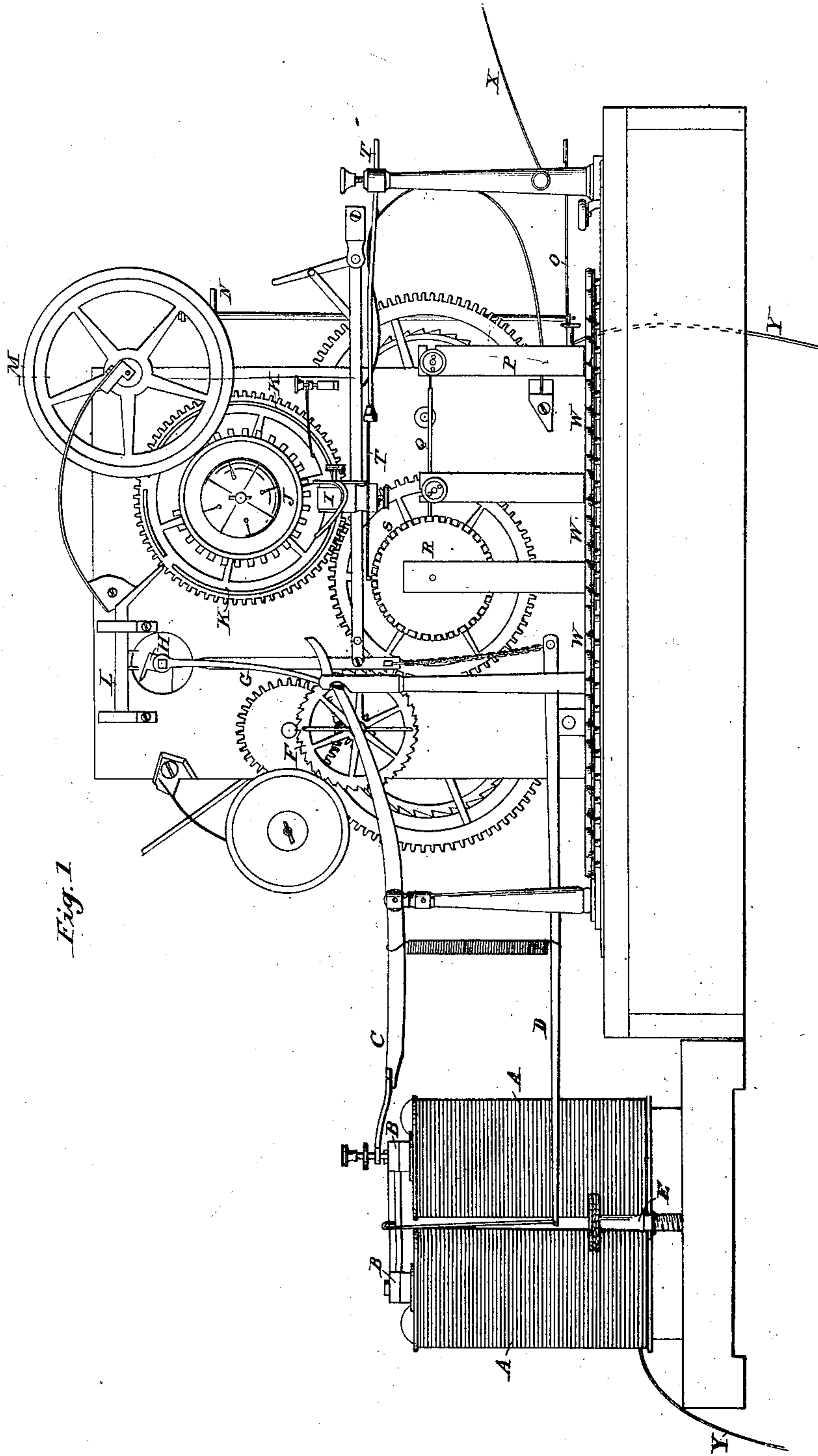


No. 14,917.

PATENTED MAY 20, 1856.

