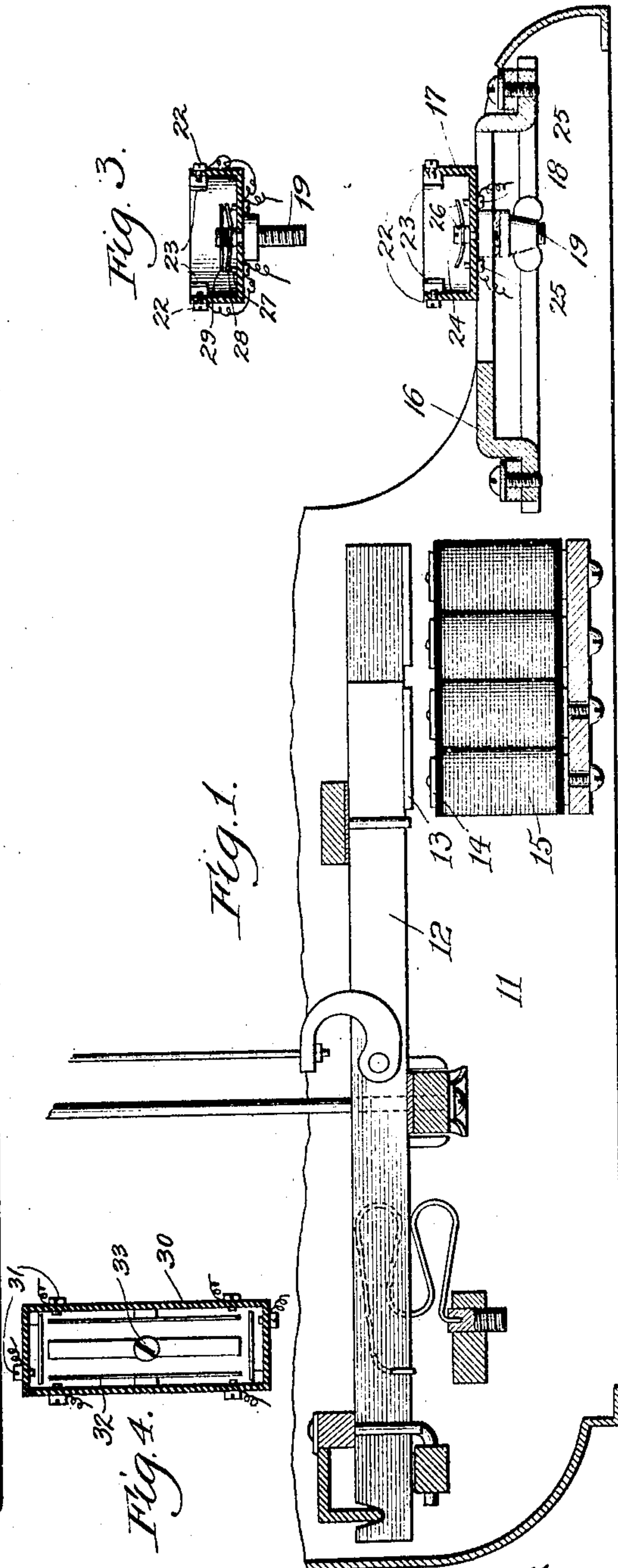
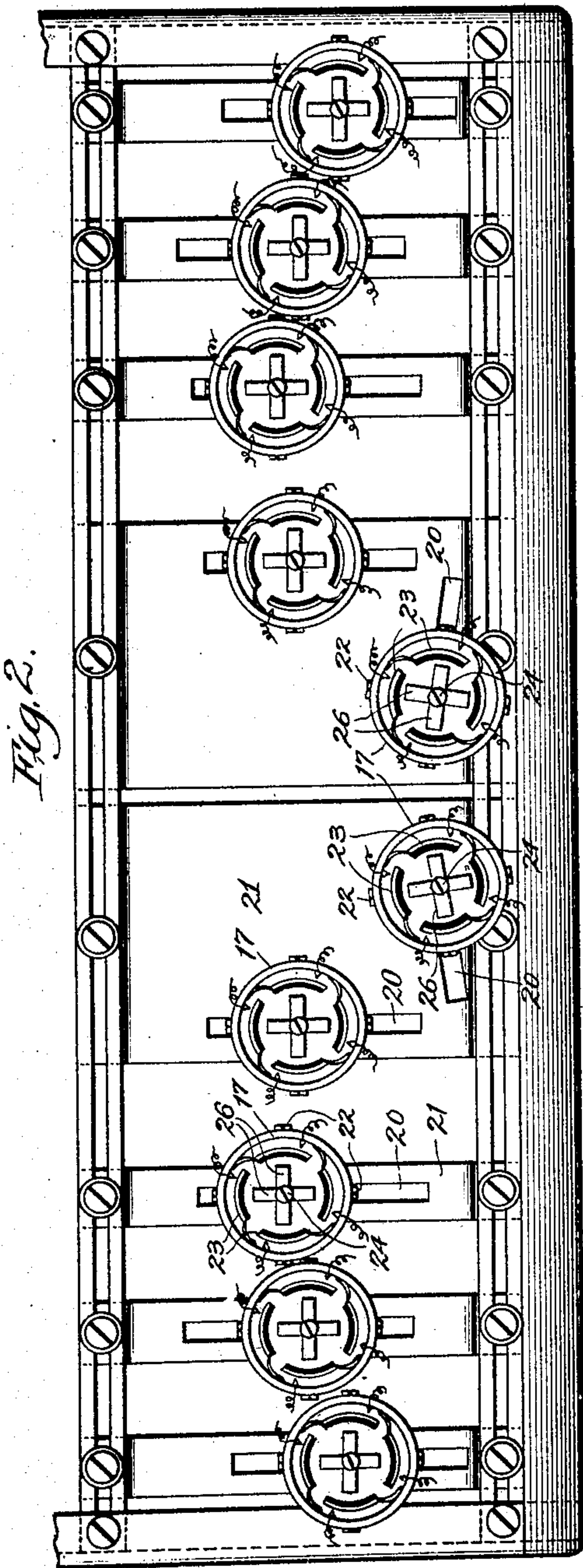


