J. S. BROWN.

Improvement in Printing-Telegraphs.

No. 129,391. Patented July 16, 1872.

Fig. 1. - Full size.

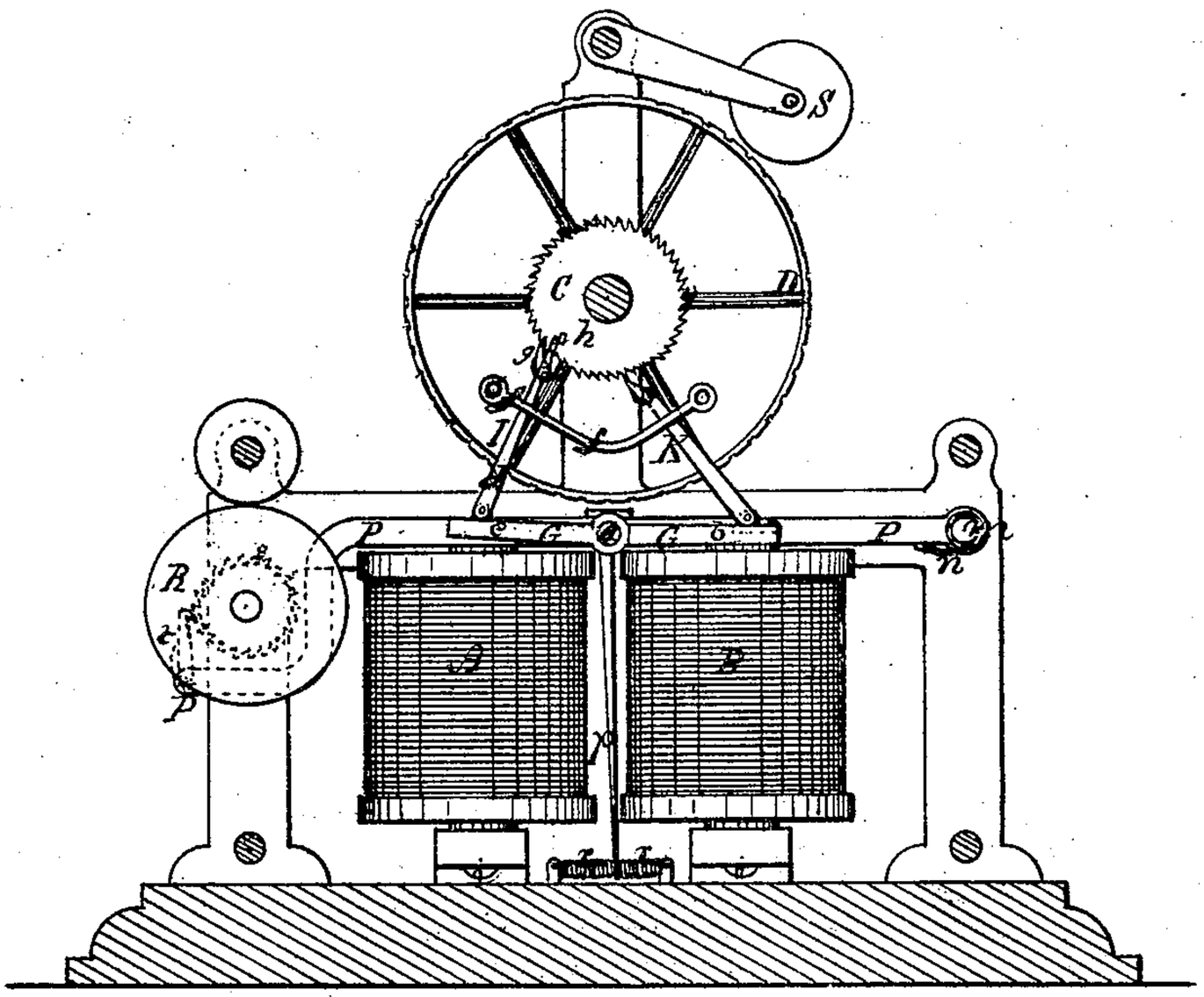


Fig. 2. - Full size.

