(No Model.)

3 Sheets—Sheet 1.

W. DREYER

ELECTRO MAGNETIC TYPE SETTING MACHINE.

No. 418,664. Patented Dec. 31, 1889.

Fig. 1.

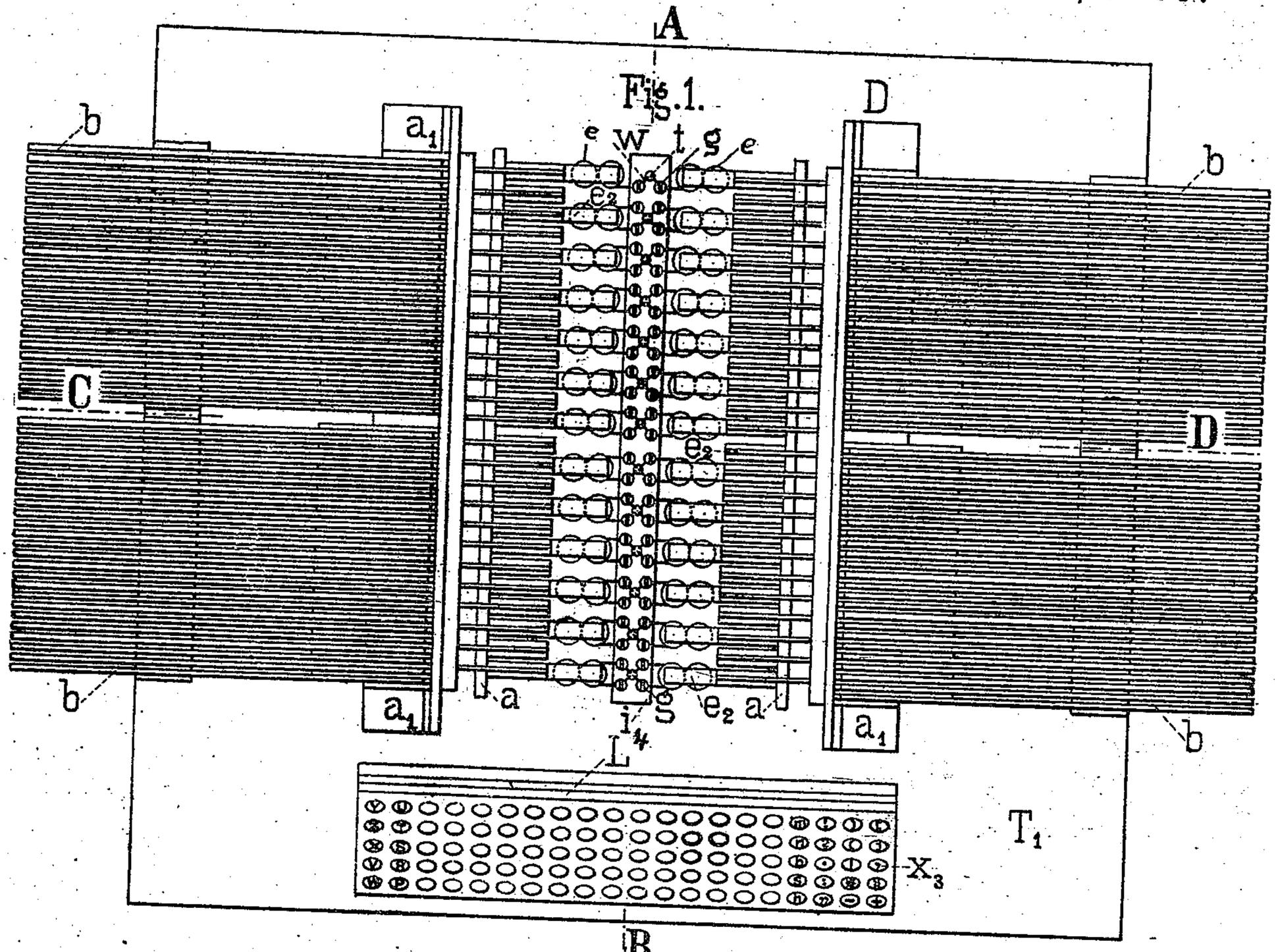


Fig. 6

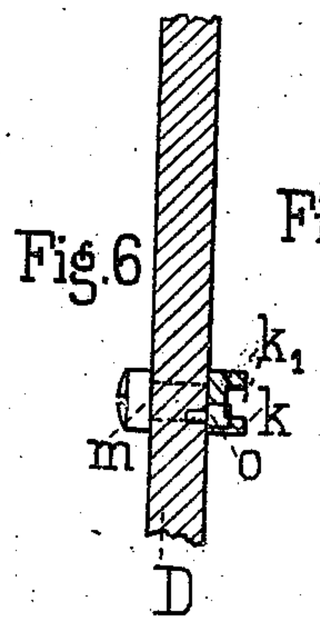


Fig. 5

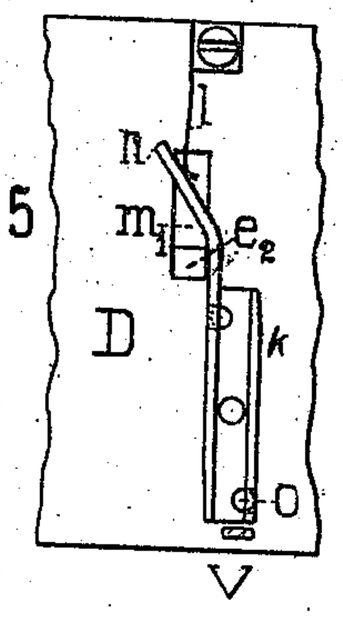


Fig. 4

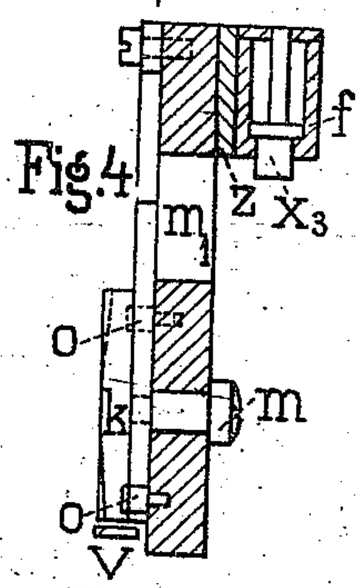


Fig. 2.