H. C. HORSTMANN.
ELECTRICAL TYPE WRITER.
APPLICATION FILED JUNE 7, 1908.

Patented Apr. 27, 1909.
3 SHEETS—SHEET 1.

919,432.



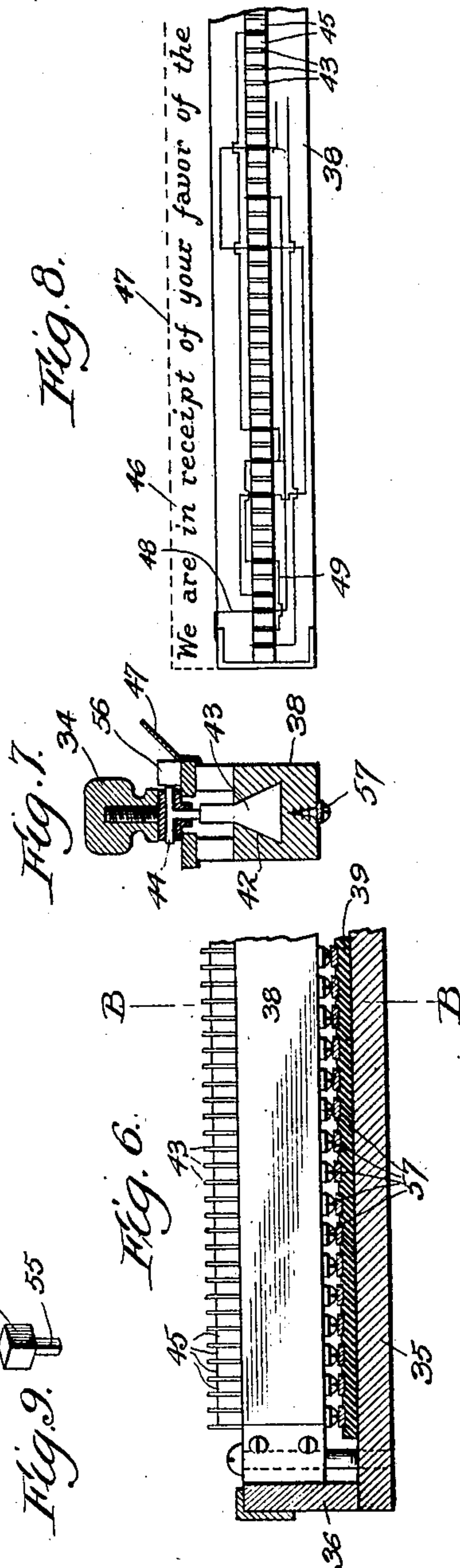
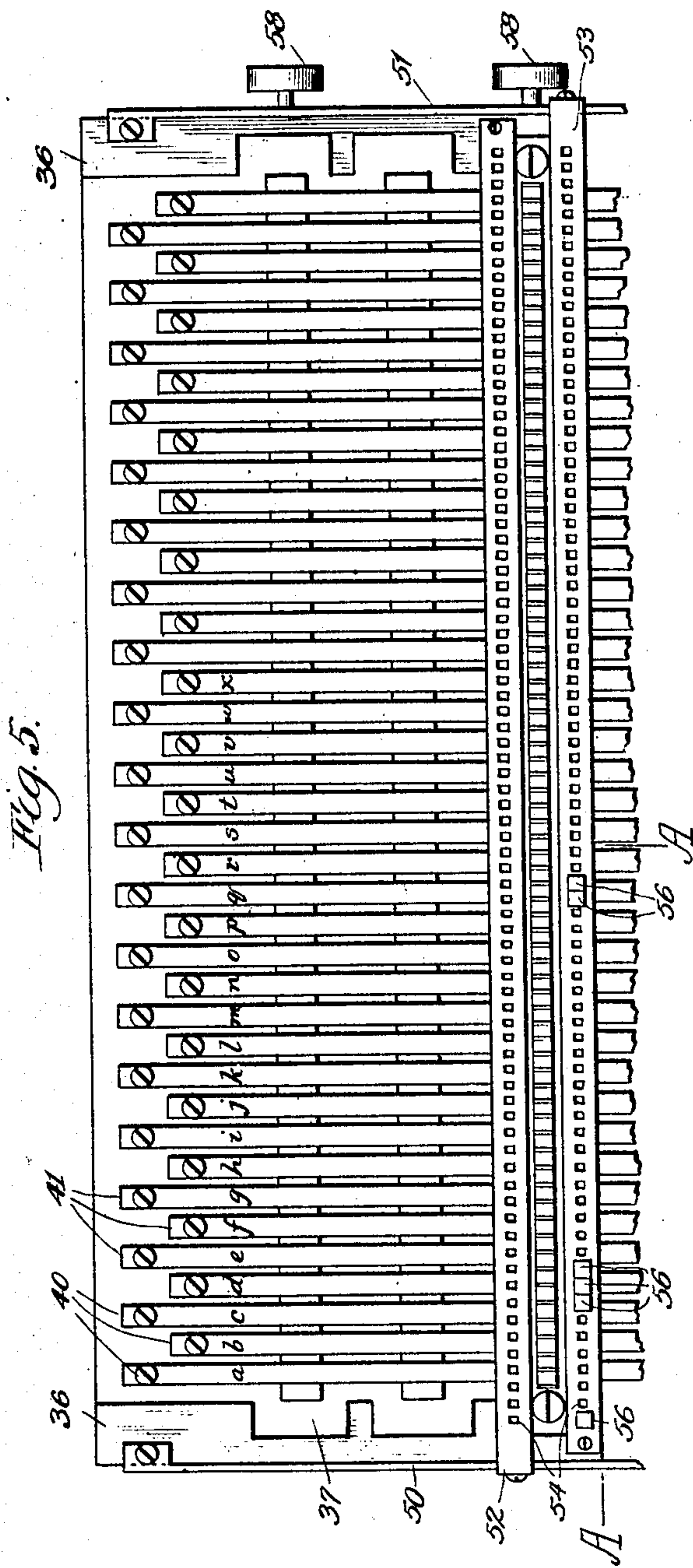
Witnesses:
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Inventor:
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By John Howard McElroy,
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3 SHEETS—SHEET 2.

