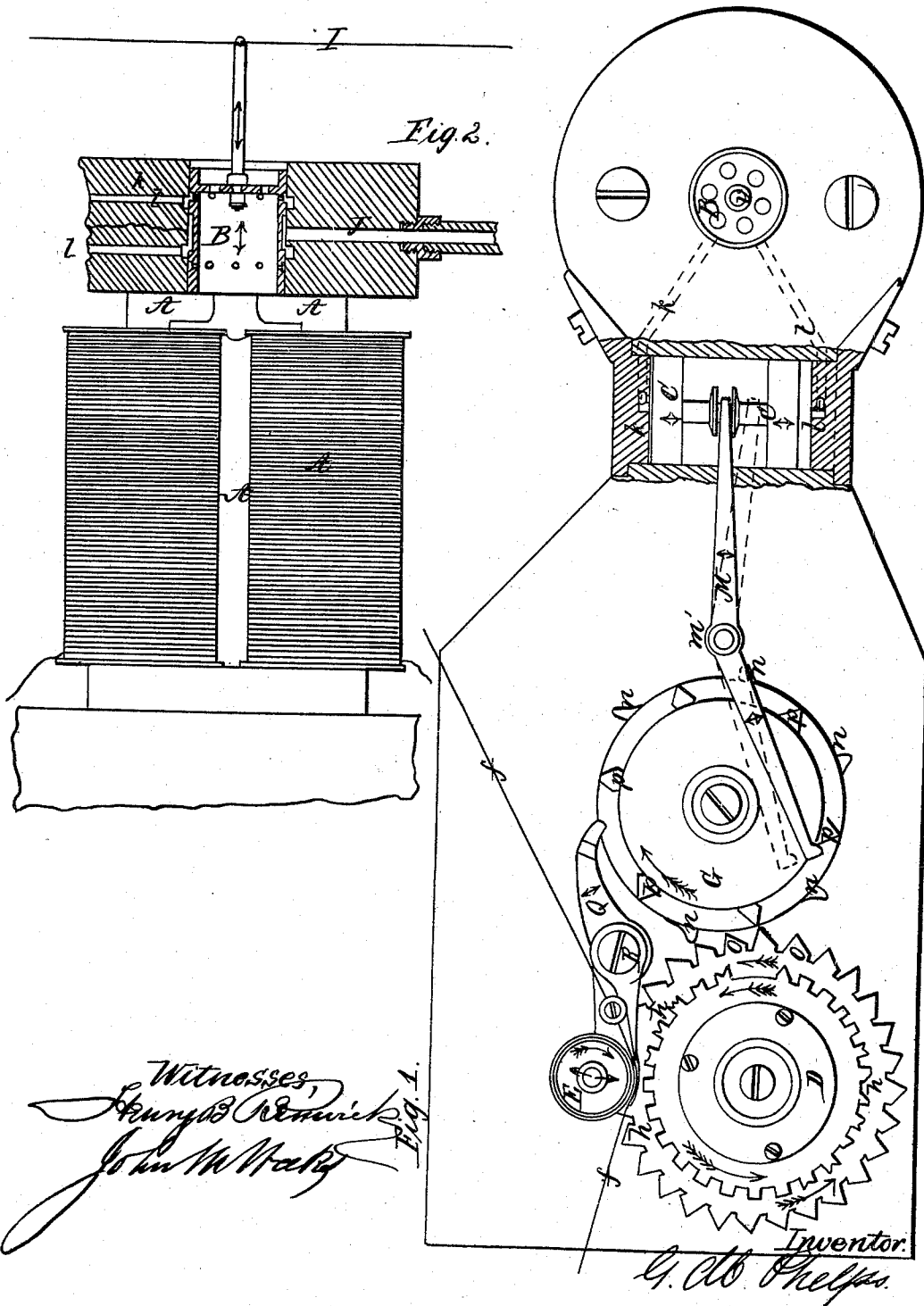


G. M. PHELPS.
TELEGRAPHIC APPARATUS.

No. 32,452.

Patented May 28, 1861.



UNITED STATES PATENT OFFICE.

GEORGE M. PHELPS, OF WILLIAMSBURG, BROOKLYN, NEW YORK, ASSIGNOR
TO AMERICAN TELEGRAPH COMPANY.

IMPROVEMENT IN TELEGRAPHIC APPARATUS.

Specification forming part of Letters Patent No. **32,452**, dated May 28, 1861.

