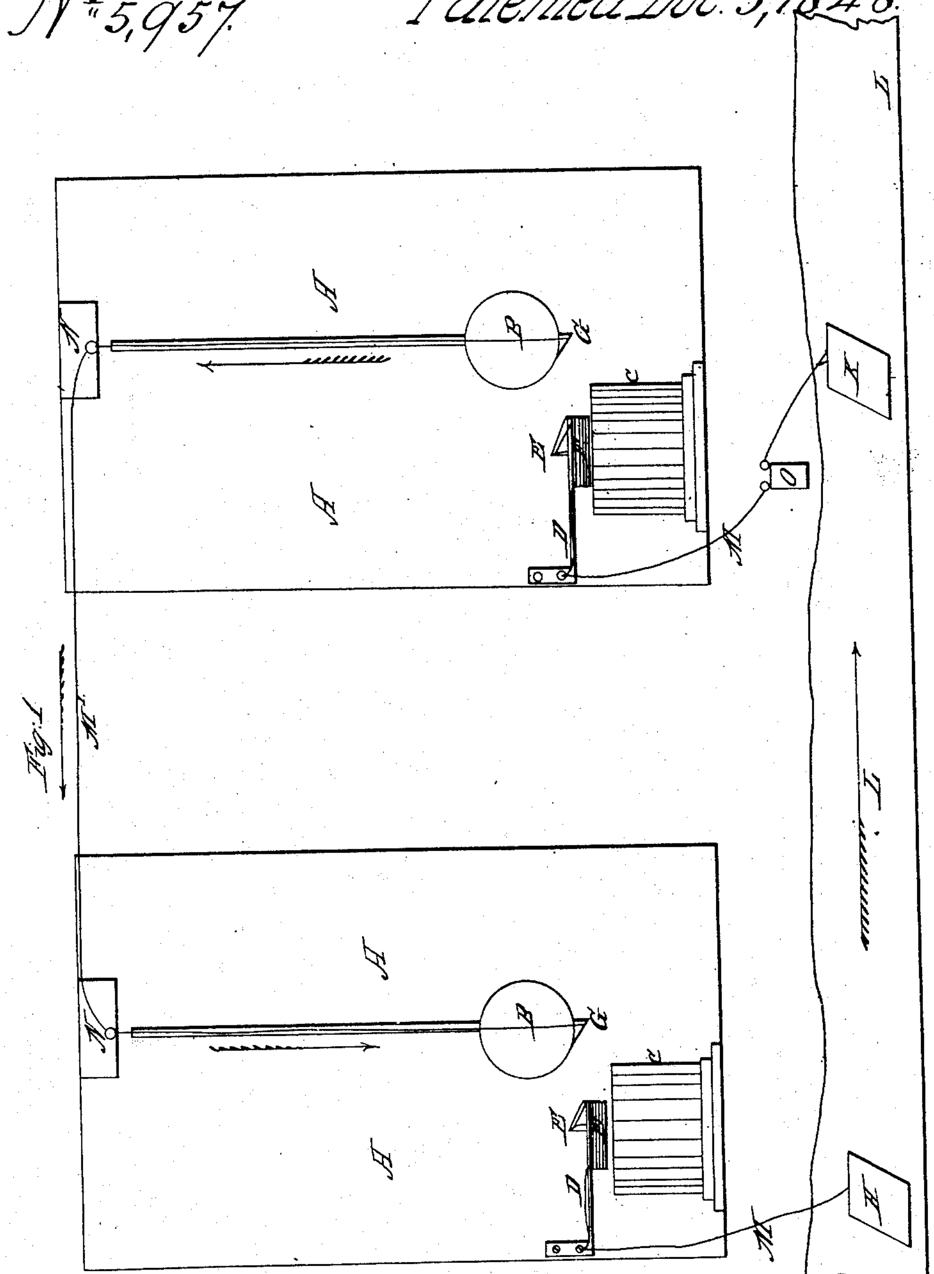
A. Bain.