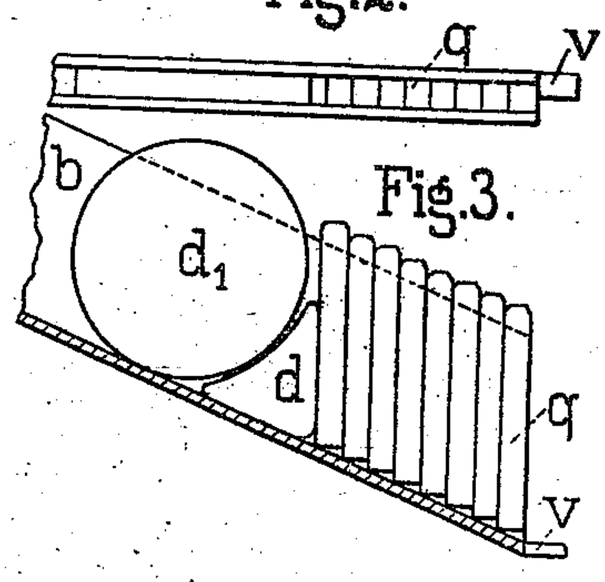
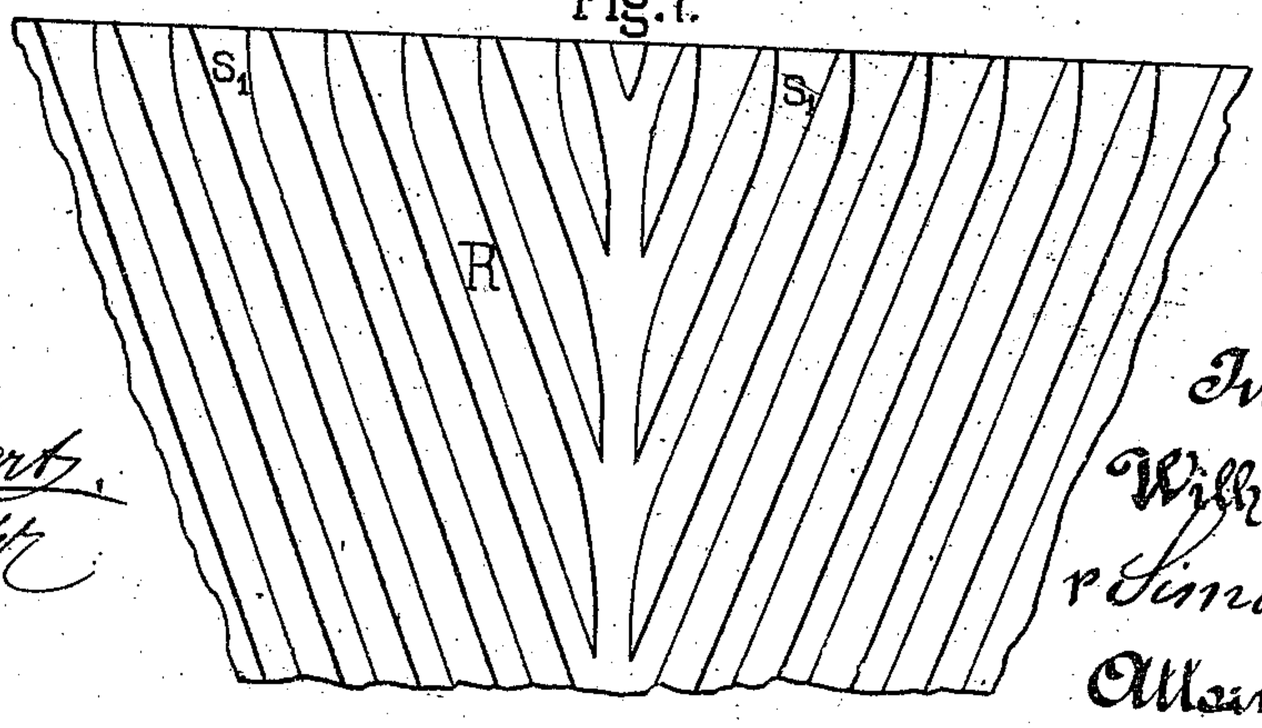


Fig. 3.

Fig. 7.



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(No Model.)