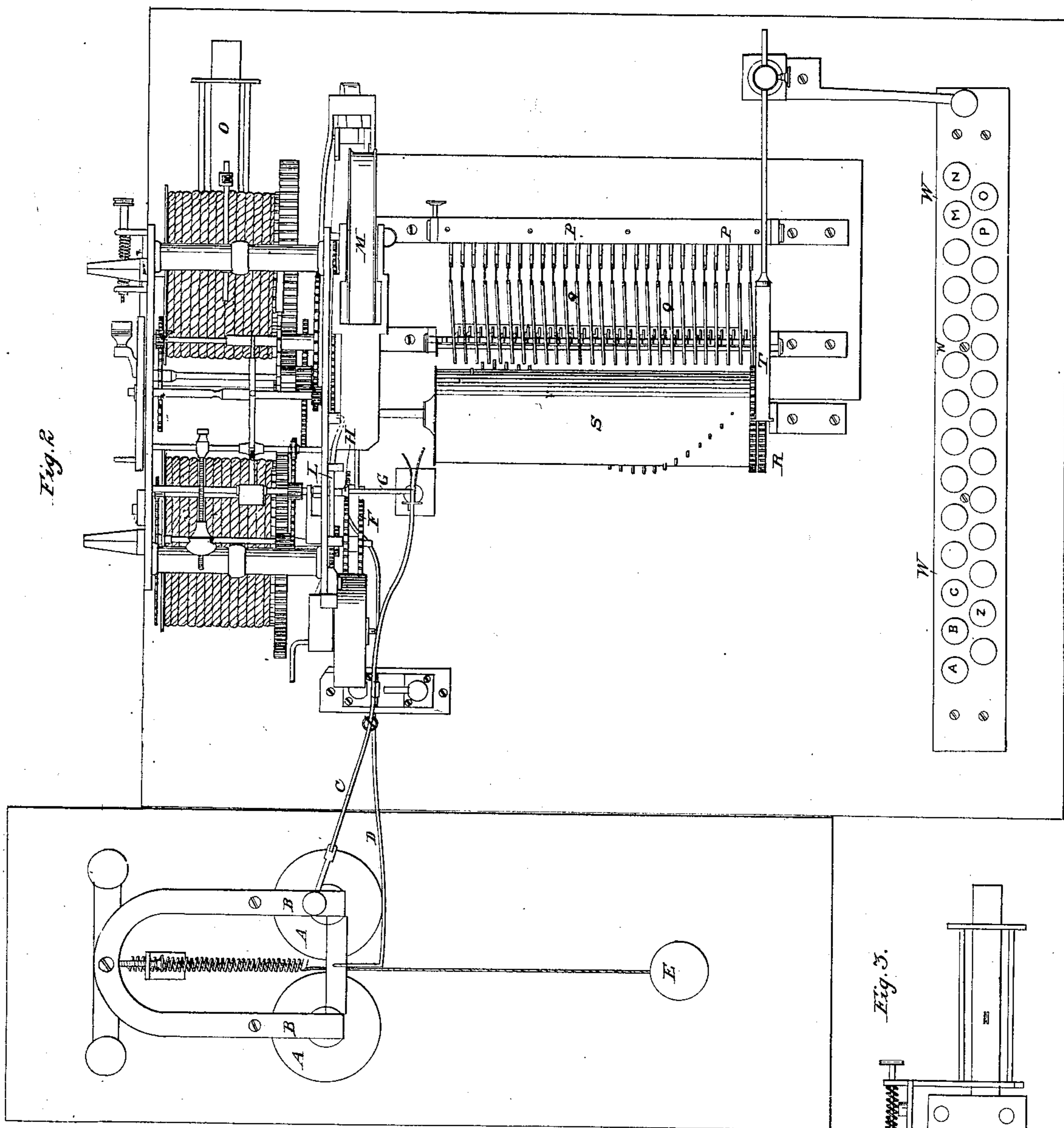
D. E. HUGHES.  
TELEGRAPH.

