

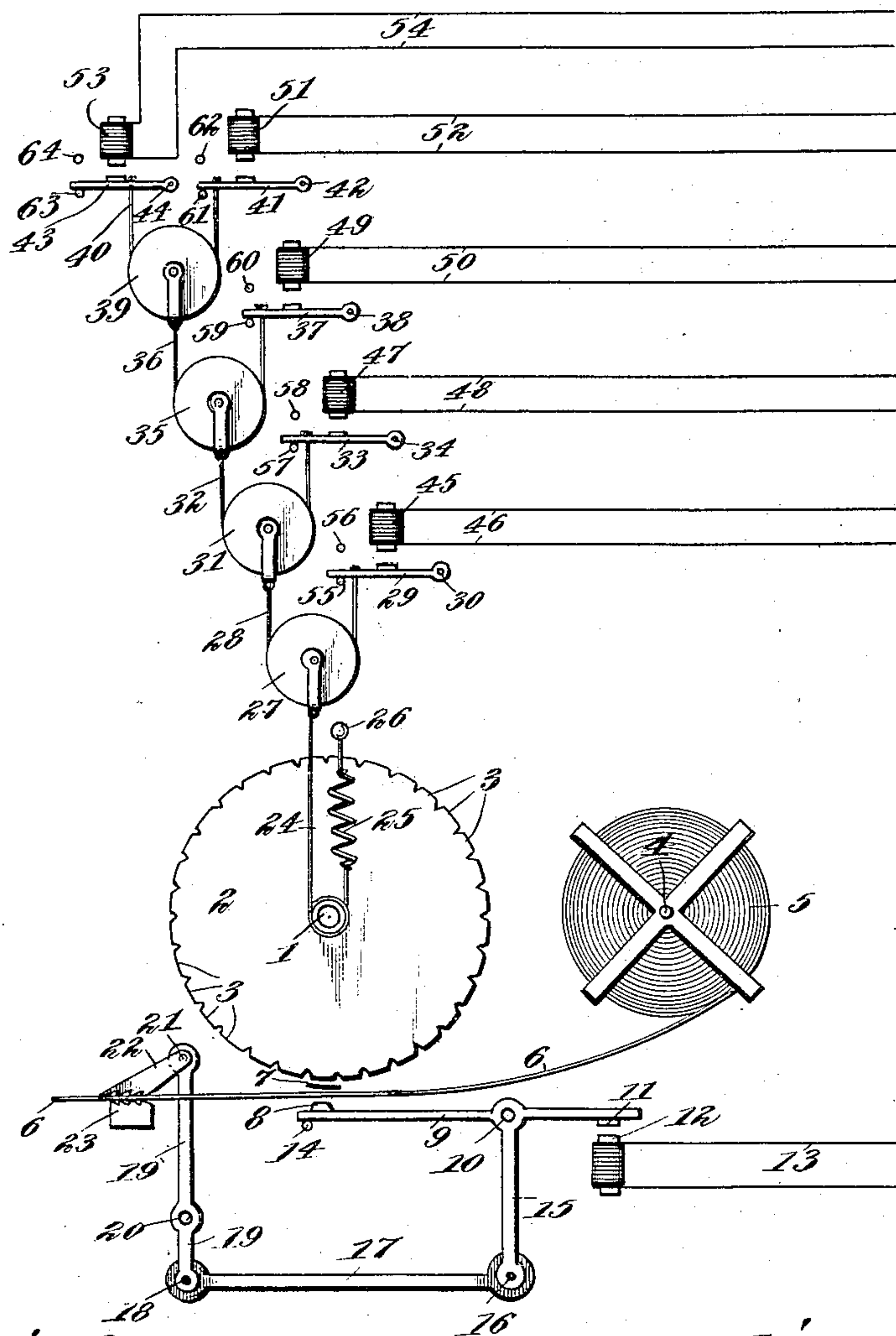
No. 767,322.

PATENTED AUG. 9, 1904.

