No. 652,422. Patented June 26, 1900.

H. BURG.

APPARATUS FOR SETTING LINES OF TYPE OR MATRICES.

(Application filed Dec. 31, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

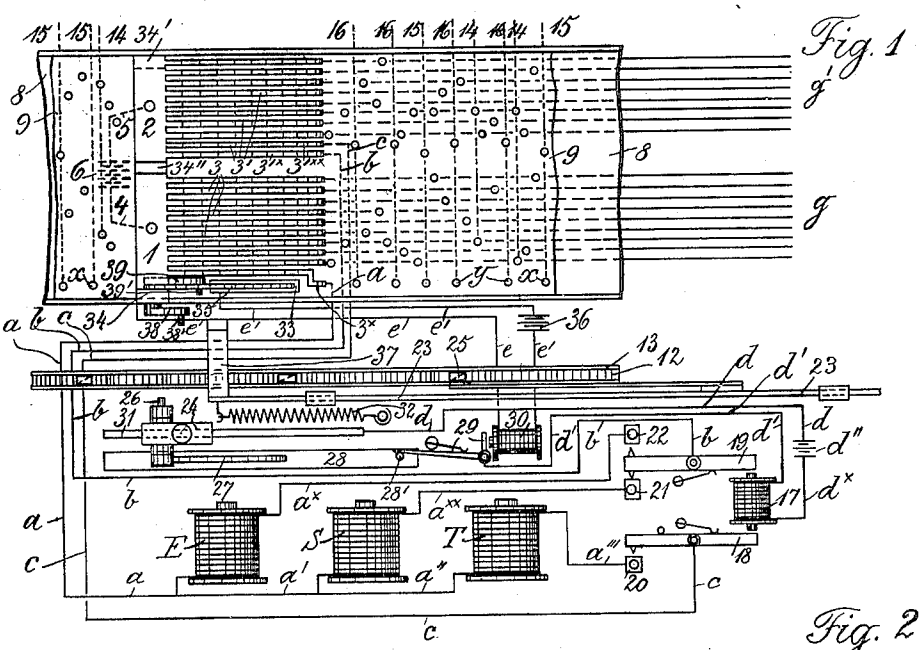


Fig. 2

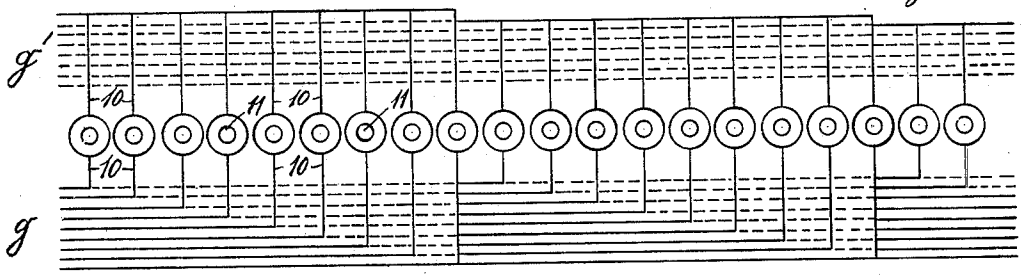


Fig. 3

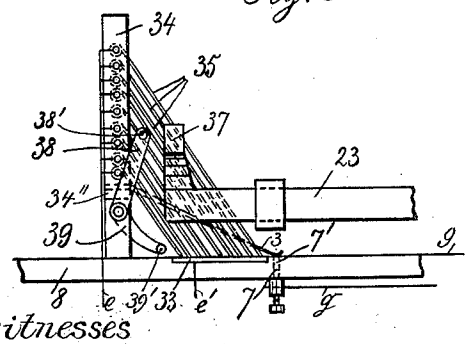
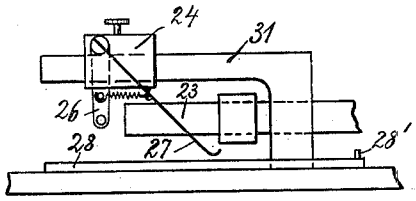


Fig. 4



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APPARATUS FOR SETTING LINES OF TYPE OR MATRICES.