919,432.



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3 SHEETS—SHEET 3.

919,432.

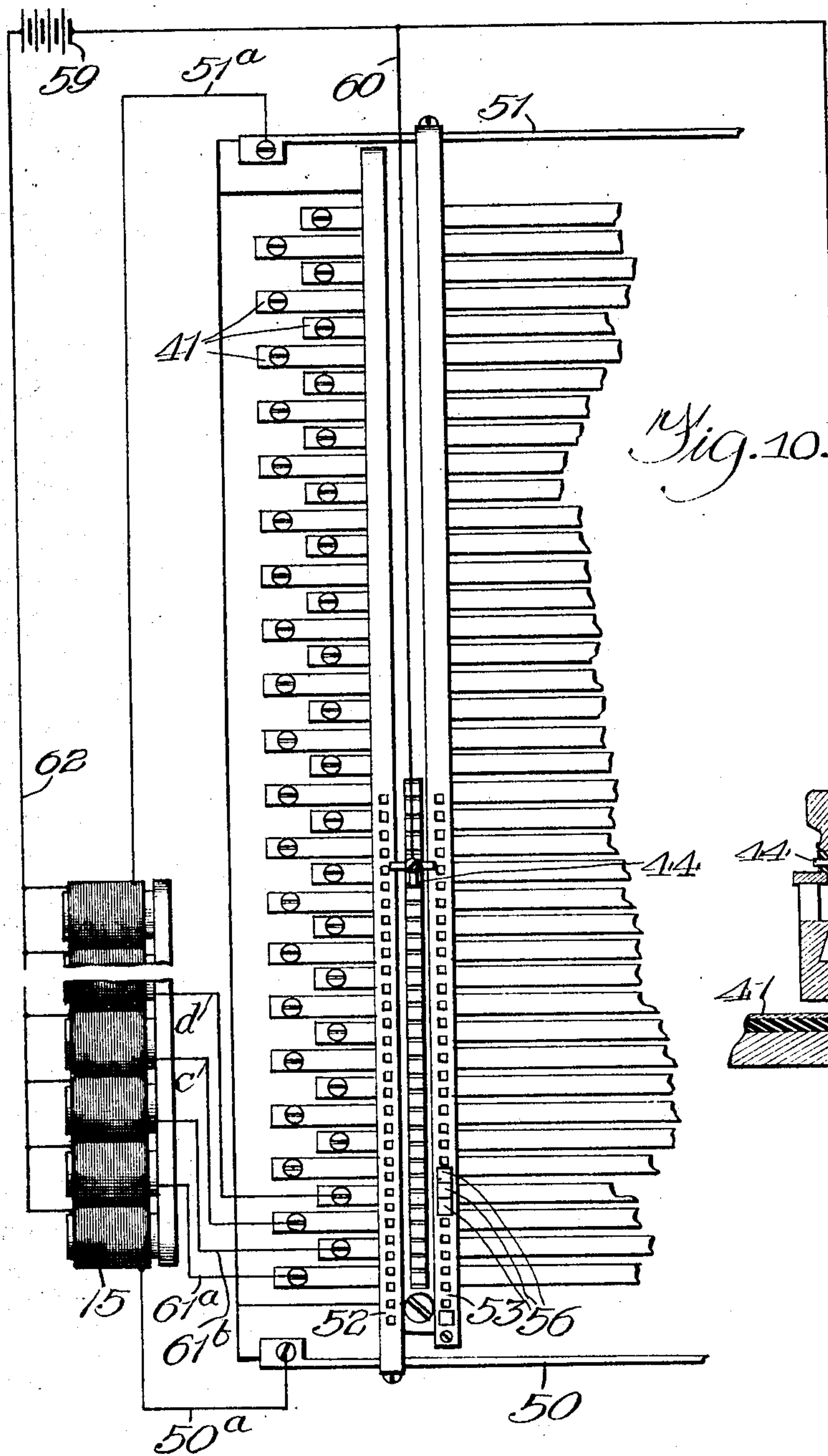


Fig. 10.

