No. 864,519. PATENTED AUG. 27, 1907.

H. DREWELL.

APPARATUS FOR THE ELECTRIC OPERATION OF TYPE SETTING MACHINES.

APPLICATION FILED AUG. 25, 1906.

3 SHEETS—SHEET 1.

Fig. 1.

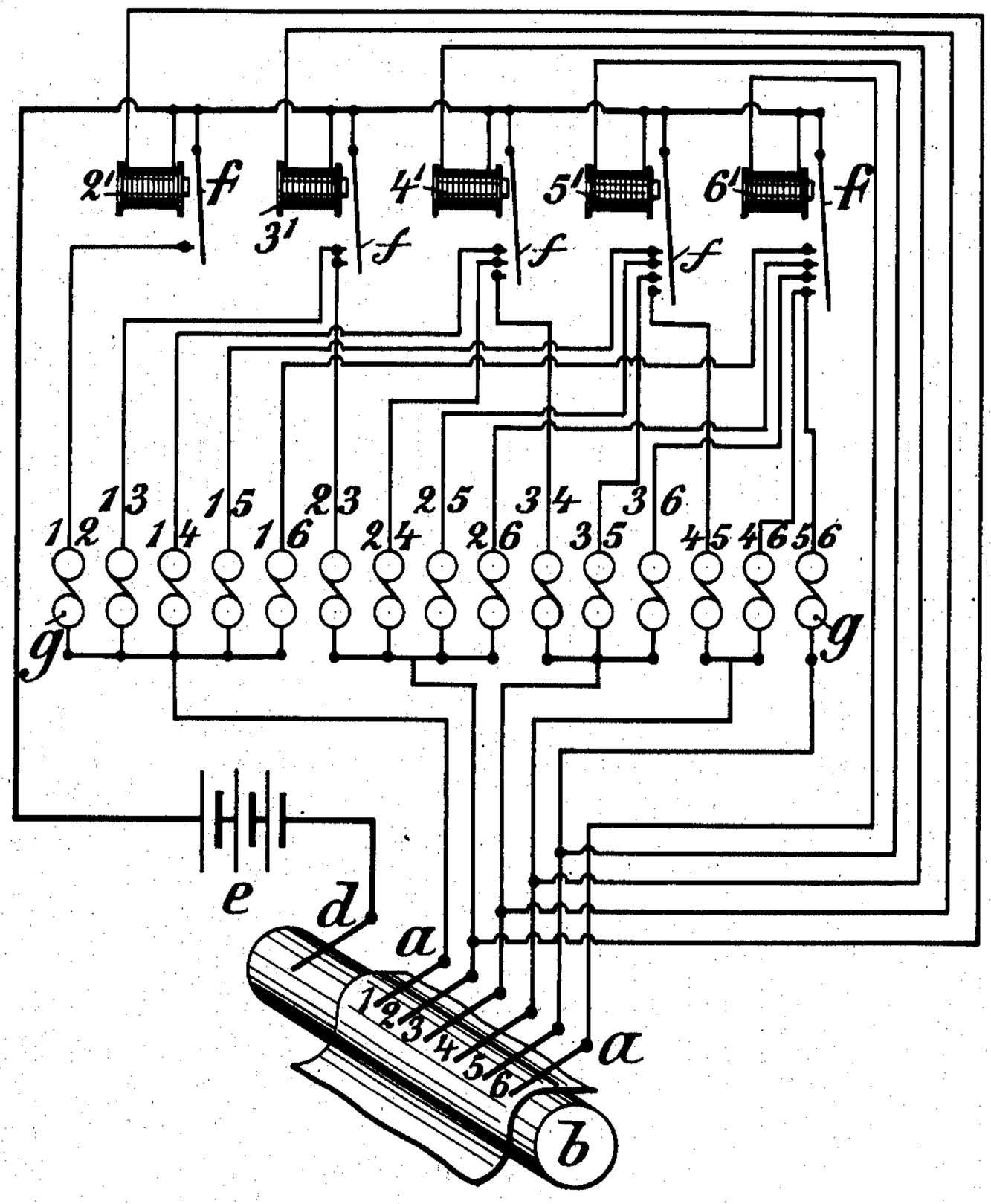

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Fig. 2.

