sponged. The paper, in proportion as it is prepared, is rolled upon a spool and exposed to a heat sufficient to dry it. It is then subjected to pressure between cylinders such as are employed to press photographic proofs, in order to obtain the requisite smoothness and uniformity of surface. The band, after this operation, is rolled anew upon a spool, and is tightly pressed until sufficient paper has been received to give the desired length to the band and thickness to the roll. The roll is then taken to a lathe, and is cut into strips of the required width.

The action of the electric current is substantially as follows: When messages are received from a distance on a metallic band, in the apparatus shown in Fig. 1, the electric current which passes over the wire will traverse the electro-magnets in order to reach the earth, the armature of the lever J will be attracted, the metal band will be brought into contact with the marking-roller, which will deposit on the band the coat of insulating-ink. The emissions of the current will be effected by means of a manipulator such as employed in the Morse apparatus. When, on the other hand, it is desired to produce characters or signals for transmission, the lever J is actuated directly by the hand, and the effect of thus raising and lowering the paper will be identical with that produced by the electric current.

When dispatches are to be transmitted through the instrument D, Fig. 1, the electric current from the pile will communicate with the rollers D, and metallic band which is in contact with them will, through the medium of the trident I, transmit the current over the wire. The current will, of course, be interrupted when the trident is in contact with that part of the metal band covered with the insulating-ink.

The operation of the instruments represented in Fig. 6 is essentially the same as that already described.

The electric current arrives over the wire through the metal point B traverses the moist part of the paper, and passes off from the tablet into the ground. It will thus, as the band moves along, decompose the moist portion of

the same, so as to form marks more or less long, according to the length of the signals at the other end of the line.

In transmitting messages by the apparatus shown in this figure the electric current from the pile passes to the rollers D, which are insulated from the rollers D′. It thence passes to the metal band, which is in contact with the trident I, and the latter is in communication with the main line or wire. Consequently, when the trident touches the metal surface of the band the electric current will be transmitted through the wire, and, on the other hand, the current will be interrupted whenever the trident is brought into contact with the insulating-ink.

In the two apparatus shown in Fig. 6 the rollers and points or tridents should, of course, be insulated from each other.

Having now described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination of the devices herein described for effecting the notation and automatic transmission of telegraphic messages, the same being constructed and arranged to operate in the manner and for the purposes set forth.

2. An insulating-ink composed of the ingredients herein named, taken in the proportions substantially as specified.

3. A decomposable liquid made of the ingredients herein named, taken in the proportions substantially as specified.

In testimony whereof we have signed our names to this specification before two subscribing witnesses.

P. CHAUVASSAIGNES.
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Witnesses:
J. ARMENGAUD,
CL. LAFOND.