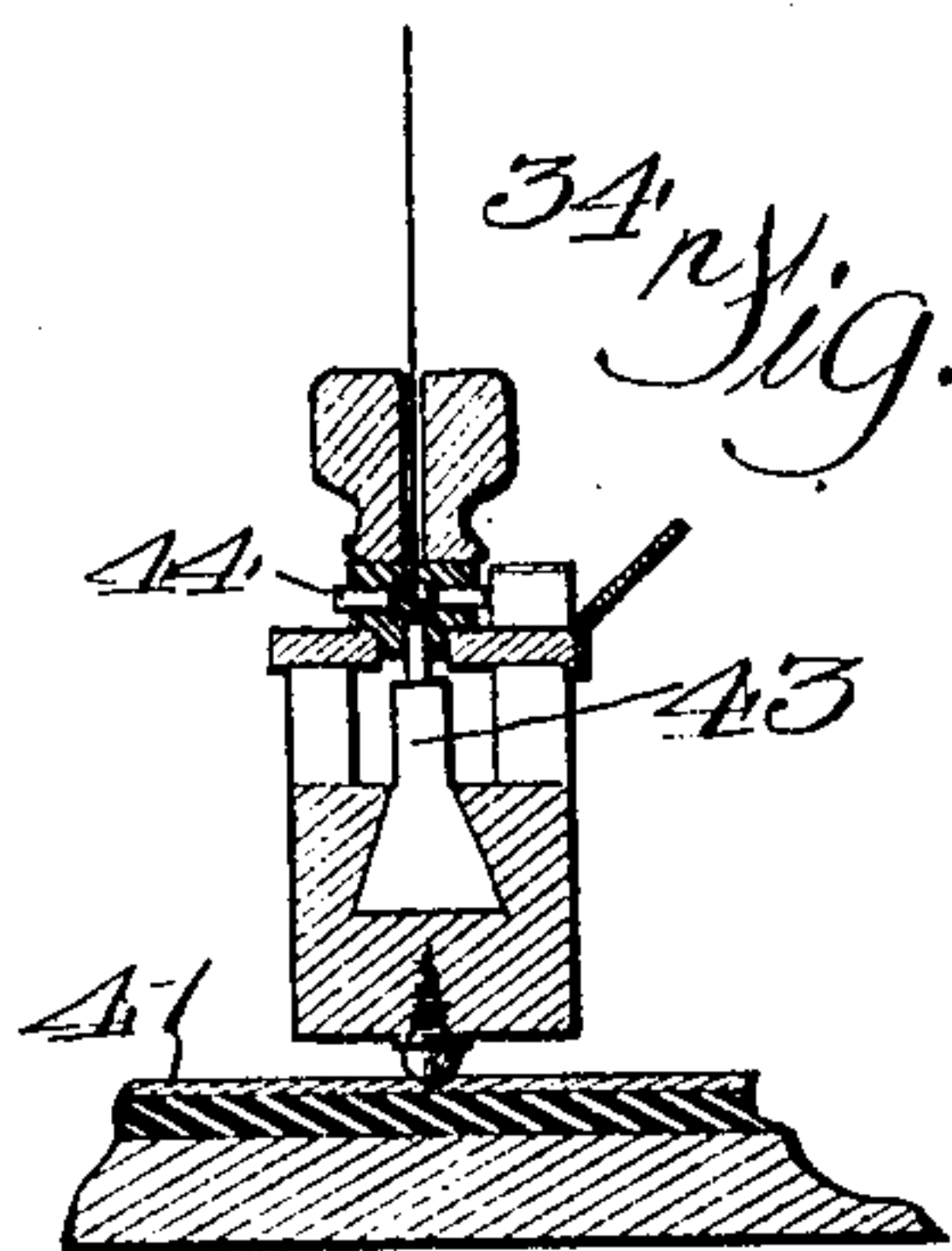


Fig. 11.