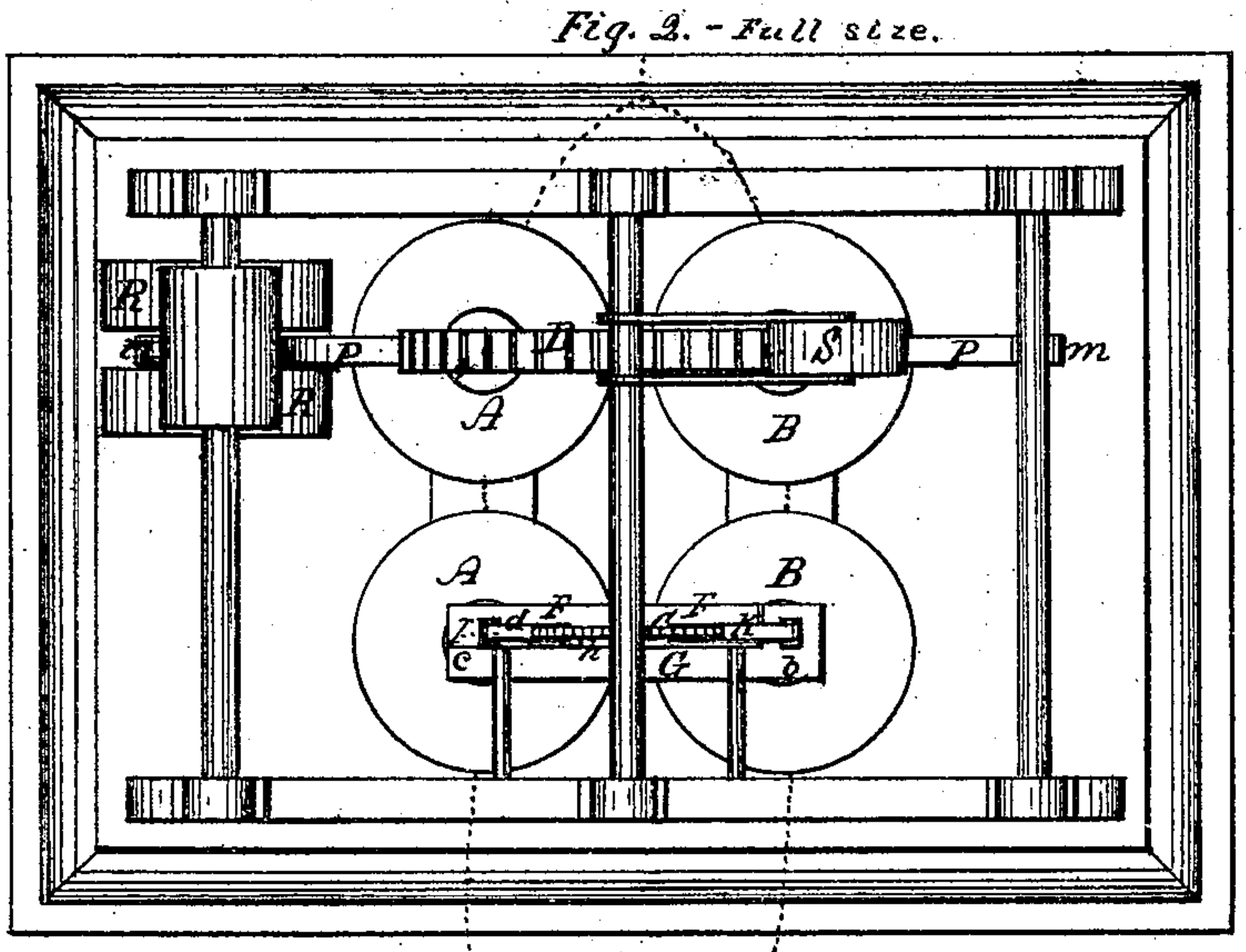


Fig. 3.