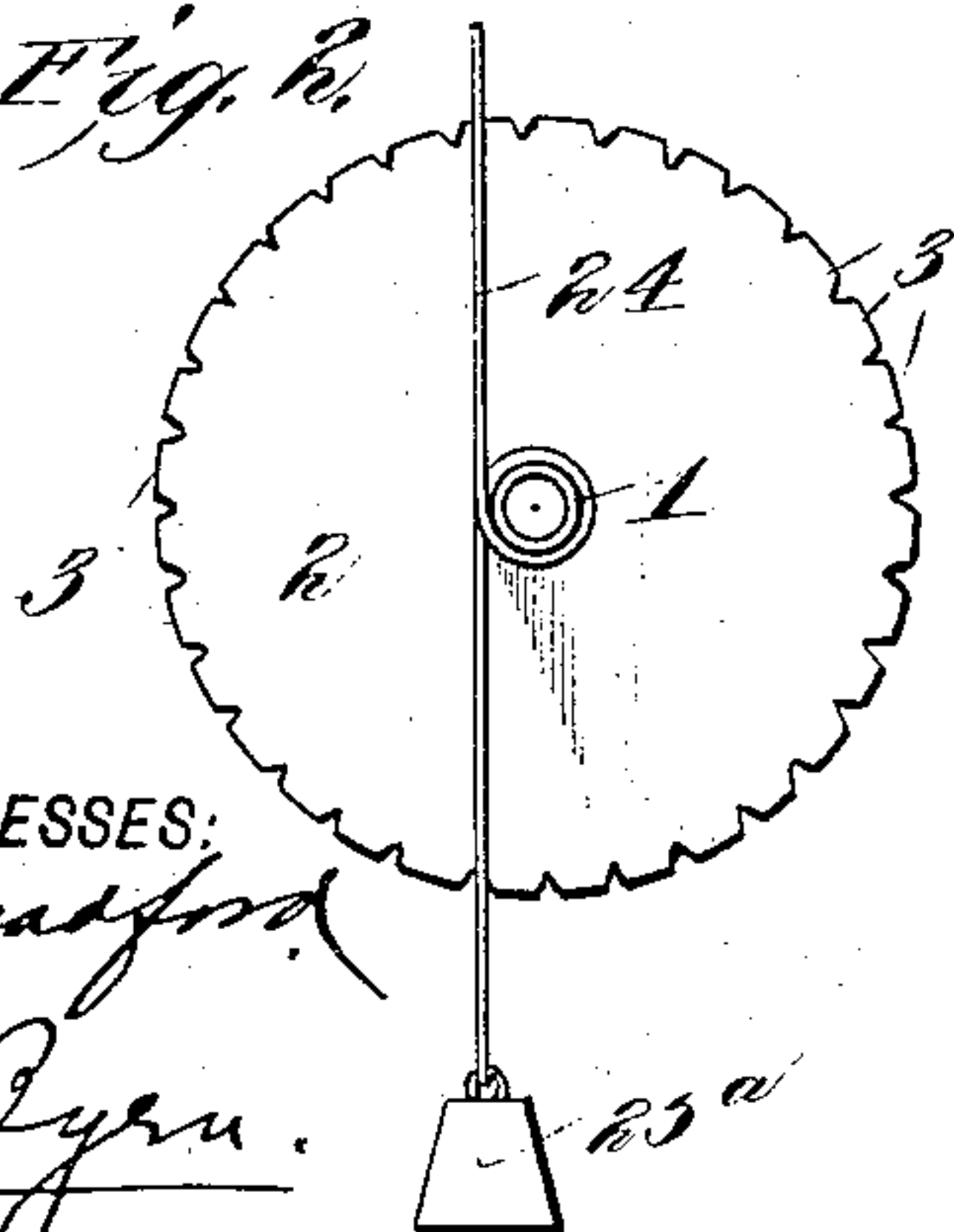
J. D. WHITE.  
PRINTING TELEGRAPH.  
APPLICATION FILED JAN. 2, 1904.

NO MODEL.

