

(No Model.)

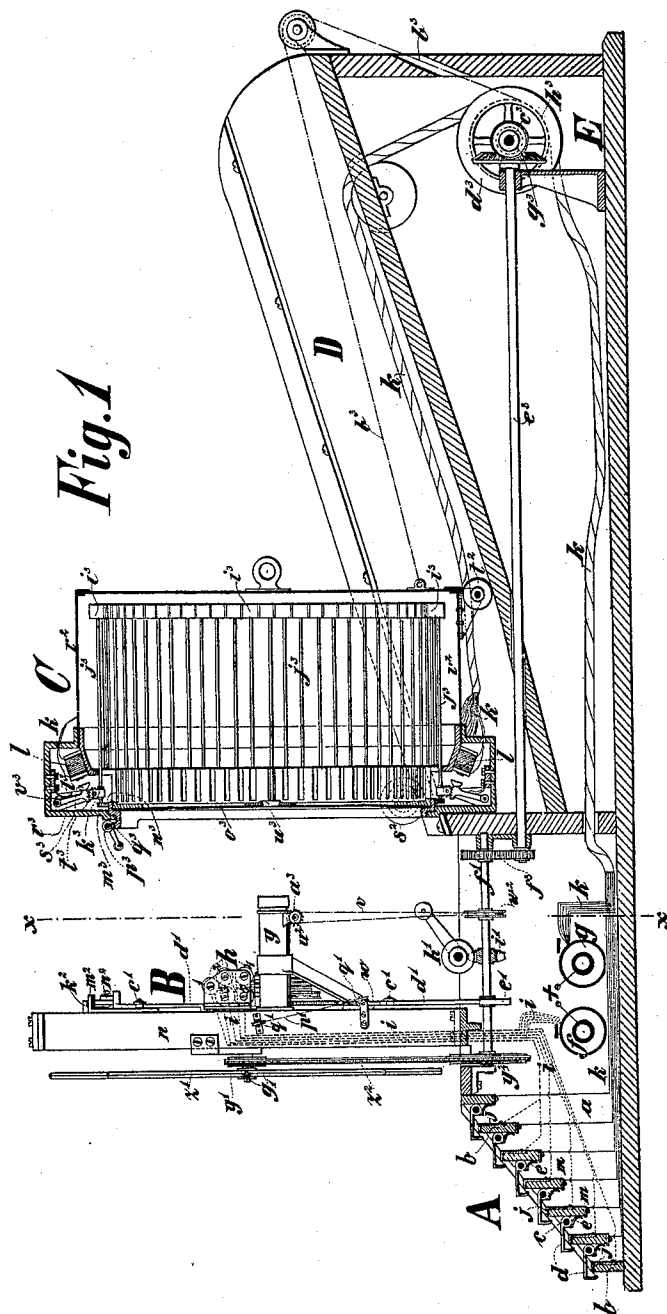
4 Sheets—Sheet 1.

E. PORZSOLT.

APPARATUS FOR SETTING TYPE AND SIGNS BY MEANS OF PHOTOGRAPHY.

No. 568,988.

Patented Oct. 6, 1896.



Witnesses:
L. V. Legendre.
Chas. C. Balston.

Inventor
Eugene Porzsolt
By *F. W. Barker*
attorney

(No Model.)