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(No Model.) 2 Sheets—Sheet 2.



Fig. 8

Fig. 5

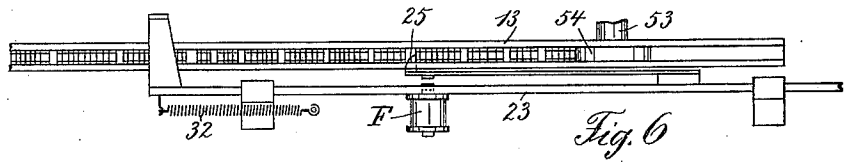


Fig. 6

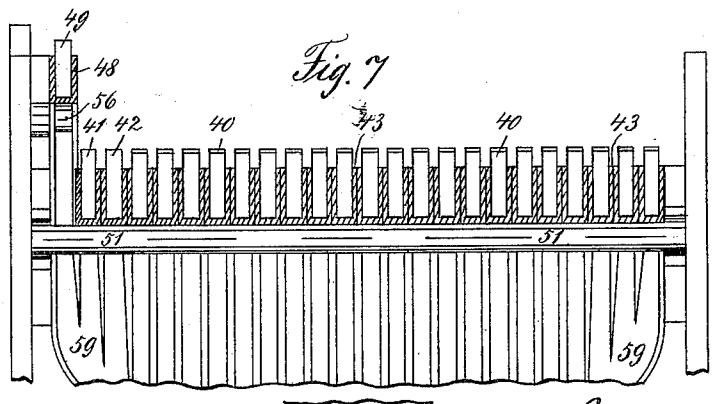
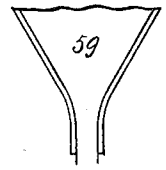


Fig. 7



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR SETTING LINES OF TYPE OR MATRICES.

SPECIFICATION forming part of Letters Patent No. 652,422, dated June 26, 1900.

Application filed December 31, 1897. Serial No. 665,021. (No model.)

To all whom it may concern:

Be it known that I, HUBERT BURG, a subject of the German Emperor, residing at Mollkirch, near Rosheim, in the Province of Alsace-Lorraine, Germany, have invented a new and useful Apparatus for Setting Lines of Type or Matrices by Means of a Regular Strip, of which the following is a specification.

The objects of my invention are, first, to form provisional lines which can be afterward lengthened or shortened to the normal length by hand or by an automatic justifying apparatus; second, to dispense with the necessity of previously justifying the line in its being marked on the strip, as heretofore, and, in consequence thereof, to dispense, third, with the necessity of previously measuring or calculating the thicknesses of types which will afterward compose the line, and, fourth, with the necessity of restricting the line to a predetermined length and to the condition of being afterward composed of types of a predetermined body; fifth, to simplify and facilitate the correcting of the register-strip in such manner that any correction can be locally and independently performed without necessitating, as heretofore, a change at the same time of portions of the register belonging to previous or to following lines or a change of the justifying or line-scoring marks of the register-strip. Shortly, the object of my invention is to free the method of setting by means of a register-strip from all restrictions inherent thereto heretofore and to give the same all the facilities and generalities of the direct method of immediately setting types or matrices.

My invention broadly consists in providing the register-strip with marks for letter-types, for provisional spaces of a middle size, at the end of each word, and for hyphens between the syllables of each word or of somewhat long words only, but not providing, as hitherto, justifying nor line-severing marks, selecting then by the said strip types or machines and provisional spaces in the given order, and suspending the action of the hyphen-selecting marks until the line composed approximately reaches a predetermined length. For the sake of brevity I shall shortly denote in the following description "severing-marks" the space or hyphen selecting marks of the register; but it must be borne in mind that line-severing marks are not understood thereby, as my register does not contain such marks.