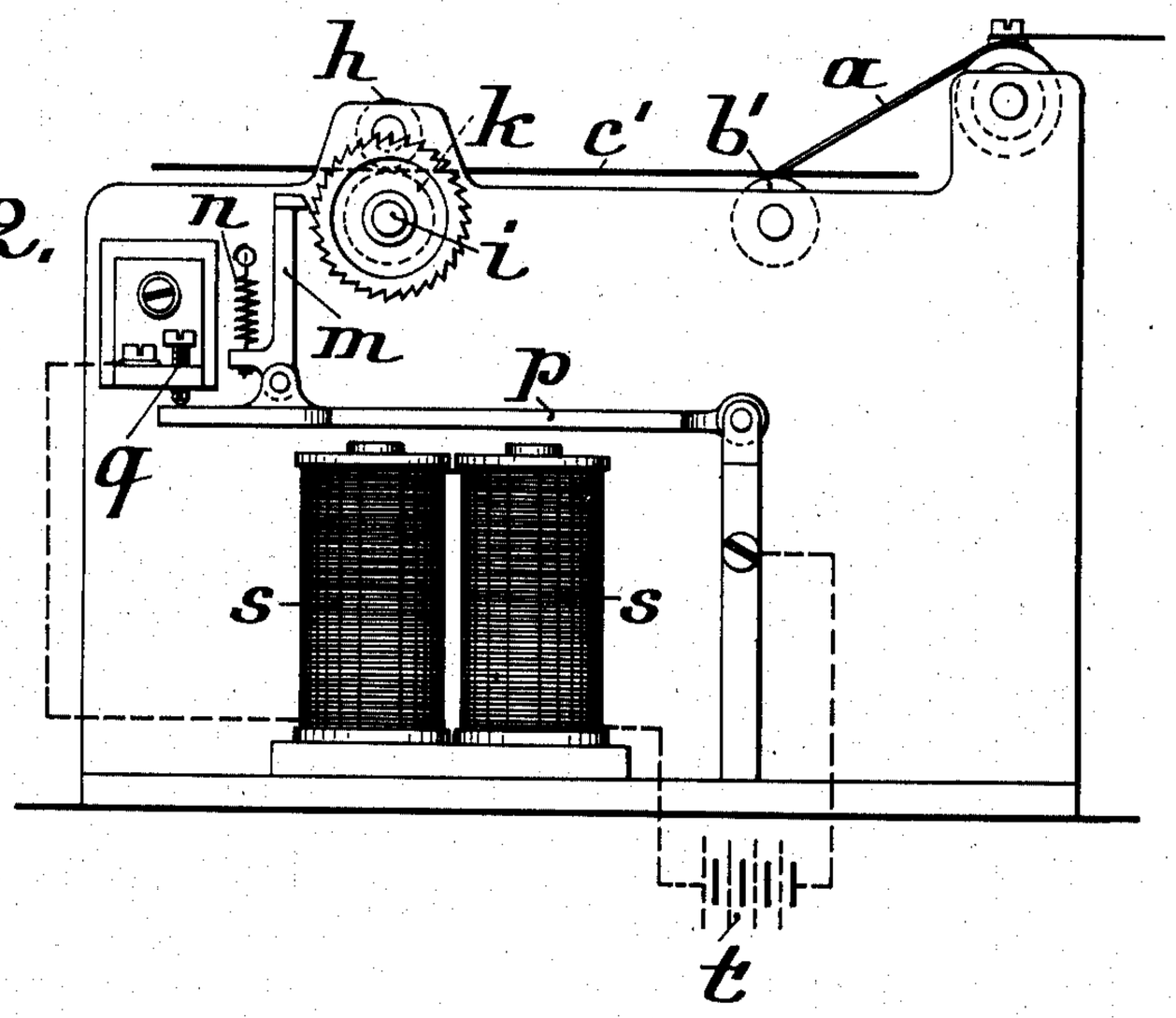