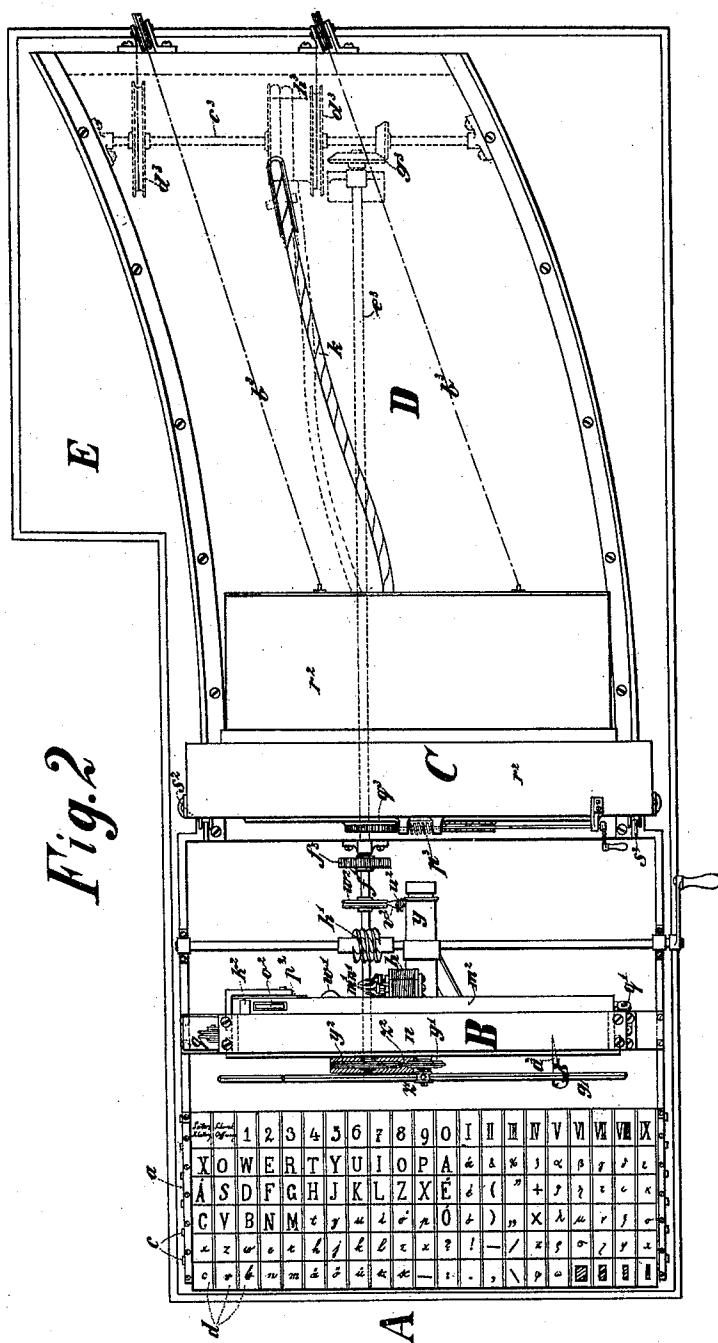
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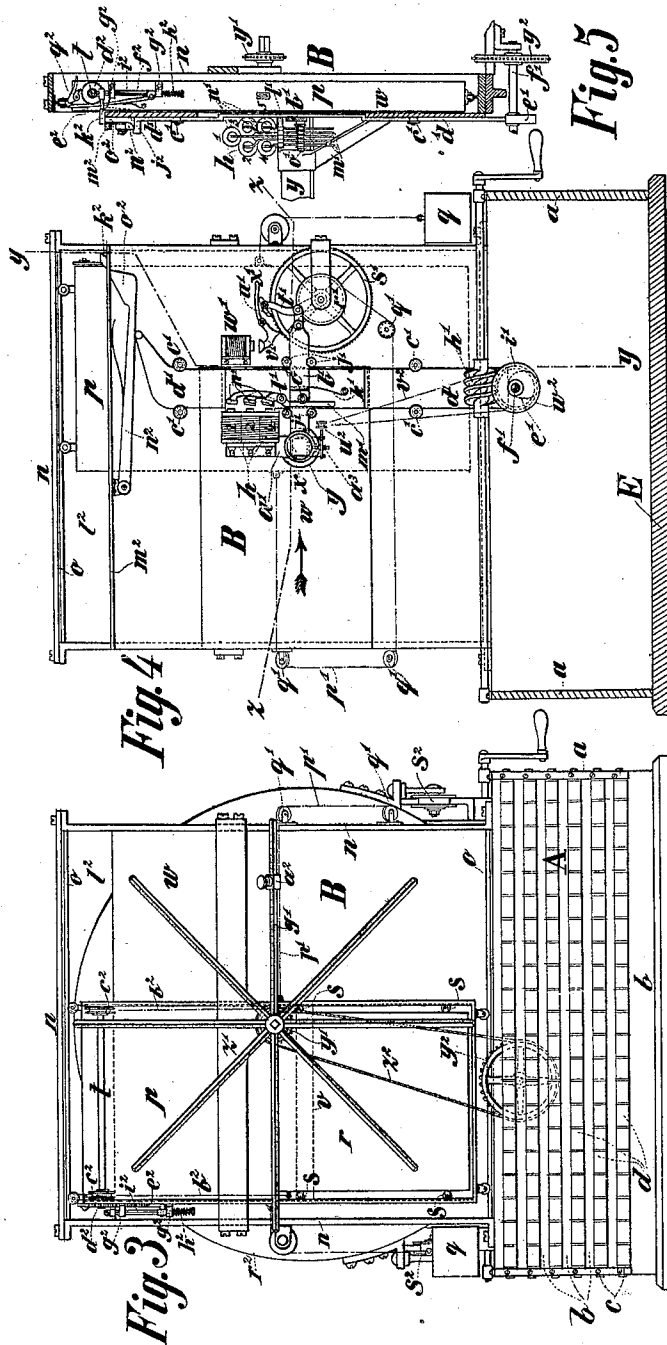