Sheet 1
2 Sheets.

Automatic Telegraph.

No. 5,957. Patented Dec. 5, 1848.



Witnesses:

P. H. Howell

W. Sewell

Inventor:

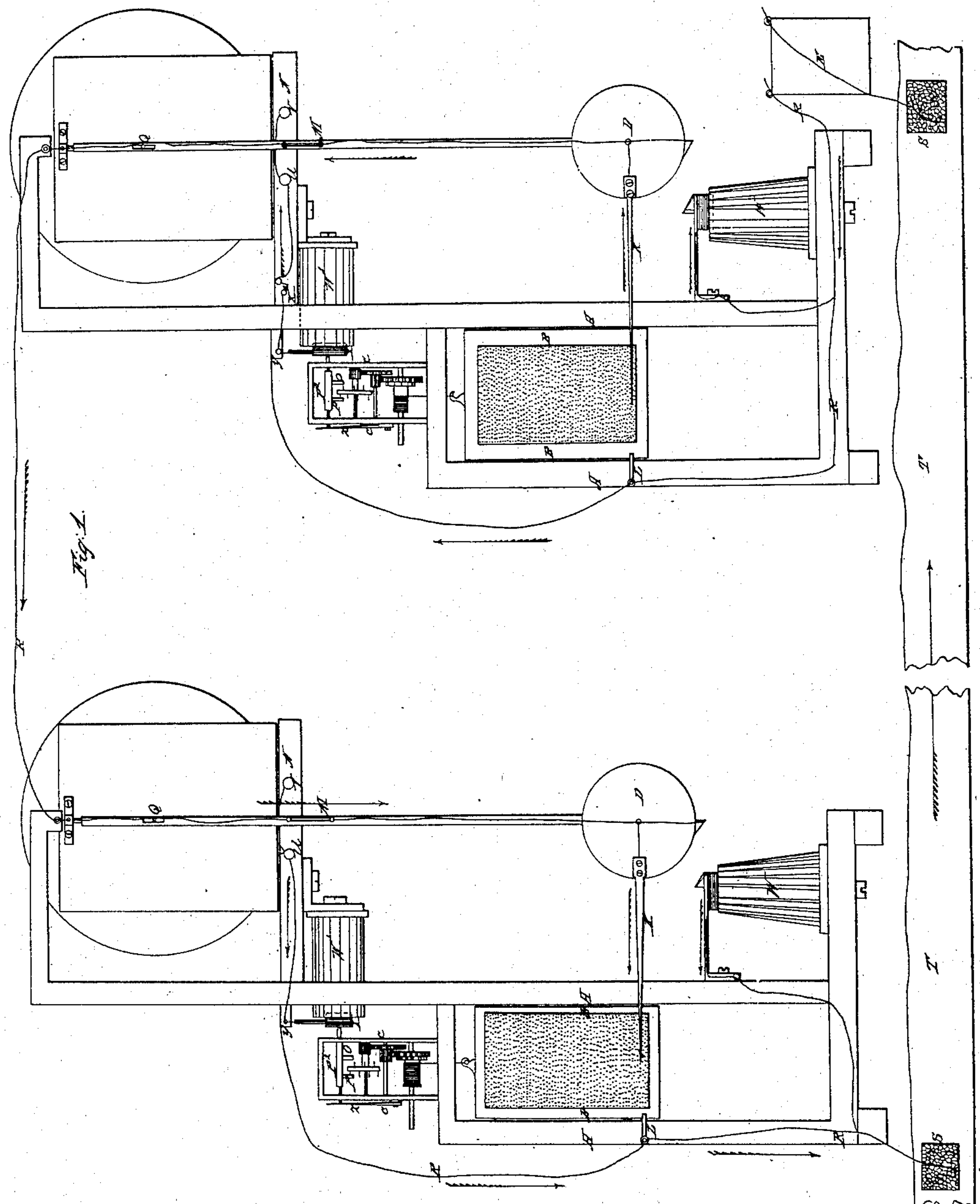
Alexander Bain

A. Bain

Sheet 2
2 Sheets

Automatic Telegraph

No. 5,957. Patented Dec. 5, 1848.