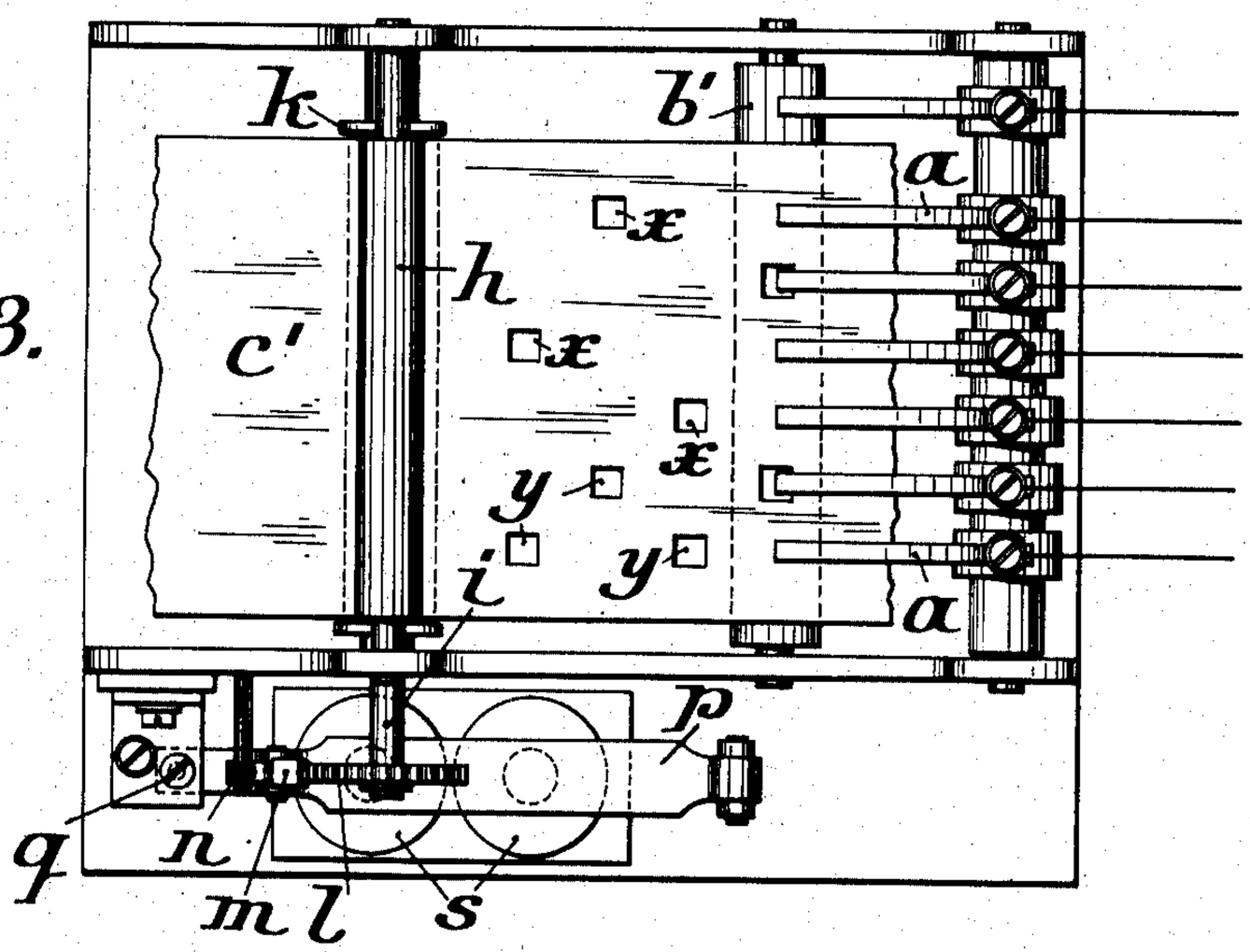