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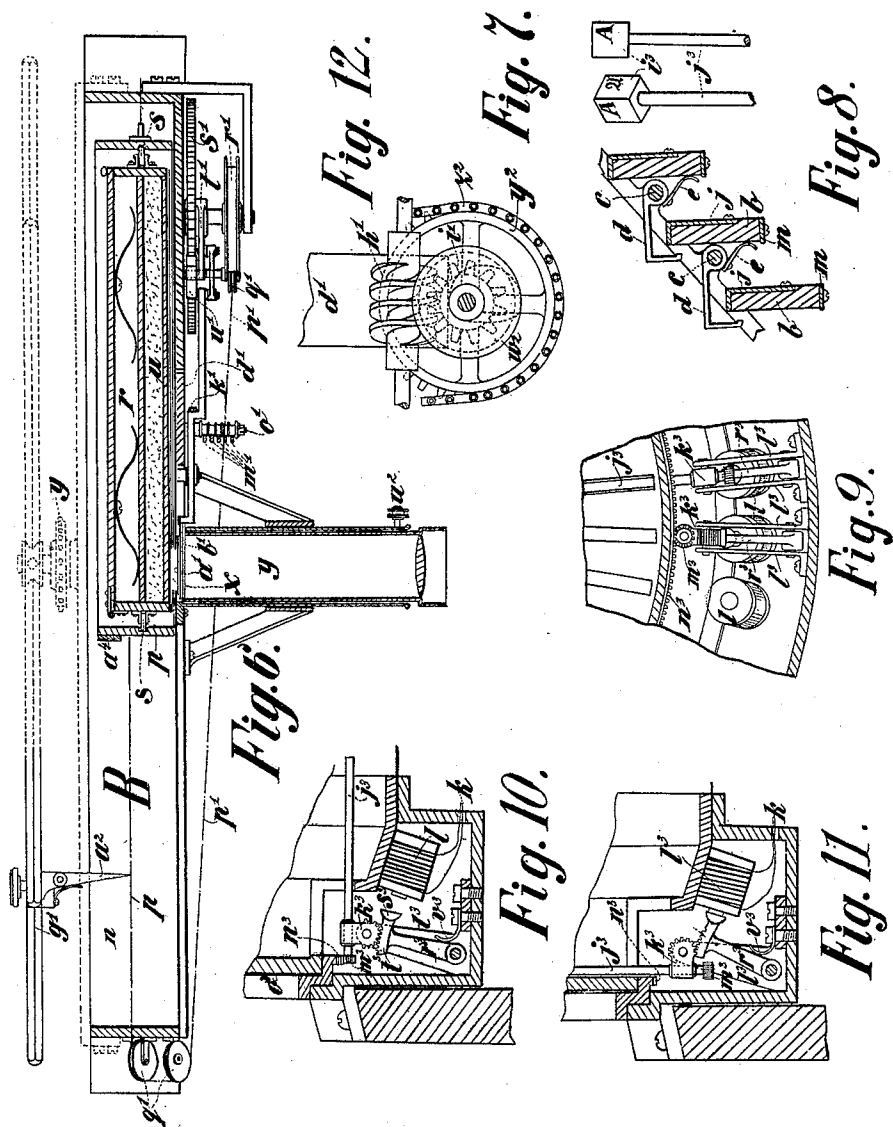
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Patented Oct. 6, 1896.