3 SHEETS—SHEET 1.



*Fig. 1*

D. E. HUGHES.  
TELEGRAPH.

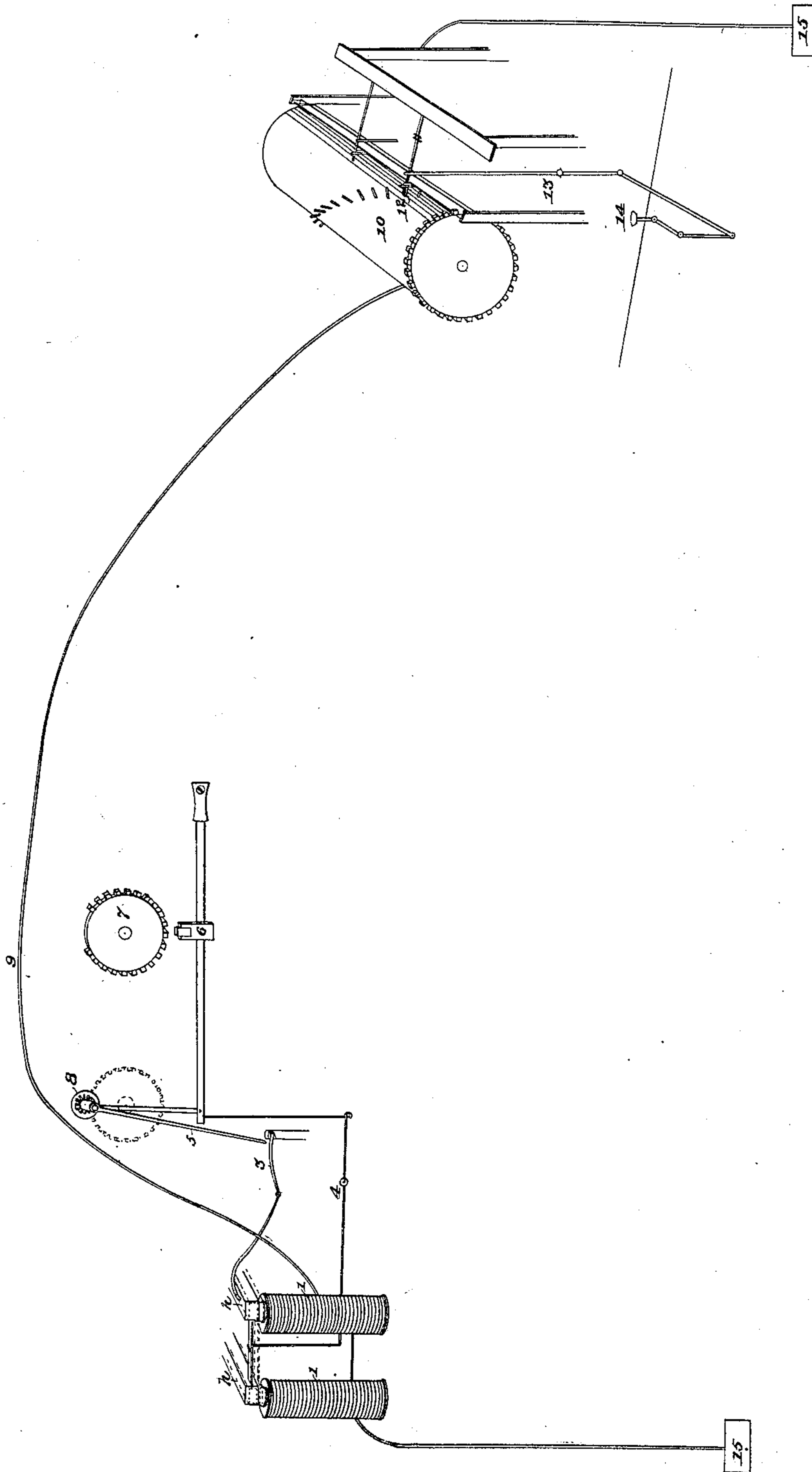


No. 14,917.

PATENTED MAY 20, 1856.

D. E. HUGHES.  
TELEGRAPH.

3 SHEETS—SHEET 3



# UNITED STATES PATENT OFFICE.

DAVID E. HUGHES, OF LOUISVILLE, KENTUCKY.

## IMPROVEMENT IN TELEGRAPHS.

Specification forming part of Letters Patent No. 14,917, dated May 20, 1856.

*To all whom it may concern:*

Be it known that I, DAVID E. HUGHES, of Louisville, in the State of Kentucky, have invented a new and Improved Mode of Electro-Magnetic Telegraphic Communication, which I term or designate as "Hughes' Compound Magnetic and Vibrating Printing-Instrument."

The nature of my invention consists in the manner of using natural and electro magnetism in its application to machinery for telegraphic purposes, and in the employment of a vibrating spring for the regulation of this and other machinery.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation, reference being had to the annexed drawings, making a part of this specification in which—

Figure 1 is a perspective view, and Fig. 2 a bird's-eye representation. Plate 3 represents parts or portions of the instrument.