To carry out my invention, I provide a slide-piece shifted by the increasing line and an adjustable stop to be set in accordance with the intended length of the line, the function thereof being to keep inoperative by convenient means the hyphen-selecting marks as long as the slide-piece does not reach the said stop and make them operative but then when the latter has been reached by the former. As this takes place if then the following severing-mark is a hyphen-selecting mark a hyphen will be really set and the line ended thereby; but if the following severing mark or marks should be space-selecting marks the line would be concluded by a space. In either case the hyphen-selecting marks must be made inoperative again and the said slide-piece returned to its initial position in order to be enabled to perform again its function for the next line when the same approximately reaches the normal length, and so on.

In order to indifferently mark the end of a line in one and the same manner, and thereby simplify the device for detaching from each other the single lines, it may be convenient to conclude each line by a special type, which I call the "end-type." To this purpose the space-feeding mechanism must be made reversible and reversed at the end of a line, so that the following space-selecting mark selects an end-type instead of a space, while the hyphen-feeding apparatus is to be combined with the feeding device of the end-type in such manner that the setting of each hyphen is immediately followed by the setting of an end-type, each line thus being concluded by an end-type. The said slide-piece and the stop coöperating therewith are to be set in accordance with the intended length of line in such manner that when they become operative the line will yet be capable of receiving at least a long syllable without becoming too long. In this case the provisional line can be shortened to give a well-justified definitive line; but if at the end of a line two or three short syllables should happen to follow each other which could all be received by the line, but yet the first of those syllables

would be really inserted, and the line therefore would be exceedingly spread by justifying. To overcome this inconvenience, the working of the hyphen and of the end-type-feeding mechanism after having been released by the slide-piece at the end of a line will be suspended again by other means, if there are several severing-marks on the register-strip following each other in short distances, reference at the same time being had to the decreasing capacity of the line, so that the working of the said feeding mechanism is released again if a sufficient number of the said short syllables has entered the line, as will be fully understood from the following description of my invention represented in the accompanying drawings, in which—

Figures 1 to 4 are diagrammatical views merely explaining the principles of my invention, Fig. 1 being a top view of the apparatus, Fig. 2 a diagram of the means for releasing the types from their containing-channels, and Figs. 3 and 4, respectively, detail side views of parts of the apparatus. In Figs. 5 to 7, inclusive, I have illustrated any convenient setting apparatus corresponding to Figs. 1 to 4 and completing the latter as to the means for ejecting the several types from their channels and assembling the same into a line, Fig. 5 being a broken vertical sectional view of such an apparatus, Fig. 6 a top view of the line-assembling channel, and Fig. 7 a partial broken front view of Fig. 5, showing the type-channels and the well-known guide-plate for the types. Fig. 8 is a perspective view of the above-mentioned end-type.

As the invention essentially consists in the general arrangement of parts heretofore described and is not restricted to any special means for operating the same, I have represented the simplest feature of such an apparatus when operated by electricity.