Fig. 3.



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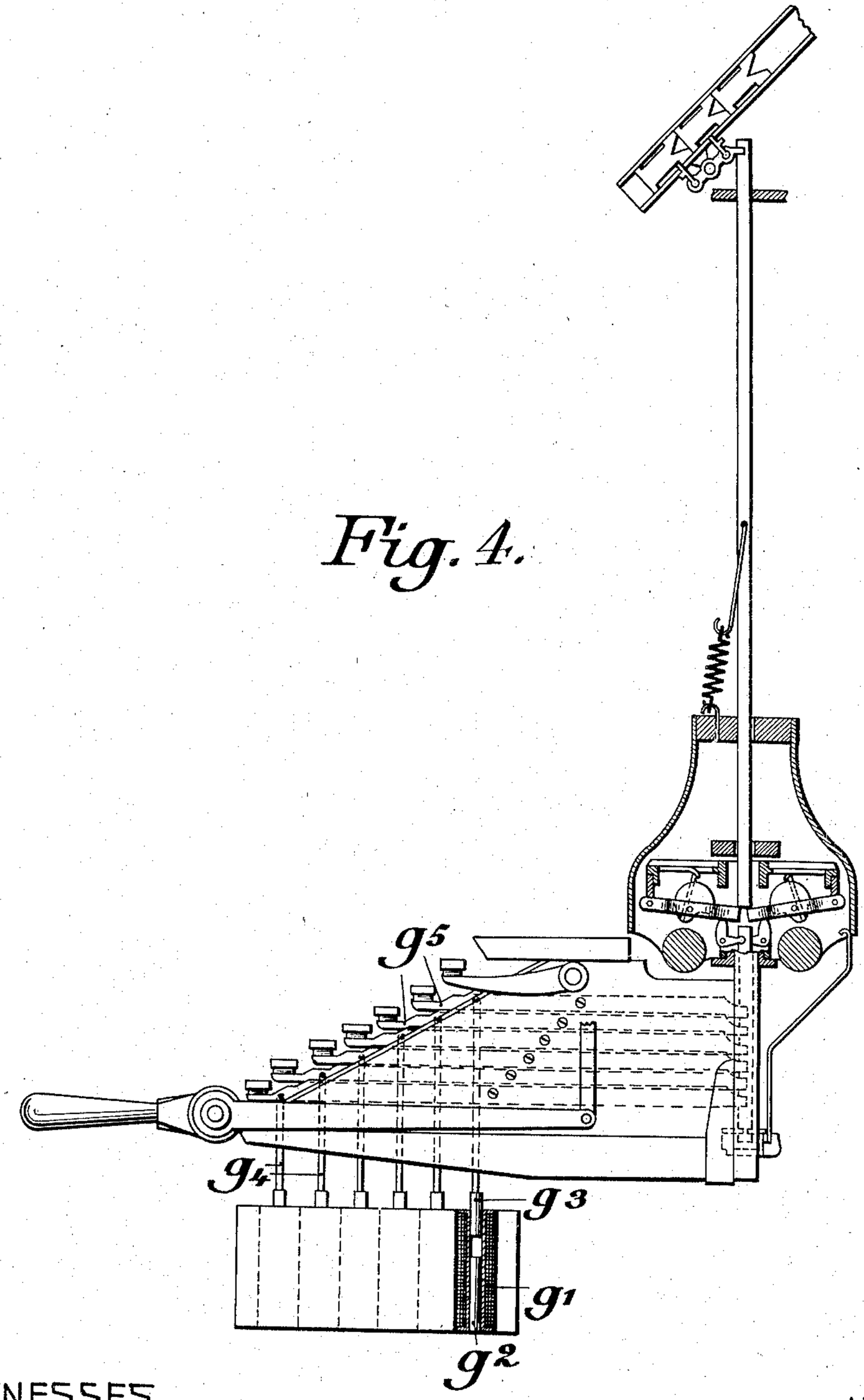
3 SHEETS—SHEET 3.

Fig. 4.



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APPARATUS FOR THE ELECTRIC OPERATION OF TYPE-SETTING MACHINES.

No. 864,519. Specification of Letters Patent. Patented Aug. 27, 1907.

Application filed August 25, 1906. Serial No. 332,070.

To all whom it may concern:

Be it known that I, HEINRICH DREWELL, engineer, a subject of the German Emperor, residing at Hanover, 26 Dieterichsstrasse, Germany, have invented certain new and useful Improvements in Apparatus for the Electric Operation of Type-Setting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to an improved apparatus for automatic electric operation of those type setting machines in which the selection of the characters is effected in accordance with the perforations in a register band.