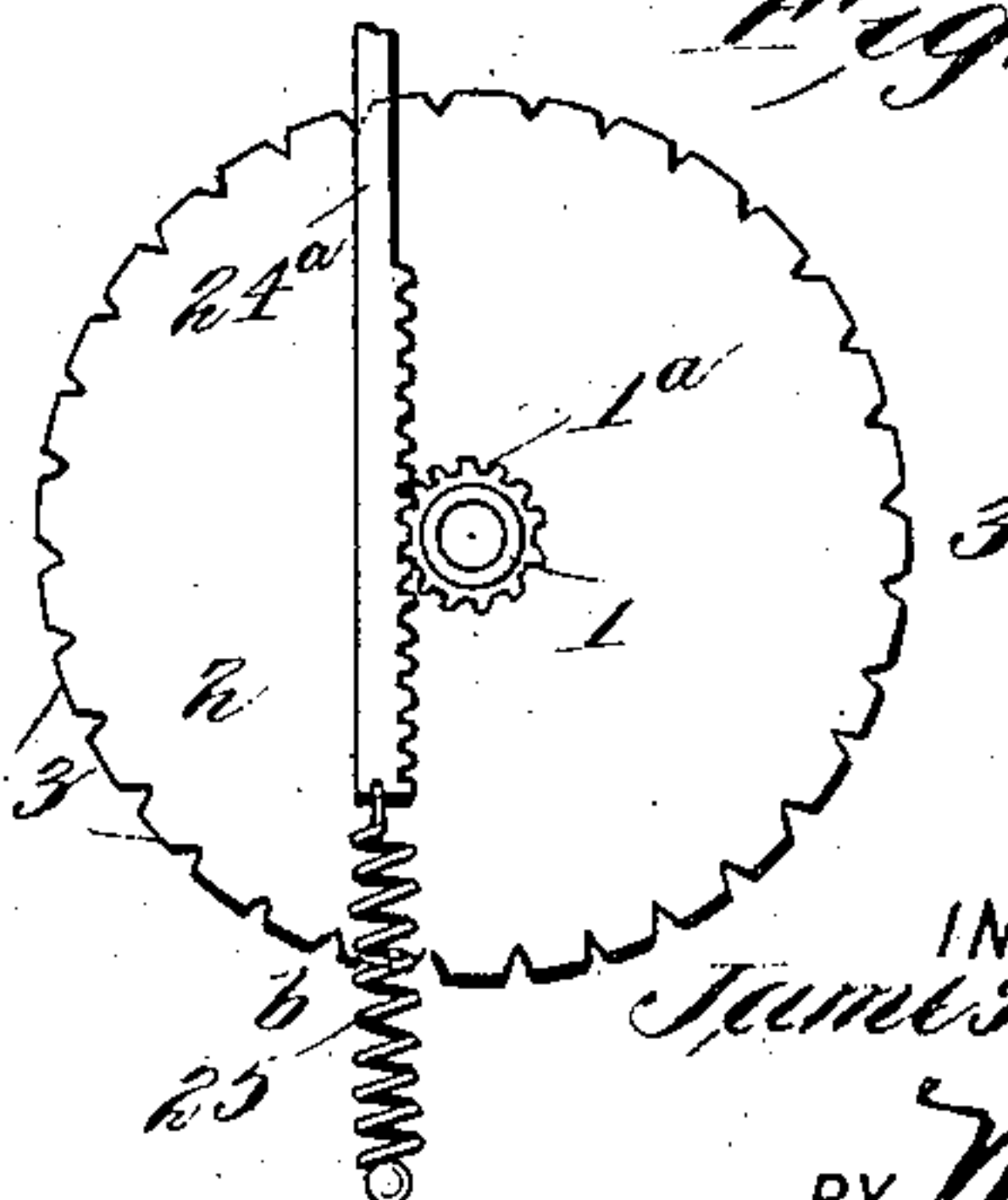
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



WITNESSES:  
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## UNITED STATES PATENT OFFICE.

JAMES DUNDAS WHITE, OF LONDON, ENGLAND.

## PRINTING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 767,322, dated August 9, 1904.

Application filed January 2, 1904. Serial No. 187,422. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES DUNDAS WHITE, a British subject, residing at 50 Clanricarde Gardens, London, England, have invented new and useful Improvements in Printing-Telegraphs, of which the following is a specification.

My invention relates to improvements in printing-telegraphs; and the object of my invention is to provide means for rotating the axle which carries the type-wheel or type-wheels or type-cylinder by electromechanical devices controlled by a few circuits, so that the opening and closing of these few circuits separately and in various combinations may be used to rotate the axle to many different degrees and to provide for the printing of many different characters.

For simplicity of description I shall describe the present invention as applied to a simple form of printing-telegraph having an axle bearing a single type-wheel and printing the letters or characters along a fillet of paper of the ordinary kind; but I do not limit my invention to this particular application, as it is equally applicable whether that axle carries one type-wheel or two type-wheels or a type-cylinder.