Referring first to Figs. 1 to 4, inclusive, a base-plate 8, of an insulating material, Figs. 1 and 3, is provided with two uprights 34 34′ and a cross-bar 34″, extending between the latter. Two insulated comb-shaped contact-pieces 1 2 are fixed to bar 34″, provided each with contact-springs 3 and 3′, respectively, to coöperate with corresponding contact-pins 7 and 7′, Fig. 3, fixed in plate 8, and in electric circuit with a battery 6 by means of wires 4 5. Two systems of wires *g g′* extend from the pins 7 7′, each wire of either system being connected at its other end to each wire of the other system, Fig. 2, by means of connecting-wires 10, and an electromagnet 11 is inserted into each connecting-wire. If, therefore, a spring 3 and a spring 3′ simultaneously come into contact with their corresponding pins 7 and 7′, the electromagnet 11 of the corresponding circuit will be excited and a type ejected from the corresponding type-containing channel by the armature-lever of the excited electromagnet. The type thus released is then delivered to the assembling-point 12 of the assembling-channel 13, Fig. 1, by any convenient means, as fully illustrated in Figs. 5 and 7. In these figures the letter-types 40, hyphen-types 41, and provisional spaces 42 are contained in channels 43 and ejected by the spring-actuated levers 44, Fig. 5, the corresponding electromagnets 45 46 being alternately arranged in two rows in order to allow of a close arrangement of channels 43 and the armature-levers 44, alternately provided with arms 47, reaching underneath the cores of electromagnets 46. Above the row of channels 43 a channel 48 is provided, containing the end-types 49, which are ejected by a spring-actuated lever 50, controlled by the electromagnet E, referred to hereinafter. A roller 51 is provided, extending underneath the ends of the type-channels 43, and a continuously-revolving movement is imparted to roller 51 by means of a belt 52 and the main driving-shaft 53, as indicated by the arrows, shaft 53 carrying at the same time the well-known type-assembling disk 54. From roller 51 a continuously-revolving movement is imparted by a belt 55 to a disk 56, placed underneath the end of channel 48. A guide-piece 57 is provided in front of disk 56, leaving a close passage for the ejected end-type, and a similar passage is provided for the ejected types 40 41 42 by the supporting-bar 58, placed in front of roller 51. By these means a type 40, 41, 42, or 49 having been released by the several armature-levers will be grasped at once at its foot by roller 51 or disk 56, and thus fully withdrawn by friction and then delivered to the guide-plate 59, on which it descends by gravity toward the common assembling-point 12 of the assembling-channel 13.

In Fig. 5 I have indicated by letters S and T the electromagnets referred to hereinafter as controlling the spaces and the hyphen-types and placed in line with the corresponding types 42 and 41, respectively, say at the left-hand end of Fig. 7. The armature-levers 44 and 50, controlled by the electro-magnets T and E, respectively, are connected by a flexible connecting-piece—say a chain or cord 60—in such manner that by actuating lever 44 for ejecting a hyphen-type lever 50 will be at the same time actuated and eject an end-type, while by actuating lever 50 by means of its electromagnet E lever 44 will not be simultaneously actuated. By these means whenever a hyphen-type is released an end-type will be simultaneously released, but not vice versa.

As concerning the circuit connections between the electromagnets E S T, these connections are indicated diagrammatically in Fig. 1 and hereinafter fully described with reference thereto.

The regular letter-types are marked each by a combination of two holes placed on sections 14 of the register-strip 9, passing with uniform speed between the contact-springs 3 3′ and the pins 7 7′, either hole of each combination corresponding to a contact-point of

the contact system 3 7 and to a contact-point of the system 3′ 7′, respectively. The provisional spaces are marked by a particular combination of two holes, as represented by the section 15 of the strip corresponding to the contact-points of two particular wires *a b*, respectively, while the particular two-hole combination of sections 16 marks the hyphen, corresponding at the same time to the contact-points of wires *a* and *c*, respectively.