The main idea of the invention is as follows: Each register band is provided, for each character to be selected with two holes which are arranged on the band transversely. When the machine is operated by means of the band, the latter is guided through a contact device, in which each hole simultaneously produces one electric contact. Each of the said contacts connects a group of electromagnets to one pole of the source of current, and in addition, influences an electric switch which connects another group to the opposite pole of the source of current. By the action of two contacts, four groups of electromagnets are therefore connected to the poles of the source of current. Two of the groups which are connected to the opposite poles, have one magnet in common. The latter is, therefore, simultaneously connected with both poles of the source of current, receives current and thus effects the selection of the character (letter or die) which corresponds to the combination of the two contacts.

In the accompanying drawings, Figure 1 shows diagrammatically an apparatus constructed in accordance with the invention, Fig. 2 is a side-elevation of the means for producing the feed of the registering-strip, Fig. 3 is a top plan-view of Fig. 2 and Fig. 4 is an elevation, partly in section, of the mechanism for operating the electromagnets.

From one pole of the source of current *e*, current is supplied by a spring contact *d* to the conducting roller *b*. On the said roll slide six other spring contacts *a*, which admit the current to branched conductors. Some branches of these contacts lead to the coils of the electromagnets *g*, and others to the coils of the auxiliary switches *f*. The armature levers of the said switches are connected to the other pole of the source of current, and, on being attracted, close one or more contacts. The current flows from one pole of the source of current through the brush *d*, the roll *b* and the spring contacts *a*, to the electromagnets *g* and thence through the contacts and armatures of the auxiliary switches *f* to the other pole of the source of current.

The register band is guided over the roll *b*. It is provided, for each character to be selected, with a group of two holes which simultaneously come under the spring contacts *a*. The working is then as follows: By suitable perforation of the register band, contacts are produced, for instance, at the springs 3 and 5. The current coming in, first closes the contacts at the auxiliary switches 3′ and 5′. From the spring 3, the current simultaneously passes to a group of electromagnets marked 3—4, 3—5 and 3—6 and thence to the corresponding contacts of the auxiliary switches 4′, 5′ and 6′. Of these latter, only the switch 5′ is closed; of the electromagnets connected to its contacts, only that electromagnet receives current, which is connected to the spring 3. Consequently, only the said magnet 3—5 becomes operative.

As shown in the drawings, the perforations of the paper strip are placed simultaneously under the contact-springs 3 and 5. It is evident that at this moment the circuit *e*, running over the roll *d* and over the contact-springs 3 and 5, through the perforations of the paper strip, is closed. By following the current over 3 and 5, the result is that the branches of the electromagnets 3′, 5′, which are illustrated at the lower part of Fig. 1, just below the contact-springs, are excited as they are switched in by the contact-springs. This is under these conditions the only current. By following the currents of the contact-springs 3 and 5 to the electromagnet *g*, it will be seen that from 3 only one current is led to the electromagnets 3—4, 3—5, 3—6, and that from the contact-spring 5 only one current is led to the electromagnet 5—6. From these electromagnets the currents are led further to the contacts, which can be closed through the armature of the electromagnets 4′, 5′ and 6′. Of these last-mentioned electromagnets 5′ is the only one excited, and of the other electromagnets the electromagnet 3′ is also excited. The armatures of 3′ and 5′ are attracted and the contacts closed. No current passes through the armature of 3′ as the two contacts which are opposite this armature are placed at the electromagnets 1—3, 2—3, which electromagnets are connected with the contact-springs 1 and 2. As there is no perforation at 1 and 2, consequently there is no current over the armature of 3. There remains therefore only one current over the attracted armature of the electromagnet 5′. This current passes through four contacts, which are connected with the electromagnets 1—5, 2—5, 3—5 and 4—5. From 1—5 one current is conducted to the contact-spring 1, from 2—5 to 2, from 3—5 to 3, and from 4—5 to 4. Only one perforation is under the contact-spring 3, and consequently the circuit is only closed over the electromagnet 3—5. The perforation under the contact-spring 5 cannot connect the electromagnet 5—6, as the armature is not attracted by 6′. Therefore, from all the electromagnets *g* only the electromagnet 3—5 is selected and excited.