I attain the objects of my invention by means of the electromechanism illustrated diagrammatically in the accompanying drawings, in which—

Figure 1 is a side elevation, and Figs. 2 and 3 are details of modifications.

In the drawings, 1 is the axle on which is set the type-wheel 2, which has thirty-two type-faces 3 3 3. On another axle 4 is the roll 5, from which is gradually unwound the paper-fillet 6. Between the fillet and the type-wheel is interposed the printing-ribbon 7, while below the fillet and opposite the lowest type-face is the impact projection 8 (which also acts as a counterpoise) on one end of the lever 9, which is pivoted at 10, and on the other end of which is the armature 11, opposite which is the electromagnet 12 in the circuit 13, the arrangement being that as often as that circuit is closed the electromagnet 12 attracts the armature 11, thus moving the lever 9 and causing the projection 8 to strike the fillet 6 and the ribbon 7

against the type-face which is then opposite it, thus printing on the fillet the character which is on that type-face. When the circuit 13 is opened, the lever 9 from the weight of the projection 8 reverts to the normal position, as shown, and is kept from going too far by the stop 14. On the lever 9 is also the rigid and downwardly-projecting arm 15, of which the lower end is pivoted at 16 to the connecting-rod 17, of which the other end is pivoted at 18 to the lower end of another lever 19, which is pivoted at 20 and has at 21 on its upper end the pawl 22, which rests above the platen 23, the fillet 6 being between them. Both the pawl and the platen have teeth facing as shown in the drawings, so that the fillet is moved forward as often as the pawl is moved forward in the direction toward which the teeth point, but is not moved when the pawl is moved backward. The general arrangement is such that the pawl is moved backward when the lever 9 is moved so as to effect printing, and is moved forward by the return of that lever to the normal position, so that the paper is intermittently fed forward between the printing strokes.

The fittings thus far described are of a well-known type. I make no claim as regards them, and I describe them only to illustrate the relation with the other parts of a printing-telegraph of my improvements in the means for rotating the axle on which is the type-wheel or type-cylinder.

Round the axle 1 is led with several turns the line 24, which is at one point attached to the axle so that when the line is drawn one way the axle is caused to rotate in one direction and when the line is drawn the other way the axle is caused to rotate in the other direction. The line 24 is inelastic; but one end of it is attached to the extensible spring 25, of which the other end is made fast at 26, the object of this arrangement being to cause the axle and disk to revolve back again when the contrary tension, presently to be described, is relaxed. That contrary tension is effected thus: The other end of the line 24 is attached to the axis of pulley 27, around which is led the line 28, of which one end is attached to the lever 29, which is pivoted at 30, and the



other to the axis of pulley 31, around which is led the line 32, of which one end is attached to the lever 33, which is pivoted at 34, and the other to the axis of pulley 35, around which is led the line 36, of which one end is attached to the lever 37, which is pivoted at 38, and the other to the axis of pulley 39, around which is led the line 40, of which one end is attached to the lever 41, which is pivoted at 42, and the other to the middle of lever 43, which is pivoted at 44. These five levers are constructed also as armatures, and opposite them, respectively, are the electromagnet 45 in the circuit 46, the electromagnet 47 in the circuit 48, the electromagnet 49 in the circuit 50, the electromagnet 51 in the circuit 52, and the electromagnet 53 in the circuit 54. As often as any one of these five circuits is closed the electromagnet in it attracts the corresponding armature-lever, and thus draws up the line attached to it, and so, though not to the same extent, any lines below that one. The other lines, like the line 24, are inelastic and the range of movement of the several levers are restricted by stops, one stop above and one stop below each lever, the stops to the five levers, respectively, being numbered in the drawings 55 and 56, 57 and 58, 59 and 60, 61 and 62, and 63 and 64. The stops are so placed and the lines so fastened to the levers that the separate movement of either of the levers 29, 33, 37, or 41 draws up the corresponding line (28, 32, 36, or 40, as the case may be) to the same extent, while the movement of the lever 43 draws up the line 40 to half the extent to which the movement of the lever 41 draws it up, since the line 40 connects with lever 43 only half as far from the center 44 as it is from the center 42 of lever 41. From this arrangement it will be seen that these levers when operated in regular succession draw out the line 24, and so rotate the axle 1 and the type-disk 2 in successive ratios which are in geometrical progression. The various parts are so proportioned that the movement of the lever 29 rotates the type-disk a distance of sixteen type-faces, the movement of the lever 33 rotates it the distance of eight, that of the lever 37 the distance of four, that of the lever 41 the distance of two, and that of the lever 43 the distance of one. Intermediate movements and the movements between the sixteen-distance movement and the complete circle are effected by the combined movements of various combinations of levers. Thus, for instance, the combined movements of the levers 43 and 41 rotate the type-disk by the distance of three type-faces, and the combined movements of the levers 37, 33, and 29 rotate it by the distance of twenty-eight. These various movements are effected by the closing of the various circuits either singly or in various combinations, and as soon as the circuits are opened again the levers, lines, and pulleys descend again to