The wires *a* 6 *c* form three different electric circuits, hereinafter denoted I II III. The said circuits contain several electromagnets E S T 17, two armature-levers 18 19, operated by the electromagnet 17, and corresponding contact-pieces 20 21 22. The said armature-levers will be hereinafter designated by the simple numerals 18 19 in the position represented by Fig. 1, in which electromagnet 17 is not excited, lever 19 then being in contact with piece 21 and out of contact with piece 22 and lever 18 out of contact with piece 20; but they will be designated by parenthesized numerals 18 19 in the reversed position—*i. e.*, in the excited condition of electromagnet 17. Armature-levers 18 19 are conducting from their pivots to the contact ends. Circuit I is composed of battery 6, wire 4, spring $3^{\times}$, corresponding pin 7, wire *a a a a′*, electromagnet S, wire $a^{\times\times}$, contact-piece 21, lever 19, wire 6 6 6, corresponding pin 7, spring $3'^{\times}$, wire 5, battery 6. Circuit II is the changed circuit I, with reversed lever 19—that is to say as follows: battery 6, wire 4, spring $3^{\times}$, corresponding pin 7, wire *a a a*, electromagnet E, wire $a^{\times}$, contact-piece 22, lever 19, wire 6 6 6, corresponding pin 7′, spring $3'^{\times}$, wire 5, battery 6. Circuit III is composed of 6, 4, $3^{\times}$, 7, *a a a*, *a′*, *a″*, T, *a″*, 20, 18, *c c c*, 7′, $3'^{\times\times}$, 5, and 6. There is no corresponding changed circuit when lever 18 keeps its normal position, (represented in the drawings,) even though springs $3^{\times}$ $3'^{\times\times}$ are in contact with their corresponding pins 7 7′, as the circuit will then be broken at 18 20. The functions of the electromagnets E S T when excited being to feed an end-type, a space, and a hyphen, respectively, there will be, therefore, set a space by closing circuit I, an end-type by closing circuit II, and a hyphen by closing circuit III. As the electromagnet 17 is not excited until the line reaches the predetermined length, as hereinafter described, circuit I will be closed and circuits II and III broken during the setting of the main part of the line, and a space therefore be set at each passage of a hole combination 15 between the contact-points, while the passage of a hole combination 16 will be inoperative, as circuit III is broken at 18 20.

The end-types are recessed, Fig. 18, and channel 13 provided with a lateral slot, so as to allow the recessed portion of the space of engaging with the hook-shaped end 25 of a spring-arm fixed to the slide-piece 23, Figs. 1 and 6, the latter thus being taken along with by the increasing line, so as to finally reach a pin-lever 26, pivoted to a stop 24, Figs. 1 and 4. A contact-spring 27 is fixed to the pivot of lever 26, and as the latter is struck by the slide-piece 23 spring 27 is brought into contact with an insulated conducting-rail 28. An electromagnet 30 is provided with a spring-actuated armature-lever 29 to bear against a contact-pin of rail 28 when electromagnet 30 is not excited, as supposed and represented in the drawings. Stop 24 consists of a conducting material and is adjustable on a conducting guide-rail 31 in accordance with the intended length of the line, while the slide-piece 23, or at least its working end, is made of an insulating material.

The parts 31 24 27 28 29, together with wires *d d′*, extending from rail 31 and the pivot of lever 29, respectively, with a battery *d″* and a wire $d^{\times}$, form an electric circuit containing the electromagnet 17. The said circuit will be closed by means of slide-piece 23 as it reaches stop 24 and strikes lever 26, provided that armature-lever 29 keeps its position represented in the drawings. Armature-levers 18 19 therefore will then be reversed to the positions 18 19 and the above-mentioned circuits II III closed. If, therefore, now a hole combination 15 passes between the contact-points, an end-type will be set instead of a space and a hyphen by passing of a hole combination 16; but as the feeding apparatus of the hyphens is combined with that of the end-types, together with the hyphen, an end-type will be set. The containing-channel of the hyphens being supposed to stand before the end-type channel on the way toward the assembling-point, the hyphen, although simultaneously released with the end-type, will first reach the assembling-point, so that each line will be concluded by an end-type to be afterward withdrawn.

The armature of electromagnet E when actuated closes at the same time a circuit *f f′*, Fig. 5, including an electromagnet F, fixed to slide-piece 23 and having its core opposite to catch 25. To this purpose lever 50 is provided with an insulated contact-spring 61, connected to wire *f*, and wire *f′* connected to a contact-pin 62 to be struck by spring 61. From this it will be clear that whenever an end-type has been set electromagnet F will be excited and catch 25 retracted from the line, thus releasing slide-piece 23, to be restored to its initial position by a spring 32. Lever 26 being likewise released from the slide-piece 23, spring 27 is brought out of contact with rail 28 and the circuit containing electromagnet 17 broken. Armature-levers 18 19 are therefore reversed again to their represented position, as required for the setting of the main part of the next line. Although the latter immediately follows the previous line, so as to form a continuous type-line in the assembling-channel, the end of each individual line, however, is marked by the end-type, which is conveniently formed

and shaped so as to allow afterward of mechanically severing the individual lines; but as the final severing of the lines is no part of the present invention and may be performed by any means it has been deemed sufficient to show the means by which the slide-piece 23 is taken along with by each line and then returned to its initial position.