Witnesses:

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J. V. Donarum Jr.

Inventor:

Henry C. Horstmann
by *John Howard McElroy*
his Attorney.

UNITED STATES PATENT OFFICE.

HENRY C. HORSTMANN, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-FOURTH TO SAMUEL EVANS AND ONE-FOURTH TO JOHN HOWARD McELROY, OF CHICAGO, ILLINOIS.

ELECTRICAL TYPE-WRITER.

No. 919,432.

Specification of Letters Patent.

Patented April 27, 1909.

Application filed June 7, 1906. Serial No. 320,519.

To all whom it may concern:

Be it known that I, HENRY C. HORSTMANN, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electrical Type-Writers, &c., of which the following is a specification.

My invention is concerned with a novel electrical typewriter, or similar machine for producing characters, and more especially with the keyboard or selecting mechanism thereof, which preferably consists of two parts: one of which may be of the ordinary construction or somewhat similar, and is used for ordinary writing; while the second is radically different and is used for form writing, as will be explained hereafter.

To illustrate my invention, I annex hereto three sheets of drawings in which the same reference characters are used to designate identical parts in all the figures, of which—

Figure 1 is a longitudinal section through a type-writer embodying my invention; Fig. 2 is a top plan view of the keyboard; Fig. 3 is a vertical sectional view of a modified form of one of the keys or finger pieces; Fig. 4 is a top plan view of another modification of the finger pieces; Fig. 5 is a top plan view of a portion of the auxiliary keyboard used for writing form letters; Fig. 6 is a sectional view of the same on the line A—A of Fig. 5; Fig. 7 is a sectional view on the line B—B of Fig. 6 and with the sliding circuit closing key shown in position and in cross section; Fig. 8 is a top plan view of a portion of the apparatus showing the wiring for a certain portion of the form letter; Fig. 9 is a perspective view of one of the adjustable shifting contacts; Fig. 10 is a somewhat diagrammatic view similar to Fig. 5, but showing the complete circuits; and Fig. 11 is a sectional view through the sweeping contact.

Where my invention is to be used in connection with a typewriter, frame work 11 is employed in which are mounted the customary parallel operating bars 12, which may be either arranged one for each character, as in the Smith Premier machine, or one for two characters, such as upper and lower case letters, etc., as in the Remington machine, by the use of shift keys, or which may be arranged for as many as three characters for

each member by the use of two shift keys. The details of the connections between the bars 12 and the type bars (not shown) are entirely immaterial, and are not illustrated. Each of the bars 12 is provided with an armature 13 located at a considerable distance above the contact tips 14 of the poles of the electromagnets 15 which are located beneath the forward ends of the bars, and which are preferably staggered, as shown, in order to reduce the space occupied by them. The electromagnet for each keybar is included in a separate or branch circuit so that when that branch circuit is closed, the electromagnet will attract the armature of its coöperating bar 12 and cause the character to be printed in the customary manner.

The framework 16 for the keyboard may be built up in any desired manner, but it is preferably arranged in the same manner as is shown in my application No. 313,155, filed April 23, 1906, in which a series of ten keys, five for each hand, are employed and are made adjustable by the mechanism shown so as to be adjustable for use by the hand of the particular operator using the machine, it, of course, being understood that the operator having a small hand will employ a different adjustment of the keys from one having a larger or differently shaped hand.

Instead of employing a single key movable in a plurality of different directions to procure the different letters, in my present invention, I preferably employ a plurality of keys or contacts grouped about a common center and arranged so that the movement of the finger devoted to that center in different directions will close different contacts, thereby causing the selection of the character by the direction of movement of the finger. To conveniently group these contacts about the center and keep the fingers readily in position, I preferably employ the cups 17 which are preferably of insulating material, and which are secured in the desired position of adjustment by the wing nut 18 being tightened on the threaded stud 19 projecting downward from the bottom thereof through the slots 20 in the plates or bars 21. The contacts 22 in the branch circuits are screwed through the walls of the cups 17, and the co-operating contacts 23 are preferably formed of spring metal having their ends secured on