3 Sheets—Sheet 2.

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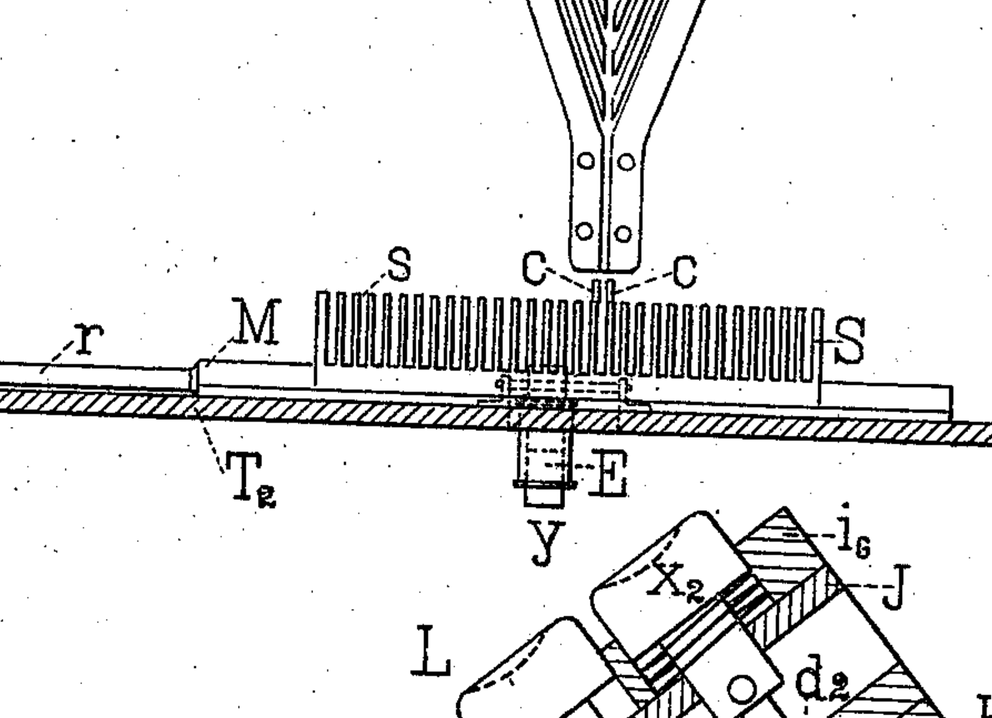
ELECTRO MAGNETIC TYPE SETTING MACHINE.