To all whom it may concern:

Be it known that I, GEORGE M. PHELPS, residing at Williamsburg, in the city of Brooklyn, Kings county, and State of New York, have invented a new and useful Improvement in Printing-Telegraphs; and I do hereby declare that the following, taken in connection with the drawings, is a full, clear, and exact description thereof.

In the drawings, Figure 1 is a plan, partially in section, of certain parts of the apparatus, and Fig. 2 is an elevation of a magnet and a section through a valve, valve-chamber, and passages.

Parts of the apparatus shown in the drawings are identical with those now in common use and described in a patent granted to the American Telegraph Company November 1, A. D. 1859, and other parts to be connected therewith may also be the same. They are, therefore, not represented in the drawings, being well known, and are referred to in the description only.

Another necessary part of the apparatus, as a whole, is an air-pump for compressing air, such as is now employed in House machines in common use, and this contrivance, being well known, is also not shown in the drawings, which are, however, sufficient to exhibit my invention to those skilled in building or using printing-telegraphs.

The nature of my invention consists in combining a piston or its equivalent and a valve controlled by an electro or other magnet with a platen, a corrector, and a constantly-moving type-wheel in such manner that the motions of the corrector and the platen shall, to a certain extent, be controlled or governed by the piston, whose power is derived from the action of compressed air admitted by the valve.

In the drawings an electro-magnet is represented at A A. Any electro-magnet proper for acting upon telegraphic mechanism will answer the purpose, and in close proximity with its poles is a valve, B, represented in the drawings as a cylindrical piston-valve. This valve I prefer to make of steel, with a ring of soft iron soldered thereto on the end nearest the poles of the magnet, and it is inclosed in a valve-chest, as shown in the drawings. Three depressions or channels surround its

periphery, and from the two end depressions small holes are bored through the valve. This valve performs precisely the duty of the valve or valves of an ordinary steam-engine. When in one position it allows air under pressure to enter one end of a cylinder and escape from the other, and when in the reverse position the air enters at the end from which it has just escaped, and escapes from the end at which it formerly entered. By altering the position of this valve a piston, such as *c c*, in the cylinder may be driven from one end to the other thereof, and any kind of valve that is capable of performing this duty may be used in place of that shown in the drawings so long as it is capable of being moved by an electro-magnet. I prefer the one represented, as it is simple in construction and nearly balanced, so that it may be moved with little force. In practice this valve moves only about the one-hundredth of an inch, such range of motion being sufficient to close one port and open another.

Into the valve-chest leads a passage, J, and a reservoir of compressed air or an air-pump constantly acting is to be in connection with this passage, so that compressed air will be ready to flow into either end of the cylinder when admitted by the valve B. From the valve-chest lead two passages or ports, *k l*, each connected with an opposite end of the cylinder shown in section in Fig. 1. This cylinder contains a piston, made for convenience in two portions, connected by a stem or rod, on which are secured two buttons or flanges, which embrace between them the forked end of a lever, M, which is pivoted at *m'*, after passing through a slot or opening in the cylinder.

I prefer the arrangement shown, wishing it to be understood, however, that any piston or diaphragm so connected with a lever that the latter may be moved by the former will answer the purpose.

The soft-iron end of the valve lies, as before stated, in close proximity to the poles of the magnet, and is constantly drawn away from the magnet by a light spring. A thin wire, such as I, tightly stretched and like that used in telegraphic instruments, and connected to the valve as represented in the drawings, is the best spring known for the purpose.

In the position in which the parts are repre-

sented in the drawings the magnet is made or in force, the valve is in contact with it, or as nearly so as an armature ever approaches a magnet in the working of telegraphs, the spring is depressed, the port *l* is in connection with the passage *J*, and compressed air is acting upon the piston, so as to hold the lever in contact with one of a set of protuberances or detent-pins, *p*, to be hereinafter described. When circuit is broken the spring will move the valve, air will enter through *k* and escape through *l*, and the piston will move to the opposite end of the cylinder, causing *M* to separate from *p*. When circuit is closed again the valve piston and lever will resume the positions as shown in the drawings.

I prefer to use the breaking of a circuit to move the lever away from the protuberance or detent; but the magnet and other parts may be so arranged that the closing of the circuit shall produce this effect.

The wire coil enveloping the magnet is to be connected through a wire with a constantly-revolving portion of the circuit at the station from which a message is to be sent. This constantly-revolving portion is to have its velocity controlled by a governor and is to be used in connection with a key-board, the whole contrivance at the place whence the message is sent being similar to that in common use, and described in the patent before referred to, granted November 1, 1859, and being capable of breaking and closing circuit when a key is struck.