the inside of the cups 17, and held out of engagement with the contacts 22 by reason of their shape and location. The finger is normally held resting on the screw 24 locating the center of the cup and it will be seen that as the finger is swung to the right or to the left or forward or back a different branch circuit will be closed and a different letter formed. When the bars 12 are each arranged to print two characters by the employment of the shifting apparatus, I employ a shift bar similar to 12 which is controlled by a branch circuit the same as the bars 12, and having the plurality of connected contacts 25 above which are located the cooperating contacts 26, which, as shown, are preferably of spring metal radiating from the common center which is connected in the circuit so that by depressing any of the arms the circuit through the shift bar is closed. When an upper case letter, for instance, is to be printed, the operator first depresses the contact spring 26 pointing toward the contact 23 that is to be closed, the contacts 26 and 23 being so relatively located that they can be closed in succession by a single movement of the finger.

In Fig. 3 I have shown a slight modification of this construction, in which in addition to the contacts 22 and 23, I employ the contacts 27 in circuit with or connected to the contacts 22 and the contacts 28 similar to the contacts 26 and the similar contacts 29 immediately above the contacts 28 but insulated therefrom, the circuits being so arranged that when the contacts 29 contact with the contacts 28 the circuit is closed through the shift bar. The operation of this form of key will be as follows: When a lower case letter or character not requiring the operation of the shift bar is to be printed, the operator simply moves his finger to the right or left or forward or rearward without moving it downward so as to close the appropriate contacts 22 and 23. When, however, an upper case letter or one requiring the shift bar is to be printed, instead of moving the finger horizontally, he moves it downwardly in the same general direction, thus first closing the contacts 29 and 28 to operate the shift key and then in the further movement closing the contacts 28 and 27 to print the desired character.

In Fig. 4, I illustrate still another modification in which no shift bar is employed, but in which the cups 30 are changed in their design so as to accommodate a greater number of contacts 31 and 32, the key being shown as an elongated rectangle and provided with eight sets of contacts, one at each end, two on the sides, and two in the bottom, which are closed by a downward movement, all the contacts being straight strips of spring metal, the outer ends of which are held just out of engagement with the con-

tacts 31, as shown. The tip of the finger is normally held on the central positioning screw or lug 33 so that from this point as a center, any desired letter in that cup can be operated by moving it in the proper direction.

With the keyboard of my invention thus far described, no great increase of speed over the present form of typewriters is possible, the main advantage being in the simplification of the keyboard mechanism by which the fingers do not have to be shifted around to different points of the board, and all characters can be printed with much smaller movements of the fingers and with the expenditure of much less force.

In the auxiliary keyboard or selecting mechanism shown in Figs. 5 to 9, I provide a system by which an operator, even though comparatively unskilled, can print certain portions of letters, such as recur frequently, with great speed.

In most business, a very large portion of the correspondence consists of the use of certain phrases which apply to that particular business, and the employment of any such a form letter and means for printing it rapidly constitutes a portion of my invention. As an example, a stock letter for dealers in certain merchandise might be made up as follows:

Stock Letter.

Dear Madam:— Dear Sir:— Gentlemen:—

We are in receipt of your favor of the _____ and in reply will say that we cannot fill your order at once before the _____.

We do not handle the make of goods you ask for at all but instead can send you _____ which our experience has taught us is a much superior article.

We are temporarily out of stock on the goods _____ you ask for but will fill your order the moment our fresh stock arrives, which will be in two or three days.

We can quote you prices, good within the next 30 days, as follows:—

The terms you offer are not satisfactory to us. We cannot vary from catalogue prices except for spot cash.

The goods in question were delivered to _____ in good order on _____ and we cannot be held responsible. We are at all times, however, willing to help our customers obtain redress from the carrier.

We have referred your inquiry regarding _____ to our _____ and will forward reply as soon as possible.

Our agent, Mr. _____ will be in your city about _____ and will be pleased to call upon you then.

Your order concerning _____ is not explicit enough and we are at a loss to know how many and what kind _____ you want.

If you do not approve of this arrangement, please notify us at your earliest convenience.