No. 418,664. Patented Dec. 31, 1889.

Fig.9.

Fig.8.



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(No Model.) 3 Sheets—Sheet 3.

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ELECTRO MAGNETIC TYPE SETTING MACHINE.

No. 418,664. Patented Dec. 31, 1889.

Fig. 10.

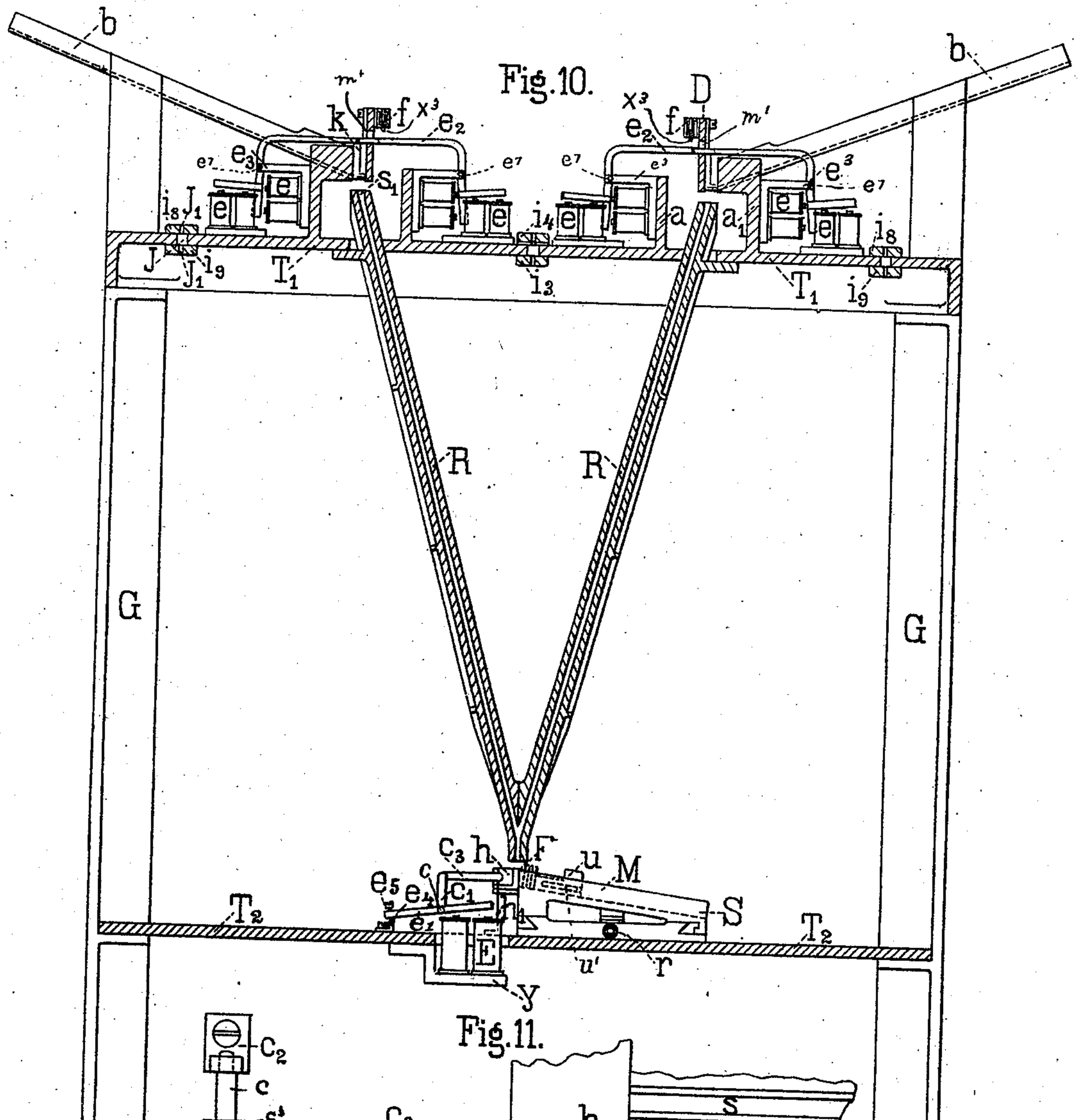
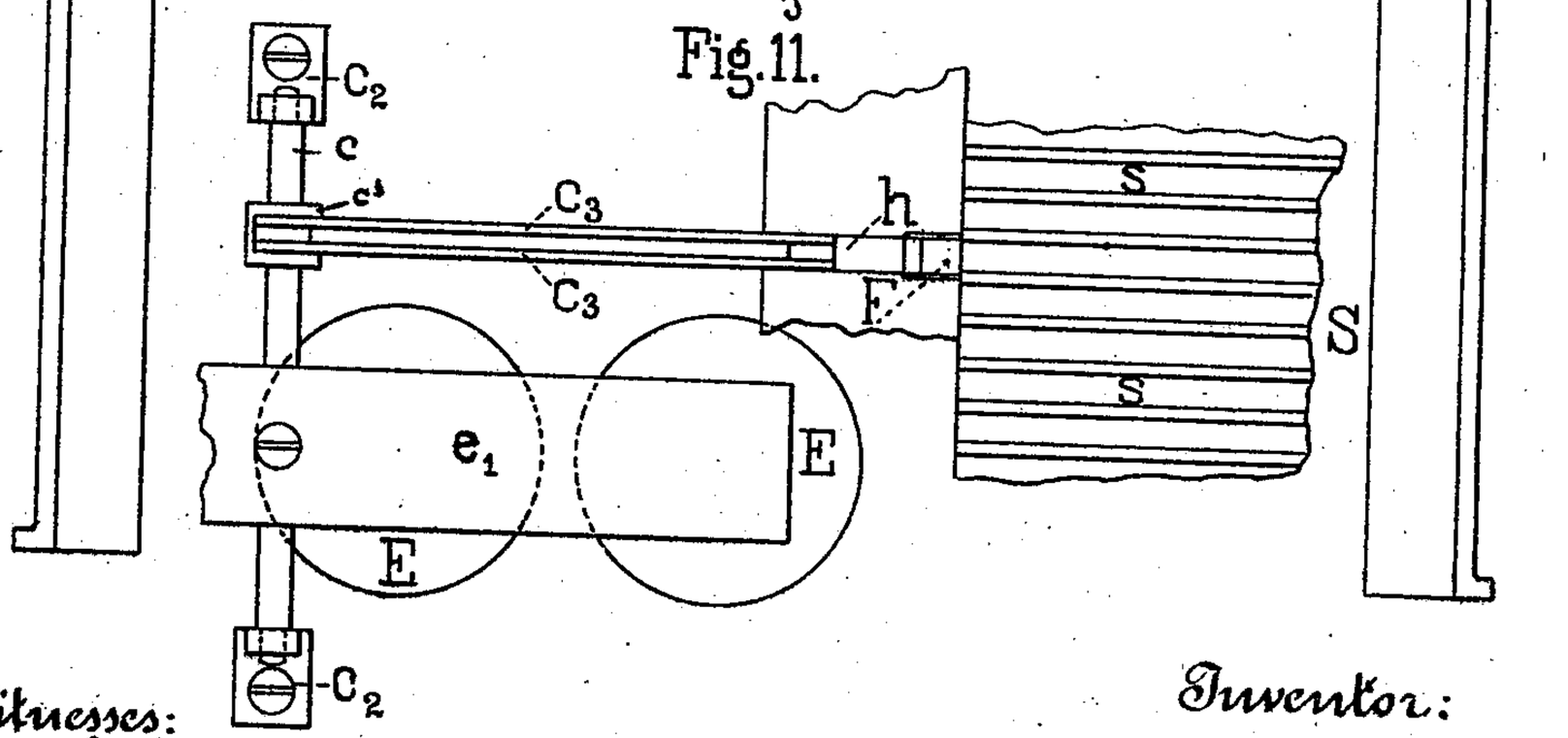