At the station where the message is to be received is a constantly-revolving type-wheel, such as *D*. This wheel is driven by any proper prime mover by the aid of a friction-connection, as certain shafts drive wheels in the House telegraph, and the velocity of the shaft is to be controlled by a governor so regulated that the angular velocity of the wheel *D* shall be as nearly as possible the same as that of the constantly-revolving portion of the circuit, before referred to as located at the station whence the message is sent.

The object of the friction-connection is to permit the wheel to be slightly advanced or retarded while the shaft still revolves at the speed defined by the governor. Another wheel, *G*, is attached by a friction-connection to a proper shaft, which is caused to revolve at the same speed as the shaft that drives the wheel *D*, and it is important to observe that the friction-connection between wheel *G* and its shaft is considerably stronger than that which connects wheel *D* with its shaft. These connections, wheels, and governor are the same as now in common use and described in the heretofore-named patent of November, 1859, and the wheel *D* and its types are to be arranged with reference to the revolving portion of the circuit and the keys at the sending-station in the same manner as they are described in that patent.

In addition to its types, (indicated at *h h*), the

type-wheel is provided with cogs *o o*, and the wheel *G* is furnished with detent-pins *p p*, rising upward from its disk, and with cog-teeth *n n*, which can engage with the teeth *o o*. A lever, *Q*, is pivoted at *R*, and is held in the position shown in the drawings by a light spring, so that a revolving platen, *E*, which is carried by one end of it, is out of contact with the types.

The paper to be printed upon is represented at *f f*, and is to be moved along at the instant of printing by any proper motion: This paper passes between the revolving platen and a thin piece of metal which has a slit cut through it, so that the type may act upon the paper. When the type-wheel and the revolving parts of the circuit are in revolution and all parts of the machinery at the receiving-station are in position, as shown in the drawings, the wheel *G* will be held at rest by the lever *M*, which is secured in position by the air pressing upon the piston. When circuit is broken the valve will be lifted by the spring, air will enter through *k*, and the lever *M* will be moved by the piston, so as to occupy the position represented by dotted lines; and when its end moves the wheel *G* will be freed or unlocked and will commence to revolve, moved by the friction-connection before described. As soon as one of the detent-pins *p* is entirely free from the end of the lever the wheel *G* will revolve as fast as its shaft, whose motion is governed so as to have an angular velocity, as before described. As wheel *G* revolves one of the pins, *p*, will strike the end of lever *Q* and force the platen and paper into contact with the type, so as to print a letter, and as soon as this detent-pin passes the tail of the lever the platen will be thrown back again by the spring before described; but prior to the printing of the letter one of the teeth, *n*, takes into one of the spaces between the cogs *o o*, and if the type-wheel has been slightly retarded since the last letter was printed will set it ahead. On the other hand, if the type-wheel has advanced too fast this entering of the tooth will retard the type-wheel. The wheel *G* is enabled thus to control the wheel *D* by reason of the former having a stronger or more rigid friction-connection with the prime mover than the latter; but the time during which *G* revolves and is at rest are determined by the piston, so that although the motions of *G* are derived from a prime mover, yet they are actually governed as to time of rest and motion by the motions of the piston. The revolving portion of the circuit is so constructed and combined with the key-board that circuit is closed immediately after it is broken by the touching of a key. This closing will again make the magnet *A*, and it will draw the valve downward into the position shown in the drawings, so that air will enter through *b* and cause the lever to assume again the position represented by the full lines in the drawings, where it is in readiness to stop the wheel *G* as soon as the next

succeeding protuberance, *p*, strikes the lever. The wheel G therefore is able to revolve during the printing of one letter only through the distance between one protuberance and another, and this wheel is controlled not only by its shaft, which moves it, but by the lever M, which permits it to start and stops it. This wheel G, when permitted to revolve, brings up the platen so as to print a letter, and also, if necessary, corrects the angular position of the type-wheel; and as the lever M is actuated by the piston, which moves as permitted by the valve, the magnet and valve so control the compressed air that it is enabled so to act upon the piston as to control the time of printing and the angular position of a type-wheel.

I claim as of my own invention—

Governing the angular position of a type-wheel and controlling the motions of a platen by force derived from compressed air or other fluid by means of the combination of a valve actuated by an electro-magnet with a piston, a platen, and a corrector combined with each other and operating in combination, substantially in the manner specified.

In testimony whereof I have hereunto subscribed my name on this 1st day of February, A. D. 1861.

G. M. PHELPS.

In presence of—

HENRY B. RENNERT,
JOHN M. WEEKS.