In Figs. 2 and 3 is shown the mechanism for feeding

the registering-strip. In these figures c^1 is the registering-strip, which passes first over the contact-roll b^1, and then between the feed-rolls h and k. On the axis i of the roll k is located a ratchet-wheel l, the teeth of which are engaged by a pawl m. The pawl m is engaged by spring n on the teeth of the wheel l and is attached to the armature p of the electromagnet s. The electromagnet is located in the manner of a self-interrupter in the circuit of the source of electricity t. In the circuit is a contact-screw q against which the armature p resists when the electromagnet p is not excited. As soon as the circuit of the source of electricity is closed the electromagnet s attracts its armature p and moves by the pawl m the ratchet-wheel l. The simultaneous current of the electromagnet p is interrrupted at the contact-screw q and the armature p is returned by the action of the spring n. This function is repeated as long as the circuit of the electromagnet is not interrupted at some other place. The ratchet-wheel l is thereby turned tooth for tooth. With the same is moved the small feed-roll k, which again feeds the paper strip c'. The paper strip has, for each type which is to be set, two holes y, which are placed simultaneously under the brushes a and close the corresponding circuits.

Fig. 4 illustrates the mechanism by which the electromagnets are operated in a linotype machine of the Mergenthaler type. The mechanism for releasing the matrices is of the usual form, and therefore needs no description. Under the keys of this apparatus are placed the electromagnets g shown in Fig. 1. They consist of a coil g^1, core g^2 and armature g^3. The armature is connected by means of a rod g^4 with the corresponding key-lever g^5. When the current flows through the coil g^1, the core g^2 brings the armature g^3 down, by which the key is depressed and the known releasing mechanism brought into operation.

The advantage of this new apparatus compared to those hitherto known, consists in the selection of the electromagnet which is to make the selection of a character corresponding to a group of holes, being effected in every case only by means of two holes, the selecting magnet forming the joint member of the two groups, one of which is connected to one pole, and the other to the opposite pole, of the source of current, only one switch in addition to the contact effected direct by the holes of the register band being required for complete selection of an electromagnet. Another circumstance which characterizes the connection described, is the fact that the operations for selecting an electromagnet, take place partly simultaneously, and partly directly after each other. Simultaneous action of the holes on the contacts, is followed direct by the closing of the auxiliary switch, and the latter is followed by the passage of the current through the correct electromagnet. There is not any connection at any moment of the operations, which could operate a false magnet. By the employment of only two holes in forming each group of holes, the contacts and the auxiliary switches are limited to the smallest number required. Owing to this peculiarity, the connection insures high degree of safety and speed in working. The holes perforated in the register band, must be distinguished from each other by their position relatively to the edges of the band or to special guide holes.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed I declare that what I claim is:

1. In apparatus for the electric operation of type setting machines the combination of a plurality of switches, a plurality of switch operating electro-magnets, a source of electric power, a plurality of conductors connecting one pole of the source of power to one terminal of each switch-operating electro-magnet, a conducting roller, a conductor connecting this roller to the other pole of the source of power, an operating band having a plurality of perforations, means for imparting longitudinal movement to the band, a plurality of contact members corresponding to the perforations in the band, a plurality of electromagnets each controlling a character of the type setting machine, a plurality of conductors connecting the contact members with the character controlling electromagnets in groups, a plurality of conductors connecting the contact members to the switch operating electro-magnets and a plurality of conductors connecting the character controlling electro-magnets in groups to the terminals of the switches, as set forth.

2. In apparatus for the electric operation of type setting machines the combination of a plurality of switches, a plurality of switch operating electro-magnets, a source of electric power, a plurality of conductors connecting one pole of the source of power to one terminal of each switch-operating electro-magnet, a conducting roller, a conductor connecting this roller to the other pole of the source of power, an operating band having a plurality of perforations, means for imparting longitudinal movement to the band, a plurality of contact members corresponding to the perforations in the band, a plurality of electromagnets each controlling a character of the type setting machine, a plurality of conductors connecting all the contact members except the last in order to the character controlling electromagnets in groups, a plurality of conductors connecting all the contact members except the first in order to the switch operating electromagnets, a plurality of conductors connecting the character controlling electromagnets in groups to the terminals of the switches, as set forth.