Witnesses:
L. N. Legendre
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UNITED STATES PATENT OFFICE.

EUGENE PORZSOLT, OF BUDA-PESTH, AUSTRIA-HUNGARY.

APPARATUS FOR SETTING TYPE AND SIGNS BY MEANS OF PHOTOGRAPHY.

SPECIFICATION forming part of Letters Patent No. 568,988, dated October 6, 1896.

Application filed November 13, 1894. Serial No. 528,630. (No model.)

To all whom it may concern:

Be it known that I, EUGENE PORZSOLT, a subject of the Emperor of Austria-Hungary, residing at Buda-Pesth, in the Empire of Austria-Hungary, have invented a new and useful Apparatus for Setting Types and Signs by Means of Photography, of which the following is a full, clear, and exact description.

This invention relates to an apparatus for very rapidly producing printed matter by means of photography. To effect this, I provide a system of keys similar to those on a type-writer, each of which keys on being depressed raises a corresponding type, letter, or like character in electrical connection therewith and simultaneously operates the shutter of a photographic apparatus. The said raised letters are thus exposed to a sensitized plate and photographed in proper succession. The sensitized plate is then removed and etched in the usual manner or otherwise prepared.

The apparatus is provided with four different but medium sizes of type which may be reproduced on a larger or smaller scale by setting the photographic apparatus accordingly, in the manner hereinafter described. Hence any size of type may be reproduced.

The adjustment of the size of type to be worked with the setting of the photographic apparatus in accordance therewith and the regulation of the length of lines are all effected automatically.

Referring to the accompanying drawings, Figure 1 is a vertical section of the complete apparatus, and Fig. 2 a plan of same. Fig. 3 is a front view, and Fig. 4 a section on line *x x* of Fig. 1 and showing the photographic apparatus. Fig. 5 is a section on line *y y* of Fig. 4, and Fig. 6 a section on line *z z* of Fig. 4. Fig. 7 shows a type-die in two positions. Figs. 8 to 10 are details on a larger scale. Fig. 11 is another sectional view of Fig. 10. Fig. 12 is an elevation of the transmitting-gear.

The keyboard *A*, which is like that of a type-writing machine, comprises a series of insulating-ledges *b*, set edgewise and stepwise in the metal walls *a* of the frame, Figs. 1 and 2. In front of each ledge *b* is an axle *c*, likewise mounted in the walls *a* and serving as pivot for the metal keys *d*, which are furnished with letters and subject to the action of springs *e*. Each upper row of keys,

therefore, projects beyond the axis of the succeeding lower row, and at the same time covers the ledge *b*, without, however, touching same. All the keys *d* are connected to the positive poles (+) of two batteries *f g* by means of the axles *c* and walls *d*. The battery *f* operates the shutter of the photographic apparatus *B* and, indirectly, the plate in same, while the other battery, *g*, actuates the type-drum *C*. For this purpose the current passes from the negative pole (−) of battery *f* through the shutter-magnets *h* to the contacts *j*, Fig. 1, on the upper edge of ledge *b* of each key *d*. Hence all the equally large types are connected with the same magnet *h*. Supposing, therefore, there are only five sizes of type, five wires *i* are provided, as shown in the drawings, and just the same number of magnets *h* for opening the shutter to the extent required by the size of the types.

The number of wires *k* running from the negative pole (−) of battery *g* to the drum *C* is the same as the number of signs or characters employed, seeing that a magnet *l* is required for operating each sign. The current from battery *g* thus passes along the wires *k* through magnets *l* to the contacts *m* at the under edge of the ledges *b* and below the springs *e*. It will therefore be evident that immediately a key *d* is depressed the spring *e* makes contact with the contact *m*, and the corresponding sign in the drum *C* is thus brought into position. Such key now makes contact with *j* and opens the shutter of apparatus *B* when the said sign in position is photographed.