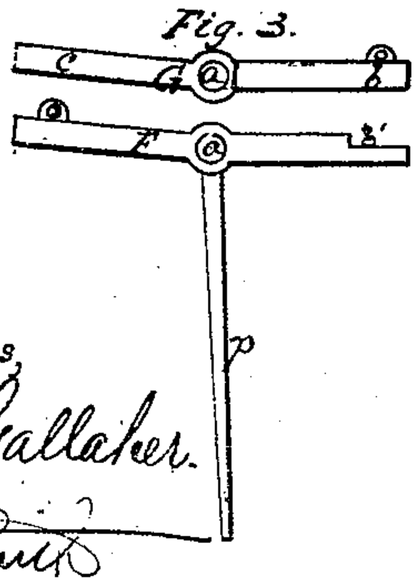


Fig. 5. - Half size.

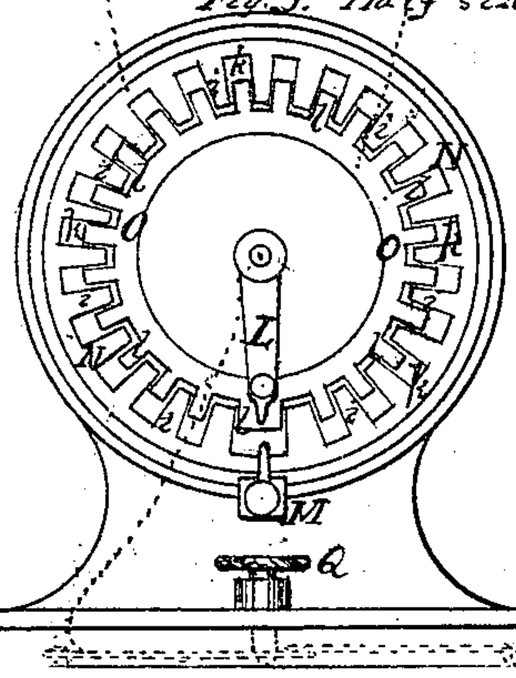
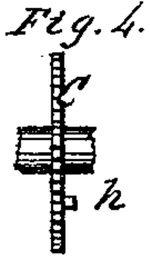


Fig. 4.



Witnesses,

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129,391

UNITED STATES PATENT OFFICE.

JOHN S. BROWN, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN PRINTING-TELEGRAPHS.

Specification forming part of Letters Patent No. 129,391, dated July 16, 1872.

To all whom it may concern:

Be it known that I, JOHN S. BROWN, of Washington, in the county of Washington and District of Columbia, have invented an Improved Printing-Telegraph Instrument; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing making part of this specification—

Figure 1 being a vertical section of the receiving-instrument, showing a side view of the working parts thereof; Fig. 2, a top view of the receiving-instrument; Figs. 3 and 4, views in detail of parts of the receiving-instrument; Fig. 5, a front view of the transmitting-instrument.

Like letters designate corresponding parts in all of the figures.

This telegraph instrument is used with a two-wire line; and the principle on which its operation is based is, that the type-wheel is turned by the alternate action of two magnets, one in each line-circuit, while the printing is effected by the alternate action of one or both of the same magnets and a complete breaking of both line-circuits, and the unison stop is brought into action by revolving the type-wheel with one only of the line-magnets, while the circuit of the other magnet remains closed or open, and is released automatically on resuming the regular turning of the type-wheel by the two magnets alternately.