The above-mentioned regulation of the end of the line when there are several short syllables or words following each other is effected by the following means, Figs. 1 and 3: The insulated conducting-rail 33 is fixed to the case-plate 8 in level thereof and in the path of the holes *x y* of the hole combinations 15 16, and a system of conducting-strips 35 is pivoted to the insulated upright 34, the said strips being arranged after each other and in a vertical plane passing through rail 33. A wire *e* is connected to the several pivots of the strips and another wire *e'* to rail 33, forming an electric circuit, together with the battery 36 and the electromagnet 30, the said circuit being closed when any one of the strips is in contact with rail 33, but broken otherwise. By closing this circuit armature-lever 29 will be attracted by electromagnet 30 and the circuit containing electromagnet 17 broken. Circuits II III, which commonly are closed at the end of a line, as stated before, will therefore be broken and circuit I closed again. Under these circumstances, therefore, at the end of a line and after the slide-piece 23 has reached lever 26 of stop 24 the same condition will take place as in setting the main part of the line—that is to say, the hole combination 15 feeds a space instead of an end-type and the combination 16 passes inoperative. If, therefore, as in the passing of several short words or syllables following each other, by passing of a hole combination 15 or 16 between the contact-points there are at the same time holes *x* or *y* on the extent of rail 33, the line will not be concluded by an end-type nor by a hyphen and an end-type combined, but regularly continued. This condition would keep on and the concluding of the line would be suspended as long as short words or syllables there should follow each other, so as to eventually make the line too long and no more reducible to the intended length by justifying. To overcome this inconvenience, a lever 38 39 is pivoted to the upright 34, traveling with a pin 39' in the path of strips 35 and carrying a pin 38', struck by a laterally-extending arm 37 of slide-piece 23 when the latter reaches stop 24. By these means as the line increases lever 38 39 is turned more and more, and strips 35 are successively raised after each other from contact with rail 33 in the measure as the capacity of the line decreases. The operative extent of rail 33 is therefore likewise successively diminishing and finally reduced to zero when the line reaches the utmost admissible length.

It may be observed that the present invention is independent of the supply of the types to be composed. The latter may be stored in containing-channels, as in common type-matrix-setting machines, or supplied by a distributing or by a type-casting device, the casting itself being performed independently of or by means of the register-strip.

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

1. A register-strip for setting provisional lines of types or matrices of any length, containing marks for letter-types, for provisional spaces and for hyphens to sever syllables, substantially as and for the purposes described.

2. An apparatus for setting provisional lines of types or matrices by means of a register-strip containing marks for letter-types, for provisional spaces and for hyphens to sever syllables, the said apparatus consisting of an assembling-channel to receive the composed line, an adjustable reversing mechanism, a traveling piece controlled by the increasing line and actuating the said reversing mechanism, and means for returning the traveling piece to its initial position, substantially as and for the purposes described.

3. An apparatus for setting provisional lines of types or matrices by means of a register-strip containing marks for letter-types, for provisional spaces and for hyphens to sever syllables, the said apparatus consisting of an assembling-channel to receive the composed line, an adjustable reversing mechanism, a traveling piece controlled by the increasing line and actuating the said reversing mechanism, means for returning the traveling piece to its initial position, a system of swinging contact-strips, a common contact-piece for the said strips and means for successively removing after each other the strips from the common contact-piece, substantially as and for the purposes described.

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

HUBERT BURG.

Witnesses:
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PAUL V. SELDEN.