The photographic apparatus *B* comprises a square narrow case *n*, Figs. 1 and 2, open in front and fixed behind the keyboard *A* on the walls *a*. A long narrow frame *p*, inclosing a second smaller frame *r*, may be moved horizontally in and toward each side of the case *n* by means of rollers running on rails *o*. The weight *q* or like device draws the frame *p* toward the left.

The smaller frame *r*, suspended from shaft *t*, may be raised or lowered by the latter and is provided with rollers *s* for that purpose. Such frame *r* contains the sensitized plate *u*, Fig. 6, which is immediately in front of the thin back wall of the frame *p*, seeing that the frame *r* has no back wall. About half-way

up the back wall of frame *p* and at the height of the highest lines is a horizontal slot *v*, (dotted lines, Fig. 3,) behind which is the square opening *x* in the center of the back wall *w* of frame *n* and in which is the above-mentioned shutter. Every part of the plate *u* can thus be brought in front of this opening, seeing that both the frames *p* and *r* are movable.

The objective *g* is arranged opposite the opening *x*, and between same is the shutter mechanism, comprising a vertical slide *a'* and a horizontal slide *b'*. The former slide *a'* opens independently of the latter immediately a key is depressed, and it remains open and at the same height (height of line) as long as the same height of line is used. The slide *b'*, however, remains closed and can only be opened for a moment for each type separately to the extent required by the width of the letter. This is effected in the following manner: The vertical slide *a'* is mounted on a bolt *d'*, movable vertically on the wall *w* between rollers *c'* along the side of the objective *y*. The lower end of the bolt *d'* abuts against the eccentric *e'* of shaft *f'*, mounted in suitable bearings below the case *n* and parallel to the walls *a*. The type or line scale *g'* of the shutter mechanism, the objective *y*, and the type-drum *C* are operated and adjusted through the medium of the shaft *d'*. On the shaft *f'* being rotated by the endless screw *h'* and wheel *i'* the eccentric *e'* raises the bolt *d'*, Figs. 1 and 4, and with it the slide *a'*, to the height required by the width of the lines or letters. The aforementioned magnets *h* are arranged above the horizontal slide *b'* and on the bolt *d'*, while the slide *b'* runs over the bolt *d'* between rollers *j'* and is kept in the closed position by a strong spring *k'*. On a horizontal pivot *l'* of bolt *d'* are mounted levers *n'*, movable vertically and parallel to the bolt *d'* and in front of the magnets *h*. The lower ends *m'* of these levers are limited in their movements by a stop *o'* on the slide *b'*, while their upper ends, furnished with soft-iron heads, are opposite the poles of the magnets *h*, and thus act as armatures for the latter.

The length of the ends *n'* of the levers and their distance from the poles 1, 2, 3, 4, and 5 of such magnet *h* are such that the stroke of the equally long arms *m'* of the levers increases according to the magnet by which the arm *n'* is attracted. For instance, when one of the arms *n'* is attracted, the other arm, *m'*, forces the slide *b'* in the direction shown by the arrow in Fig. 4, and thus brings such slide into the open position. Consequently the top magnet *h* opens the slide *b'* to the least extent—i. e., for the narrowest letters—and the lowest and front magnet to the greatest extent for the broadest letters. On opening the slide *a'* to a still greater extent (for longer or higher letters) the distance of the two pivots *l'* and *o'* increases, the arms *m'* are longer, and the slide *b'* is opened to an extent equal to the increased length of the letter.