Witnesses:

Inventor:

Alexander Bain

UNITED STATES PATENT OFFICE.

ALEXANDER BAIN, OF LONDON, ENGLAND.

IMPROVEMENT IN COPYING SURFACES BY ELECTRICITY.

Specification forming part of Letters Patent No. 5,957, dated December 5, 1848.

To all whom it may concern:

Be it known that I, ALEXANDER BAIN, formerly of the city of Edinburgh, now of the city of London, and Kingdom of England, electrical engineer, at present in the city of Washington, and a subject of the Queen of Great Britain and Ireland, have invented and made and applied to use certain new and useful improvements in the means for taking copies of surfaces by electricity, by which improvements messages may be sent from one place to another at a distance, and for which said improvements I seek Letters Patent of the United States, as the same are shown in the specification of a patent issued to me under the Great Seal of the United Kingdom of Great Britain and Ireland on the 27th day of May, 1843, and which specification was duly enrolled the 27th day of November, in the same year, wherein the said invention and improvements were fully and substantially set forth, as hereinafter described and shown, reference being had to the drawings annexed, which show my improvements for taking copies of surfaces—for instance, the surface of printers' types—at distant places.

In these drawings the conjoined figure in Sheet 1 represents certain improvements in electric time-pieces, as the same are employed by me for the purpose of giving isochronous movements to the transmitting and copying portions of the machinery, and shows a method of making two pendulums at a distance regulate each other so as to keep the same time. The like marks of reference apply to the same parts in both portions of this figure. In these A A are the backs of the inclosing-cases. B B are two pendulums, of the same length, suspended at N N. C C are two permanent magnets. F F are two multiplied coils of wire attached to the springs D D. G G are two similar catches, one attached to each of the pendulum-bobs. L L is a section of the earth. H K are plates of metal. O is a galvanic battery with one pole connected with the plate K. To the other pole is connected or attached the wire M, which leads up to the spring D. This is in connection with one end of the coil F, the other end being connected with the metallic catch E. The end of a similar wire is connected with the catch G of the pendulum and led up the rod into connection with the lower end of the pendulum-spring, the springs of the two pendulums being connected by the top wire, M'. The connections are similar at the other pendulum, and the current returned by the earth, as shown by the arrows at L. The pendulums will be kept in motion by clocks in the ordinary manner, and made to move in the same direction and at the same time. When the two pendulums are near the extremity of their vibrations to the left and the catches on the bobs are in contact with the catches beneath the electric circuit is completed, and the current will pass through the pendulums and wires, at the same causing the coils F F to be attracted by the magnets, and thus depressing the catches E E, and by these means allowing the catches G to pass over them, and when the pendulums have passed over the catch E the current is broken until upon their return vibration the faces of the catches G come into contact with the faces of the catches E; and should one pendulum arrive at this point first it must remain until the other comes up to the like point at the other station to complete the electic circuit, when the catches E will be again depressed by the attraction of the magnets and both pendulums be released simultaneously.