Fig. 11.



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UNITED STATES PATENT OFFICE.

WILHELM DREYER, OF FRANKFORT-ON-THE-MAIN, PRUSSIA, GERMANY.

ELECTRO-MAGNETIC TYPE-SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 418,664, dated December 31, 1889.

Application filed September 2, 1883. Serial No. 176,005. (No model.) Patented in Belgium August 17, 1885, No. 69,699; in England August 25, 1885, No. 8,995; in France November 6, 1885, No. 170,249, and in Germany May 20, 1886, No. 34,992.

To all whom it may concern:

Be it known that I, WILHELM DREYER, a subject of the Duke of Brunswick, residing at the city of Frankfort-on-the-Main, in the Kingdom of Prussia, German Empire, have invented a new and useful Electro-Magnetic Type-Setting Machine, (for which I have obtained patents in Germany May 20, 1886, No. 34,992; in France November 6, 1885, No. 170,249; in England August 25, 1885, No. 8,995, and in Belgium August 17, 1885, No. 69,699,) of which the following is a specification.

My invention relates to an electro-magnetic type-setting machine whereby printers' type is automatically conducted into a suitable receiving-channel and set up in lines; and the object of the invention is to reduce the type-setting effort or manipulation to the striking of keys corresponding with the type which is required to be set, thus allowing the work to be done by any person without previous apprenticeship, while an experienced operator will be able to do four times more work than by hand only. I attain this object by the mechanisms illustrated in the accompanying drawings, in which—

Figure 1 shows a plan view from above the machine. Fig. 2 shows a plan view of a type-channel. Fig. 3 is a cross-section of a type-channel. Figs. 4, 5, and 6 are details of the iron bar D, with the discharging-cell *k*, the brass bar *f*, and the contact-buffers x^3. Fig. 7 is a part of the channel-board R uncovered. Fig. 8 is a cross-section of the key apparatus. Fig. 9 is a cross-section of the machine on line A B of Fig. 1, the covering being removed to expose the partition. Fig. 10 is a cross-section of the machine on line C D of Fig. 1. Fig. 11 is a plan view from above the receiving-cell F with the clearing mechanism.

The principal parts of the machine are arranged upon an upper and a lower table T′ and T^2, supported by suitable standards G, Figs. 9 and 10. Near the middle of the lower table T^2 an aperture allows the electro-magnet E, carried by the bracket-piece *y*, to appear above the surface. The armature *e*′, Figs. 10 and 11, is fixed to a shaft *c*, carried in two supports c^2, Fig. 11. A lever *c*′, fixed to said shaft *c*, is coupled with the clearing-hammer *h* by bars c^3. The hammer *h* is in contact with a spring *h*′, serving to push the hammer back to its normal position after each forward stroke. Any excessive action of the spring is prevented by the stop-piece e^4, Fig. 10, and by the set-screw e^5, provided in the armature *e*′. The table T^2 also carries a support M, Figs. 9 and 10, provided with a sliding grooved plate S, having a number of receiving-channels *s* for the reception of the types as they come down into the receiving-cell F and are pushed out of it by the hammer *h*, Fig. 11. Upon the upper table T′ there are four upwardly-projecting pieces or ribs *a* and *a*′, Figs. 1, 9, and 10, of which *a*′ has as many notches as there are type-receptacles *b* to be supported by them. To the inner surface of the ribs *a*′ there are affixed bars D, Figs. 1 and 10, having a discharging-cell *k*, Figs. 4, 5, 6, and 10, in front of each notch, and these cells *k* are each secured to the bars D by one screw *m* only, Figs. 4 and 6, so as to allow the cells *k* to oscillate thereon, as required. A spring *l*, pressing on the arm *n*, Fig. 5, keeps the cells in the vertical position. The cells *k* are open in front of the type-channels *b*, placed in the notches, and form what may be called their "heads." The interior *k*′, Fig. 6, of each cell *k* is adapted to the size of the type destined for it, but leaving a sufficient free space to insure its being readily released therefrom.