The horizontal movement of the plate *u* is effected by the horizontal slide *b'* in the following manner: A cord *p'* runs along the right side of the frame *p*, and, on leaving the case *n*, passes over rollers *q'* to the winding-rollers *r'*. On the same axis as the latter is mounted a wheel *s'*, the lever *t'* of which is so coupled to the slide *b'* that on closing the latter the pawl *u'* of lever *t'* turns the wheel *s'*, and thus the cord *p'* is wound on the roller *r'* and the frame *p* moved toward the side. A pawl *v'* for preventing the return of the wheel *s'* may be disengaged by a magnet *w'*, Fig. 4. On said pawl *v'* being attracted by the magnet *w'* the arm *x'* of pawl *v'* releases the pawl *u'* of lever *t'*. The frame *p* is then returned to its original position by the weight *g*. The magnet *w'* may be actuated either automatically or by means of the keys *d*, according as it is desired to begin a new line or to make lines.

The automatic actuation of the magnet *w'* is effected by the line mechanism in the following manner: The scale-star *z'* is loosely mounted on the square hub of wheel *y'* at the front of the case *n* and is composed of eight arms marked with the scales of the eight principal sizes of letters being used. This star *z'* is brought into the desired position by the shaft *f'* through the medium of the chain-wheels *y'* *y'*² and chain *z'*, Fig. 3. On the said horizontal arm a contact-finger *a'*², Fig. 2, protruding into the open case *n*, is fixed by means of a screw at the point where the lines are to end. This finger *a'*² is in connection, by means of the metal frame, with a pole of one of the aforementioned batteries, while the other pole of such battery is in connection with a contact *a'*¹ on the right of frame *p* and at the height of the finger *a'*². When, therefore, the frame *p* reaches the finger *a'*², the magnet *w'* disengages the abovementioned mechanism and the weight *g* draws the frame *p* back to its original position. The electric current may also be interrupted by pressing down one of the keys *d*, in which case the frame *p* is more effectually returned.

A special key may be used for cutting off the current, although in that case one of the magnets *h* must be brought into communication with such key. The frame *p* thus returns while the slide *b* is still in the open position, and consequently a line is simultaneously produced on the plate *u*. In the latter case it is preferable to connect the automatic finger *a'*² to a bell instead of to the magnet *w'*. The bell is then rung when the end of a line is reached.

At each return of the frame *p* the plate *u* is moved vertically in the following manner: The shaft *t*, mounted in frame *p* and carrying the frame *r*, vertically movable on rollers *c'*, is provided at the left and outside the frame with a ratchet-wheel *d'*², on which the rack *e'*² is pressed by a spring *f'*². This rack *e'*² is pivotally connected to a rod *i'*², which may be moved vertically in two bearings *g'*², and which

is subject to the downward tension of a spring h^2 . The rod i^2 itself is not rotatable, but it carries at its upper end a horizontal arm k^2 , which may be turned to the left, and which is brought to the right again by a spring j^2 , Fig. 5. The arm k^2 projects through the slot l^2 of the wall w and glides along the lower bent-back angular part m^2 of the slot f^2 , Figs. 2 and 4. Underneath the part m^2 is secured an arm n^2 , resting on the bolt d' in such manner that its wedge-like nose o^2 extends so far through the slot p^2 as the height of the line corresponding to the position of the bolt d' requires. When the frame p advances, the arm k^2 comes in contact with the nose o^2 and turns toward the left. On the return of such frame, however, the arm k^2 , which cannot turn to the right, runs up the slanting edge of the nose o^2 and thus raises the rod i^2 , and through this the rack e^2 , which therefore turns the wheel d^2 and thus raises the frame r . The latter is returned by hand on raising the pawl q^2 , which at the same time disengages the rack e^2 by forcing same back.

Finally the letter-drum C, of any suitable shape, comprises a cylindrical case r^2 , whose front side is parallel to the back wall w of the case n , and which may be moved along the inclined plane D by means of its wheels s^2 , s^2 , and t^2 . The drum C moves simultaneously with the adjustment of the types and in accordance with the position of the objective. For this purpose both the objective and the drum are adjusted from the shaft f' —viz., the objective directly by means of the gear u^2 v^2 w^2 , which causes a small wheel a^2 to move the inner tube of the objective backward or forward, and the drum C by a winding mechanism which moves the drum C up and down the inclined plane D by means of two ropes b^3 .

The inclined plane D curves toward the left, as shown in Fig. 2, in order that the image of the letters retreating from the objective may be taken at the proper part of the plate u .