Figures 1 and 2, Sheet 2, represent two machines for transmitting and receiving copies of surfaces, one of which machines may be considered as at Boston and the other at New York. These two instruments are in every respect the counterparts of each other except X^2, Fig. 2, from which the message is sent. A A is a strong wood frame; B B, a metal frame filled with short insulated wires parallel to each other, and at right angles to the plane of the frame. These may be put in as follows: The small wires are previously insulated by thread in the usual manner, then cut into lengths of about an inch, and as many put into the frame as that will receive. Then pour a quantity of liquid sealing-wax on and to fill between them. When cold, grind and polish to a plane and smooth surface on both sides flush with the frame, as represented by the numerous dots. D D are pendulums, which are kept in constant motion by powerful clocks Q Q. The motions of these pendulums are kept isochronous by electric coils and permanent magnets, as shown in Sheet 1. These coils and magnets serve no other purpose and do not act in or form any part of the long telegraphic circuit in which the electric current travels when the marks are making by the current. K is a steel-spring carried by the pendulum, the extreme end rubbing gently upon the surface formed by the insulated wires in the frame B B. L is a spring fixed to the wood frame. The free end of this spring presses upon the metal frame B B. M is a slight spring carried by the pendulum, having a pin projecting through the pendulum that presses gently upon the wood frame N. U and V are two metal studs flush with the frame N. W is a permanent magnet. E is a voltaic battery. T T are sections of the earth. S S is carbon. R R R are conducting-wires. C C is a piece of clock mechanism, to which the metal frames B B act as weights. O P are two pins in the slide-spindle P^2. X is a coil of insulated wire suspended by two insulated springs at Y, to which are attached conducting-wires. W′ is a second permanent magnet. Z is a spring.

When a communication is to be made I proceed in the following manner: I first set up the types composing the communication in the usual manner in a metal frame, which fits into metallic contact with the back of the frame B B, Fig. 2, Sheet 2, with the printing-surface in contact with the back ends of the small parallel wires. In the distant frame B B, Fig. 1, Sheet 2, will be kept placed two thicknesses of damp paper previously saturated with a solution composed of equal parts of prussiate of potassa and nitrate of soda, and at the back of the paper a smooth metal plate, pressing the paper into contact with the ends of the parallel wires and exactly fitting the frame B B. The operator, having set up his types and placed them in the frame B B, Fig. 2, Sheet 2, then joins the connecting-wire at X^2, and when the pendulums are at the extreme ends of their vibrations—that is, when the pins in the springs M M come upon the studs U U or V V—a current is sent through the coils X, which are then repelled by the permanent magnets W′, and, pressing upon the slide-spindles, releases one pin of the top wheel, which allows the wheels to make one-eighth of a revolution. When the pins carried by the springs M M are off the studs U U or V V the current is broken, and the coils being no longer repelled by the magnets, the springs Z Z force the spindles toward the permanent magnets, which releases another pin of the wheels, and by these repeated actions the frames B B continue falling until they reach the bottom of the frames A A.

It will be observed that the electric current constantly passes through the portion of the small insulated wires contained in the frames B B that may be in contact with the springs K K, except when the pendulums are at the extreme ends of their vibrations, and the springs K in contact with the frames B B, and as the spring K in Sheet 2, Fig. 2, will only take the current from the short wires whose inner points are in contact with some portion of the type, the current will pass at that point and no other, and consequently the current will be delivered at a corresponding point through the paper in the frame B B of Fig. 1, Sheet 2, and this operation will produce a copy of the printing-surfaces of the type in a series of small dots in the paper by the electric current decomposing the substance and changing the color of the moist chemical compound in the paper.

For simplicity in the representation and references, only one conducting-wire and one spring K are shown in the drawings, Sheet 2, as used with each instrument; but in practice these may be varied and used so as to copy an entire line of types at each vibration of the pendulums.

It is also evident that a copy of any other surface composed of conducting and non-conducting materials can be transmitted and taken by these means.

What I claim, and desire to secure by Letters Patent, is—

1. The copying of surfaces by the electric current through a single circuit of conductors by means substantially the same as herein set forth.

2. The exclusive right to the use of prussiate of potassa as the most useful ingredient in solutions of chemical compounds for preparing paper to receive marks formed by the action of electric currents thereon for telegraphic purposes.

In witness whereof I have hereunto signed my name, in the city of Washington, this 18th day of November, in the year one thousand eight hundred and forty-eight.

ALEXANDER BAIN.

Witnesses:

B. K. MORSELL,

W. SERRELL.