A in Fig. 1 is the electro-magnet, the poles of which are in contact with the natural magnet B. (The poles being made the same as the natural magnet by electricity, the natural magnet no longer feels an attraction for the soft-iron poles of the electro-magnet, and is at liberty to fly upward, being raised by a spring.) If opposite polarity be given to the electro-magnet by electricity, the natural and electro magnets are held in contact by mutual attraction, and when the electric circuit is broken the natural magnet is at liberty to fly upward, the spring having sufficient force to overcome the attraction of the natural magnet for the soft-iron of the electro-magnet. An armature of soft iron might be substituted for the natural magnet when the current is used as last above specified. The natural magnet B, in rising, works a detent, C, which sets free a crank or eccentric, G, which, in its revolution, moves the platen I, the feed-wheel F, and the lever D, by which the magnet B is restored to its resting position. Thus the press and feed-wheel are governed by the combined use of natural and electro magnetism.

The crank H is revolved by a series of wheels or clock-work put in motion by weights, springs, or other motive power, the revolution of which crank moves the lever D, which draws down the natural magnet to the electro-magnet, returning the natural magnet to its original position, thus restoring the connection between the

electro and natural magnet. Two instruments being constructed to move in harmony, and so arranged that, the cog-wheel R of one being always in connection with the electro-magnet, the bearing-spring T, which is connected with the extremity of the main line at the same moment, being in connection with or resting on one of the cogs of R at a distant office, a similar spring, which is connected with the other extremity of the main line, at the same moment rests on one of the cogs of a cylinder similar to S, which cylinder can be put in connection with the ground-wire Y at pleasure by means of projections from the cylinder, which at the proper time restores one of the connecting-springs Q, after being released from its rest, to its original position, and in so doing forms an electrical communication with the ground-wire. By this means one magnet is in connection with the cylinder of another instrument, and is made to operate at the pleasure of the distant operator. The next moment the cylinder S is in communication with the bearing-spring T. The distant instrument being in connection with the cog-wheel R, the magnet thereof is liable to be affected, provided a connecting-spring be thrown down, which establishes the connection with the ground-wire, in consequence of which the magnet of the distant machine operates by being in connection with the spring T, communicating with the main line X, and this explains the manner in which the cog-wheels or circuit-breakers are employed, that the tooth of one shall be in connection with the electro-magnet and a tooth of the other in connection with an insulated cylinder, which, by the action of springs moved by keys at pleasure, is brought in connection with the ground-wire at the same time that it cuts off communication with its own magnet, which operation makes a letter, the one cog-wheel having its connection insulated, so that the action of the circuit shall be intermitted from one to the other. Thus by each revolution of these wheels the magnets are brought twenty-seven times reciprocally in connection with the cylinders of each other. Thus communications may be received or expressed in printing (or printing may be done backward and forward) by either instrument or machine at the time or moment when such instrument or machine is communicating a message to the other.

For transmitting simultaneously both ways

by breaking the main circuit, the natural magnet or soft-iron armature at the transmitting-station is held at rest by the attraction of the electro-magnet developed by means of a small battery, one pole of which is connected through the magnet with the connecting-spring Q and the other with the bearing-spring T, the short circuit being closed by the contact between a projecting pin on the cylinder S and one of the connecting-springs Q. Such small battery forms a part of the main circuit in receiving and of the short circuit in transmitting.

L is a bolt to be moved toward the flange K by the action of a cam attached to the crank H. The flange K has one slot opposite the blank on the type-wheel J, also one other slot opposite any given letter, the flange of the similar wheel of like machines in other offices each to have two slots, one corresponding with the blank on the type-wheel and the other corresponding with some different letter by which such office is distinguished; for example, determining the letter A on the wheel to represent the New York office, the letter B to represent the Baltimore office, and the letter C the Washington office. The first action of electricity starts all instruments on the route, and at the same time moves the bolt L near to the flange K. The next action of the crank sends the bolt against the flange K; or, if a slot be opposite the bolt, the latter passes through, and, being in form properly adapted to the flange, permits the instrument to run; but if no slot be opposite the bolt the same is forced against the flange and stops the revolution of the wheel. Suppose, then, it is desired to communicate with New York to the exclusion of Baltimore. Both instruments being ready to receive, the first closing and breaking of the current starts all instruments at the same time, the bolt in each by the first revolution moving near to the flange. The next breaking and closing of the circuit, if effected while the slot is opposite the bolt, forces the bolt through the slot, not suspending the operation of the instrument A; but no slot being opposite A in the instrument at Baltimore, the corresponding bolt there is forced against the flange and instantly suspends the movement of the wheel, thus so arranging a bolt and operating the same so as to preclude at will the communication of the intelligence or message from intermediate or more distant offices on the circuit from which it may be desired to withhold the same.