Let A B represent the two magnets, one in each of the wire circuits; C, the ratchet-wheel, by means of which the type-wheel is turned; and D the type-wheel. Each of the magnets A B is composed of two spools, as usual, but only one spool of each magnet acts on the armature or armatures F G, which turn the type-wheel, while the other spool of each magnet receives and attracts the lever-armature P, which effects the printing. The respective spools or helices of the two magnets, by which the type-wheel is turned, are placed side by side, quite close together, and the armature F is pivoted at *a* between them, so that it vibrates with the requisite extent of movement as it is alternately attracted to the magnets. For the simple purpose of turning the type-wheel, with a step-by-step movement, it would be sufficient to attach a pawl to each end of a single armature; the two pawls I K thus arranged alternately push the ratchet-wheel C forward one notch; but, for the purpose of providing a unison-stop, another armature, G, is placed by the side of the armature F, vibrating on the same pivot, *a*. One end, *b*, of the armature G is made of brass or other non-magnetic material, but the other end *c* is of iron. Both ends of the armature F are of iron. The pawl I is attached to the armature F, and the pawl K is attached to the brass end *b* of the armature G, which projects over the adjacent end of the armature F, as shown in Fig. 2, the end of the said armature F being cut away or shouldered for that purpose, as shown in Fig. 3, and this projecting end is of sufficient weight to overbalance the other end *c*, except when the latter is attracted by the core of the magnet A, and thus, ordinarily, the end *b* rests on said armature F, the two armatures (shown separate in Fig. 3) moving together as one when the magnet A is magnetized, its attraction of both armatures uniting to lift the pawl K, and when the magnet B is magnetized its attraction of the armature F lifting the pawl I; but, when it is desired to secure or test the unison of the instruments on the line, the transmitter-key L, Fig. 5, is stopped at the period point, or any other point arranged for the purpose, so as to hold the magnet B magnetized and the magnet A unmagnetized, thereby keeping the pawl I lifted, and leaving the armature G and its pawl K free to move, since the brass end *b* of this armature is unaffected by the magnet B. The arm *d* of the pawl I moves in a fixed guide, *f*, Fig. 1, and its upper end extends a little along the side of the ratchet-wheel C, while its click *g* takes into the notches thereof. On the side of the said ratchet-wheel is a stop-projection, *h*, so arranged that it will strike the end of the arm *d* of the pawl I when the latter is held lifted by the constant attraction of the magnet B and stop the type-wheel at the period point; but when the said magnet becomes demagnetized and the pawl I drops, the said stop-projection will pass by the arm *d* and allow the type-wheel to turn again. In order to bring the stop *h* around to the arm *d* in all the instruments of the line together, to secure the unison, the circuit of the magnet A is alter-

nately closed and broken, while the circuit of the magnet B is held closed, thus turning the ratchet-wheel by the single action of the pawl K. The transmitter is constructed with two metallic circuit-closing ring-plates, N O, on its face, insulated from each other either by simple spaces *k k* or some non-conducting material between, there being inwardly-extending teeth or projections *i i* on the inner edge of the outer plate N, and outwardly-extending teeth or projections *l l* on the outer edge of the inner ring-plate O. The two sets of projections *i i* and *l l* intervene between one another alternately, as shown. The ring-plate N is in the circuit of the magnet A, and the plate O is in the circuit of the magnet B, and the circuits of both are closed through an index, L, connected at the center of the transmitter with the ground-wire, and touching as it revolves, by metallic contact, the said projections *i i* and *l l* alternately. In order to effect the unison movement, the transmitter has a separate unison-key, M, connected in circuit with the ground-wire, which is ordinarily held on an insulated space opposite to the period point, as shown in Fig. 5. When it is turned around the periphery of the transmitter it alternately passes over and comes in contact with the projections *i i* of the circuit-closing plate N of the magnet A, and with the non-conducting surfaces between them, or passing over the non-conducting spaces, if used; but since, in one revolution of this key, only half as many notches of the ratchet-wheel C are moved as when the transmitting-key L is turned, which alternately comes in contact with the said projections *i i* and the projections *l l* of the circuit-closing plate O of the magnet B, as shown, hence the unison-key is required to be turned twice around the transmitter to bring all the instruments into unison. The key is then left in its previous position again, and the instrument is operated by the transmitting-key as usual, the first breaking of the circuit of the magnet B drawing down the pawl I and allowing the stop H to pass by its arm *d*. The printing-hammer is raised by a lever-armature, P, pivoted at *m*, or its equivalent, which is situated over the other otherwise unoccupied helix of both magnets A B, the arrangement being clearly shown in Figs. 1 and 2. It is held down by the attraction of the magnets, and is raised to effect the printing by a counter spring, *n*, situated at the pivot *m*, or in any other convenient position. The spring is so adjusted in strength that, when either of the magnets A B is magnetized, the armature P is held down and the printing is effected only when both magnets are demagnetized. Therefore, while the type-wheel is moving, since the two magnets are alternately magnetized in immediate succession, the printing-armature cannot rise, nor when the transmitting-key L is stopped, since that is always on a closed circuit of one or the other magnet. To break both circuits at once, and thereby allow the printing-armature to rise and force its hammer upward, a printing-key, Q, is provided on the transmitter, which, when depressed, cuts the circuit of both the ground wires. It is kept raised by a spring or its equivalent.