The types *q*, Figs. 2 and 3, arranged vertically in their inclined receptacles *b*, have by their own weight, as well as by that of the triangular follower *d* and of the roller *d*′, a tendency to glide forward and to push the foremost type on into the discharging-cell *k* and to press it against the back of the cell. This tendency is, however, limited by the stops or studs *o*, Figs. 4, 5, and 6, which are screwed into the bar D, so as to extend their heads into the cell *k* through lateral apertures. Thus the type will bear against these studs or stops, and not against the back of the cell itself.

The bottom of each type-receptacle has a projection or lip *v*, Figs. 2, 3, 4, and 5, which, coming under the discharging-cell *k*, serves to sustain the foremost type until it is re-

leased by the operator, as will be hereinafter described.

A brass bar *f*, Figs. 4, 9, and 10, is fastened to the bar D on the side opposite to the cells *k*, and is furnished with as many contact-buffers x^3, Figs. 4, 9, and 10, as there are type-channels *b* or discharging-cells *k*. There is a perpendicular slit in the bar D in front of each such buffer. An insulating-layer *z*, Fig. 4, (for instance, of asbestus,) separates *f* from D, and the fastening of both bars is done so as to exclude electric communication. The four rib-pieces *a* and *a'* also form the points of support for the bracket-pieces e^3, for carrying the horizontal electro-magnets *e*, Fig. 10, arranged in duplicate pairs for more effectively operating the levers e^2, while the perpendicular magnets *e* are secured to the table T'. The brackets e^3 serve as centers of motion for the double levers e^2, Fig. 10, which are pivoted at e^7. The lower parts of said levers form the armatures, while the upper parts reach into and beyond the slits *m'*, Figs. 4 and 5, of the bar D. Between the rib-pieces *a* and *a'* the necessary apertures are provided in the table T', Fig. 10, for introducing the channel-board R from below the table, where it is fastened. On the table T' is also the key apparatus L, Figs. 1, 8, and 9, with as many keys as there are different types required for setting. The surface of each key is marked with the corresponding letter or sign to that upon which it operates. In the lower part of the key apparatus L an insulating-fillet i^7 contains, right below each key, a contact-buffer H, to which the wires W are attached by the screws *x*, Figs. 8 and 9. From the said screws *x* the wires pass through holes *t'*, Fig. 9, below the table, and are conducted thence to and through the holes *t* in the insulating-fillet i^3 to the surface of the insulating-fillet i^4, where they are fixed under the screws *g*, Fig. 1. Under each of these screws *g* is also an end of the wire of one of the electro-magnets *e*, and thus these latter are in communication with the keys. To prevent contact between the table T' and the wires *w* before the electric current has circulated around the magnets, the wires are conducted through several insulating-fillets *i'*, i^2, i^3, i^4, i^8, and i^9, Figs. 1, 9, and 10. The other wire ends of the electro-magnets are simply fixed to the table, and this is put in communication with the negative pole of the electric battery, which is established under the table. All the levers e^2 being in free communication with the table T' are consequently in connection with the same pole. The brass plate J, Figs. 8 and 9, however, which is in the middle of the key apparatus L and insulated from the buffers H, communicates with the positive pole of the same battery.

The wires of the electro-magnet E, Fig. 10, are on one hand conducted to the brass bar *f*, Figs. 4 and 10, and on the other to the positive pole of the battery. The channel R, Figs. 7, 9, and 10, is composed of so many channels *s'* as there are type-receptacles *b*, these channels being so disposed as to converge or lead all into a central channel, and the two or more funnels are combined to form at their lower extremities one issuing channel or throat, whence the discharged types fall into the receiving-cell F, Figs. 10 and 11, arranged upon the table below.