3. In apparatus for the electric operation of type setting machines the combination of a plurality of switches, a plurality of switch operating electro-magnets, a source of electric power, a plurality of conductors connecting one pole of the source of power to one terminal of each switch-operating electro-magnet, a conducting roller, a conductor connecting this roller to the other pole of the source of power, an operating band having a plurality of perforations disposed in groups of two, means for imparting longitudinal movement to the band, a plurality of contact members corresponding to the perforations in the band, a plurality of electromagnets each controlling a character of the type setting machine, a plurality of conductors connecting all the contact members except the last in order to the character controlling electromagnets in groups, a plurality of conductors connecting all the contact members except the first in order to the switch operating electromagnets, a plurality of conductors connecting the character controlling electromagnets in groups to the terminals of the switches as set forth.

4. In apparatus for the electric operation of type setting machines the combination of a plurality of switches, a plurality of switch operating electro-magnets, a source of electric power, a plurality of conductors connecting one pole of the source of power to one terminal of each switch-operating electro-magnet, a conducting roller, a conductor connecting this roller to the other pole of the source of power, an operating band having a plurality of perforations disposed in groups of two, means for imparting longitudinal movement to the band, a plurality of contact members corresponding to the perforations in the band, a plurality of electro-magnets each controlling a character of the type setting machine and arranged in groups, a plurality of conductors connecting all the contact members except the last in order to the groups of character controlling electromagnets the number of electromagnets in

the group connected to the contact member first in order being one less in number than the total number of contact members and the number of character controlling electromagnets in each succeeding group connected to each succeeding contact member decreasing by one, a plurality of conductors connecting each contact member except the first in order to a switch operating electromagnet, a plurality of conductors connecting the character controlling electromagnets in groups to the terminals of the switches this grouping of the electromagnets as to number and individuals being inversely as the grouping of numbers and individuals with relation to the contact members.

5. In apparatus for the electric operation of type setting machines the combination of a conducting roller a source of electric power, a conductor connecting this roller to one pole of the source of power, an operating band having a plurality of perforations disposed in groups of two, means for imparting longitudinal movement to the band, a plurality of contact members corresponding to the porforations in the band, a plurality of switches in number less by one than the number of contact members, a plurality of switch operating electro-magnets, a plurality of conductors connecting one pole of the source of power to one terminal of each switch operating electro-magnet, a plurality of electromagnets each controlling a character of the type setting machine and arranged in groups, a plurality of conductors connecting all the contact members except the last in order to the groups of character controlling electromagnets, a plurality of conductors connecting all the contact members except the first in order to the switch operating electromagnets, a plurality of conductors connecting the character controlling electro-magnets to the terminals of the switches in groups arranged otherwise than the grouping with relation to the contact members this grouping being such that only one character controlling electromagnet is energized by the combination of any two contact members brought into operation by a group of perforations in the band as set forth.

6. In apparatus for electrically operating type-setting machines by means of a perforated register-band moved longitudinally through a contact device the contact members of which are controlled by the band, the combination of a plurality of electromagnets, each controlling a character to be composed by the type-setting machine, a plurality of electrically operated switches having one terminal fitted with different numbers of separate contacts, a plurality of electromagnets to operate these switches, a plurality of conductors, each connecting one of the contact members controlled by the band except one to the switch-operating electromagnets, a plurality of conductors connecting the contact members controlled by the band except one to the character-controlling electromagnets and further to the separate contacts of the electrically operated switches, these conductors being so arranged that the number of possible paths for the electric current through the character-controlling electromagnets, each perfected by two perforations of the register-band actuating simultaneously on the contact device, is equal to the number of different combinations by twos which can be taken from a number of units (elements) equal to the number of contact members controlled by the band.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

HEINRICH DREWELL.

Witnesses:
HENRY J. FULLER,
HERMINE GÖDECKE.