In order to prevent the vibration of the armatures F G so as to move the type-wheel after printing, particularly when printing the same letter or character successively, the armature F is held by a slight spring at half vibration between the cores of the magnets A B. As shown in Fig. 1, this is arranged by means of an arm, *p*, projecting downward from the said armature to a spring, *r*, which holds the armature in position, and yields either way when either magnet attacks the armature. Therefore, when the printing-key breaks both circuits, the armatures F G only vibrate half way back—not sufficiently to move the ratchet-wheel a notch. The paper is fed along by the armature-lever P, in the manner shown in the drawing. The vibrating end of this armature extends into a notch or space in the middle of the lower feed-roller R, in which space there is a ratchet-wheel, *s*, under which the armature extends, and is provided with a hook-pawl, *t*, that at each ascent of the armature takes into a further notch of the said ratchet-wheel, and at the next descent of the armature moves the ratchet-wheel the distance of a notch, and thereby turns the feed-roller. There is no special novelty in the arrangement of the inking-roller S.

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

1. A printing-telegraph instrument, the type-wheel of which is turned by the alternate action of two electro-magnets, substantially as herein specified.

2. A printing-telegraph instrument, the printing-hammer of which is operated by the action of the same two magnets that turn the type-wheel, in connection with a counter-spring or its equivalent, substantially as herein specified.

3. A printing-telegraph instrument, in which the paper is fed along by the action of the same two magnets that turn the type-wheel, substantially as herein specified.

4. A printing-telegraph instrument, in which the unison-stop is brought into action by one of the magnets that turn the type-wheel, substantially as herein specified.

5. A printing-telegraph instrument, in which the unison-stop is released by simply resuming the alternate action of the two magnets that turn the type-wheel, substantially as herein specified.

6. The combination of the alternately-acting magnets A B, vibrating armature or armatures F G, pawls I K, and ratchet-wheel C or its equivalent, substantially as and for the purposes herein specified.

7. The combination of the armatures F G, pawls I K, and stop *h*, constructed and arranged substantially as and for the purpose herein specified.

8. The combination of the printing-armature P with the magnets A B, substantially as and for the purpose herein specified.

9. The armature F, provided with the arm *p* and spring *r*, in combination with the magnets A B and printing-armature P, substantially as and for the purpose herein specified.

10. The combination of the armature P, provided with the hook-pawl *t* and the paper feed-roller R, formed as described, and provided with the ratchet-wheel *s*, substantially as herein specified.

11. The combination of the interposed circuit-closing plates N and O and the transmitting-key L, substantially as herein specified.

12. The additional unison-key M, on the transmitter, arranged and operating substantially as herein specified.

13. The transmitter, provided with the transmitting, unison, and printing-keys L M Q, arranged and operating substantially as herein specified.

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Witnesses:

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