The vibrating spring O is connected with an anchor-escapement by means of the connecting-rod, N, which by its vibrations governs a ratchet-wheel moved by a series of wheels and weight corresponding with parts of clock-work, setting free at each vibration a tooth of said ratchet-wheel, thus directly governing the revolutions of the type-wheel, which is on the same shaft.

Fig. 3 on Plate 2, is the vibrating spring with the compensating slide or weight attached thereto, the movement of which slide or weight

is effected and controlled by a lever and connecting-spring operated on by a thumb-screw, the object and effect of which are to compel a uniform movement under different temperatures.

J is the type-wheel, (on the periphery of which the letters are in relief,) and it makes continuous revolutions without any apparent intermission of rapidity during the action of the platen and while the communication is being printed.

S is the cylinder or barrel, upon which pins or projections are arranged spirally at equal intervals upon the circumference, as shown upon the drawings. The spring Q is so arranged that by the action of the keys W W W it is thrown into line with the projections. The circuit is then completed at the moment of contact between the projections or pins and the springs. The series of keys W W W is so arranged that the connecting-springs Q are thrown into position so as to be acted on by the projections on the barrel or cylinder, which restore at the same time the connecting-springs to their original position, thus closing the circuit.

Plate 3: No. 1 is the electro-magnet. No. 2 is the natural magnet; No. 3, the detent moved by natural magnet No. 2 when released from the electro-magnet, permitting the crank-lever No. 5 to revolve, and in so doing raising the platen 6, so as to press up against the letters of the type-wheel 7, at the same time restoring the natural magnet to its original position by the action of lever No. 4, which lever 4 is operated on by the crank 8. No. 9 is the connecting-wire or main line. No. 10 is the cylinder. No. 11 is one of the connecting-springs in communication with the cylinder by means of pin 12. No. 13 is a lever by means of which the connecting-spring 11 is thrown into connection with the pin on cylinder 10. No. 14 is one of the keys indicating the letter to be printed, the pressing down of which moves lever 13. No. 15 represents the ground-plate.

I do not claim any feature of any existing printing or marking telegraph as any part of my invention, nor do I desire to interfere in the least with any heretofore invented. Conceiving that I have made important improvements in telegraph-instruments, I desire protection only for that which is novel and of my own invention; and therefore

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

1. The holding in place of the attractive power of electro or natural magnetism as applied to telegraphic purposes, whether the same be applied in the manner herein described or in any similar manner producing like results.

2. Combining with the permanent magnet or a soft-iron armature an adjustable spring, to sever it from its contact with the soft iron of the electro-magnet whenever a change is made in the electrical condition thereof, and a lever or its equivalent, which, after the permanent

magnet or armature has been separated from the iron by the action or the breaking of a current, shall bring it back again into renewed contact by the action of the power which has been called into action by the retreat of the magnet.

3. The employment of two cog-wheels or circuit-breakers at each station, so arranged that one shall be in connection with the electro-magnet at the same station and the other in connection with the transmitting-cylinder at that station, the whole being arranged so that the connection alternates at each station for every letter between the electro-magnet and the transmitting-cylinder at that station in such manner that the through-connection is always simultaneously through the transmitting-cylinder of one station and the electro-magnet of the other station, whereby the machine at each station can at the same time be transmitting a message and receiving a message, it being understood, however, that I do not claim in general the use of a single wire for the simultaneous transmission of different messages by means of rapid changes of connection, which is not new, but only the peculiar manner, as above claimed, in which I have applied it in connection with my machine.

4. So arranging a bolt and operating the same by a cam or its equivalent that it shall act upon a wheel attached to the shaft of the

type-wheel, so as to preclude the intelligence from one station being communicated to any other station or stations on the circuit from which it is desired to withhold the communication.

5. The employment of a vibrating spring, properly weighted at its extremity, if necessary, and so arranged by a series of mechanism as to govern and regulate the movement of the type-wheel. This I claim also as a governor in other machinery, without limiting its use to its connection with electro-magnetism.

6. Printing by electro-magnetism by a continuously-moving type-wheel printing while in motion.

7. The arrangement of a cylinder with pins spirally arranged thereon to operate by contact with metallic points to close and break the circuit, when this is combined, for the purposes herein set forth, with the system of keys and catches so arranged that any desired point may be thrown into a position where it will be retained until it is struck by its corresponding pin.

8. The closing a short circuit at the transmitting-station at the same moment the main circuit is broken.

DAVID E. HUGHES.

Witnesses:

JOS. C. G. KENNEDY.

E. M. HAMILTON.