The winding mechanism comprises a horizontal shaft c^3 at right angles to the shaft f' and carrying two pulleys d^3 , on which wind the ropes b^3 , running from the drum C. The shaft c^3 is actuated from the shaft f' by a shaft e^3 , engaging with shaft f' by means of spur-gear j^3 and with c^3 by means of bevel-gear g^3 . When the drum C moves, the wires k of the type-magnets l , collected so as to form a cable, simultaneously wind round the drum h^3 , mounted on the shaft c^3 , and thus the drum C has a free course. The types to be reproduced are fixed on small dies, Figs. 1 and 7, mounted on rods j^3 , which latter are arranged in a circle round the inner side of the cylindrical casing r^2 and at right angles to the front wall of the drum C. The other ends of the rods j^3 almost touch the front wall of the latter. The rods j^3 are so mounted on radially-arranged stands l^3 by means of small toothed blocks k^3 that they may turn in the latter, and when in the stationary position engage

with teeth of ring n^3 by means of a pinion m^3 , Figs. 1, 9, 10, and 11. The ring n^3 surrounds the circular central part o^3 , forming the front wall of drum C, and which may be rotated by means of an endless screw p^3 and a correspondingly-toothed gear q^3 , Fig. 2. This rotation takes place when one of the alphabets or series of characters is changed, seeing that each of the four sides of the dies has a different kind of type, and by rotating the middle part o^3 of the rods j^3 are likewise turned. The letters or characters may thus be changed four different ways by this mechanism. The toothed segment t^3 of arm r^3 , furnished with anchor-plate s^3 and mounted in stand l^3 , engages with k^3 , while the armature-plate s^3 is arranged opposite a magnet l . On passing the current through the latter by depressing one of the keys d such magnet l attracts the arm r^3 , which thus turns k^3 , when the rod j^3 is brought into the vertical position, Fig. 11, and the proper side of the die i^3 presented to the square opening u^3 in the front wall o^3 . The rod j^3 is returned to its original position by a spring v^3 on the circuit being broken.

It will be evident that music-type may be produced in the same way. In that case the lines of the staff may either be made on the plate u direct or by photographing a point and moving the plate horizontally.

It will also be evident that the shape and construction of the various parts of this apparatus may be modified without in any way departing from the spirit of this invention.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I declare that what I claim, and wish to secure by Letters Patent, is—

1. In an apparatus for setting up types and signs by means of photography, a system of keys provided with letters, music-signs, or like characters, electromagnets operated by depressing such keys, a photographic apparatus for photographing the types brought before the objective by said electromagnets, a further set of electromagnets operated by the same system of keys and opening the shutter of the photographic apparatus so as to expose the characters to a sensitized plate, substantially as described and shown in the drawings.

2. In an apparatus for setting up types and signs by means of photography, a slide a' mounted on vertically-movable bolt d' engaging with eccentric e' of shaft f' , and a slide b' operated horizontally by the arm m' of levers attracted by magnets h , said slides a' , b' forming the photographic shutter and being arranged between the objective and the sensitized plate u , such magnets h being actuated by depressing the keys d , substantially as described and shown in the drawings.

3. In an apparatus for setting up types and signs by means of photography, a type-drum C mounted on rollers behind the photographic apparatus B, in which drum the types bearing

different alphabets are on heads i^3 of horizontal rods j^3 arranged around the inside of the drum C and operated by magnets l , said drum C being moved on inclined plane D by means
 5 of ropes running onto the drum of a winding mechanism, substantially as described and shown in the drawings.

4. In an apparatus for setting up types and signs by means of photography, a system of
 10 keys bearing the characters to be set up and mounted on axles c in electrical connection with batteries f , g types brought into a position to be photographed on depressing the

corresponding keys; magnets l attracting arm r^3 engaging with toothed block k^3 of rods j^3 ,
 15 which latter are returned to their original position by springs, substantially as described and shown in the drawings.

In witness whereof I have hereunto signed my name in the presence of two subscribing
 20 witnesses.

EUGENE PORZSOLT.

Witnesses:

WML. GENTRY,
 NERIX HOENIGER.