A sliding piece *u*, Fig. 10, provided with a spring *u'*, acts as a support to the types in the grooves *s*, and the screw *r*, Figs. 9 and 10, serves to move the plate S and to place an empty groove in front of the cell F as soon as the preceding one is sufficiently filled.

The machine is worked in the following way, viz: When a certain type is wanted—for instance, the letter A—the key marked A is pressed down so as to effect the contact of the two fingers or pieces d^2 and d^3, Fig. 8, to establish thereby the electric current. Consequently the electro-magnet *e* corresponding to the type A will be put in activity. It will attract its armature and move the lever e^2. The upper end of this lever will accordingly be lifted in the slit *m'* and pushing aside the arm *n* of the cell *k*, Fig. 5, it will throw the said discharging-cell *k* out of its vertical position. By this oscillation the type in the cell *k* is removed from its support *v* and from the studs *o*. At the same time the cell *k*, which is placed in an oblique direction across the end of the type-receptacle *b*, prevents the following types from entering the cell *k* and of pressing the first type against the back of the cell, which might impede its release therefrom. The first type is therefore completely free, and gliding from the cell *k* into the channel *s'* immediately below and which forms a part of the channel-board R, it will reach the receiving-cell F, Fig. 11. As soon as the type is discharged from the cell *k*, which is only a moment's work, the operating-key is let loose, the electric current is interrupted, and the spring *l*, Figs. 4 and 5, pushes the cell back into its normal position, where it is at once occupied by the following type. When the first type is in the receiving-cell F, another one can be discharged by pressing the operating-key corresponding to the letter required, and so on; but apart from the effect mentioned above, another one is obtained which will be now described, viz:

When the upper part of the lever e^2 is lifted in the slit *m'*, it will not only displace the cell *k*, but also touch the contact-buffer X^3, Figs. 4 and 10, and will thus communicate negative electricity to the brass bar *f*. The electric circuit being thus established for the electro-magnet E, this latter will be put in action at every discharge of the type. Attracting its armature, it will move the hammer *h* and cause the type standing in the cell F to be pushed into the groove *s* (provided in the sliding plate or frame S) before another type has come down.

A stick (not marked in the drawings and the length of which is variable according to

the length of the lines to be formed) is fixed to the sliding piece *u* and touches an electric bell as soon as the required length is attained. The compositor then turns the screw *r* to put an empty groove in front of the cell F.

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

1. The combination, with the discharging-cells *k*, of the stop *o*, the bar D, the lever e^2, the electro-magnets *e*, arm *n*, and the springs *l*, as and for the purpose specified.

2. In an electro-magnetic type-setting machine, the combination, with the frame, of a series of inclined type-setting receptacles, oscillating type-cells at the mouths of the receptacles, electro-magnets with intermediate connections and springs for operating the cells, a channel-board below the cells, reciprocating bar for releasing the type from the channel-board, and electro-magnets for moving the bar and the key apparatus for controlling the several parts, substantially as described.

3. The combination, with the frame of the inclined type-receptacles having lips *v* and stops *o*, of oscillating cells *k*, electro-magnets with intermediate connections and springs for operating the cells, a channel-board below the cells, a receptacle below the channel-board, a reciprocating bar for releasing the type, and an electro-magnet for moving said bar, substantially as set forth.

4. The roller *d'* and the triangular piece *d*, in combination with the type-channel C, employed for forcing the type forward, substantially as described.

5. The combination, with a series of inclined type-receptacles, of oscillating cells at the mouths of the same, electro-magnets with intermediate connections and springs for operating the cells, and a channel-board below the same, substantially as described.

6. The combination, with the inclined type-receptacles, of the bar D, oscillating cells *k*, and electro-magnets with intermediate connections for operating the cells, the channel-board, and the key apparatus, substantially as described.

In testimony whereof I sign this specification in the presence of two subscribing witnesses.

WILHELM DREYER.

Witnesses:
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JOH. HEINR. MEYER.