the normal, the line 24 is relaxed, and the spring 25 causes the axle and type-disk to revert to the normal position, the tension of the inextensible lines preventing them from coming too far back. The arrangement is such that when they are in the normal position the impact projection 8 has opposite it the type-face which corresponds to spacing. That type-face may be so fashioned as to make a very insignificant mark when printed from, and the other type-faces have on them various characters, which are all located in some convenient order to the various single and combined movements. These movements are operated by the opening and closing, singly and in various combinations, of the circuits which control the movements of the levers, lines, and pulleys, and thus it will be seen that the required letter is brought into printing position by the closing of the corresponding circuit or combination of circuits, while the printing is effected by the closing of the printing-circuit 13, and that when the circuits are opened again the various parts revert to the normal position. The circuits may be closed from the transmitting end either directly or by means of relays. They may also be closed by means of wireless telegraphy, the coherers or detectors in the several circuits being properly attuned to the corresponding devices in the transmitter.

For convenience I have described my invention as consisting of a series of four pulleys and five electromagnets and levers; but I do not limit my claims to this particular number. The number of the series may be varied, and it will be evident that by adding one further line, pulley, and lever to the series a type-wheel of sixty-four type-faces could be operated in a way similar to that described.

As a modification of the means for oscillating the shaft of the type wheel or cylinder I may, instead of the spring 25, (shown in Fig. 1,) use a weight 25<sup>a</sup>, as shown in Fig. 2, or I may dispense with the line 24 altogether and use in the place of the same a rack-bar 24<sup>a</sup>, as shown in Fig. 3, which meshes with a small pinion 1<sup>a</sup> on the shaft 1. This rack-bar may be directly connected to the axis of the lower pulley 27. Its downward movement may be assisted either by a spring 25<sup>b</sup> or by a weight, as shown in Fig. 2.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a printing-telegraph the combination with an axially-oscillating shaft bearing a circular series of type-facets; of means for imparting a variable throw to the shaft and type-facets, consisting of a series of electromagnets with separate circuits, a series of armature-levers acted upon by said electromagnets, a series of pulleys and a series of lines one for each pulley and passing around



the same and attached each to its armature-lever at one end and to the axis of the next pulley above at the other end and means for connecting the lower pulley to the oscillating shaft substantially as and for the purpose described.

2. In a printing-telegraph the combination with an axially-oscillating shaft bearing a circular series of type-facets; of means for imparting a variable throw to the shaft and type-facets, consisting of a series of electromagnets with separate circuits, a series of armature-levers acted upon by said electromagnets, a series of pulleys, and a series of lines one for each pulley and passing around the same and each attached to its armature-lever at one end and to the axis of the next pulley above at the other end, and a printing and feed mechanism for the paper comprising an electromagnet and circuit, an armature-lever bearing a hammer-face and an intermittently-acting feeding device substantially as described.

3. In a printing-telegraph the combination with an axially-oscillating shaft bearing a

circular series of type-facets; of means for imparting a variable throw to the shaft and type-facets, consisting of a series of electromagnets with separate circuits, a series of armature-levers acted upon by said electromagnets, a series of pulleys and a series of lines one for each pulley and passing around the same and attached each to its armature-lever at one end and to the axis of the next pulley above at the other end, the upper pulley having two electromagnets with circuits and armature-levers and having its line connected at one end to the armature-lever of one of its electromagnets and having its other end connected to the armature-lever of its other electromagnet for the movement of this line a distance different from all the others and means for connecting the system of pulleys to the oscillating shaft substantially as described.

JAMES DUNDAS WHITE.

Witnesses:

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