Hoping to receive your order, we remain,
yours truly,

Trusting you will find the goods satisfactory, we remain, yours truly,

6 Awaiting an early reply, we remain, yours truly,

A supply of these stock letters which would be made up for the requirements of the particular business would be printed, and in connection with it, a sheet of instructions for each of the correspondents and stenographers might be made as follows:

Instructions.

15 "If the dictation sheet is attached to the letter it answers, the type-wristist can get name, address, date and proper title from the letter and the corresponding clerk need not fill in those items. The selection of the proper ending can also be left to the judgment of the type-wristist.

20 "Mark each sentence to be used with a number in the order in which it is to appear in the letter. Cross out all words that are not to be used and insert such as may be needed, but do not appear in the text. If matter not provided for in the sheet is to be written, make check mark through "Take additional matter." If phonograph dictation is used, outline section below.

30 "In starting in with this system, it will be well to use the general stock letter and dictation sheets supplied by the company and from time to time, when occasion presents, make note of such alterations as your particular business requires. In this way you will soon obtain a perfect letter answering your requirements, and can have it printed in large quantities and very cheaply, by the company. We have quite a stock of such letters on hand and will be glad to help you select one."

The stock letter can readily be fitted to any change in the dictation sheets and the two should always be identical.

45 From an examination of this stock letter and the instructions, it will be readily apparent that for the ordinary letter, the correspondent would need merely to underscore such phrases as he desired to use, as are indicated on the form, and where it was necessary, he could write in in the blank spaces such statements as might be necessary and did not appear on the forms. These sheets thus marked are turned over to the operator, and the auxiliary keyboard is designed to reproduce this form exactly, being especially adjusted for the requirements of each business, and the operator, by sweeping the form key 34, shown in Fig. 7, over the contacts corresponding to the underscored portions of the form letter, can readily write the letter desired, and that at a higher speed than even a skilled operator working on the present style of machines, as the

limit of the speed is that of the typewriting machine, and it is a well known fact that the speed of the most rapid operator is never equal to that of a well constructed machine. When any especial phrase appears which is written in, as indicated in the form sheet, the operator drops the form key 34 and using the ordinary keyboard 16 writes out the special matter and then resumes the form portion of the letter, and so until the letter is completed.

Referring now especially to Figs. 5 to 11, the auxiliary or form keyboard consists of the base 35, which is preferably of some insulating material, and is arranged to rest at the right of the ordinary keyboard or in suitable proximity thereto. At the ends of this keyboard 35 are placed the rails 36, which are provided at intervals of each line corresponding to the lines of the stock letter with the recesses 37 which are adapted to receive and position the ends of the contact cross bars 38. Secured on the base piece 35 between each opposite pair of the recesses 37 is a strip 39 of some yielding elastic insulating material, such as soft rubber, and extending the entire length of the base board 35 and secured at both ends, as by the binding screws 40, are the character strips 41; of which there is one for each bar 12 of the machine proper, and it constitutes a portion of the circuit for the electromagnet 15 devoted to that particular bar. The cross bar 38 is provided with the channel 42, which preferably has the reentrant angles or overhanging flanges, as shown, so that it will hold the contact pieces 43 therein. These pieces 43 are stamped up out of thin copper or brass, and are of the shape shown having the base corresponding to the shape of the channel in the bar 38 and the tip extending up into the plane of the downwardly projecting arm of the contact piece 44 of the key 34. These contact pieces 43 are spaced apart by similarly shaped soft rubber pieces 45, which, as seen in Fig. 6, are a trifle shorter than the pieces 43, so that the tips of the contacts 43 will project above the tips of the spreaders 45 so that as the key 34 is swept along the channel, its contact 44 will engage the tips of the pieces 43 one after another. Each of the pieces 43 is devoted to a particular letter, as appears at Fig. 8, and the contents of the entire line is shown in the index characters 46, shown in Fig. 8, which appear on the index plate 47, which projects upwardly from the rear of the cross piece 38 so that the operator can readily see the characters to be printed as the key 34 is swept along that particular cross piece. All of the contacts 43 which operate the space bar, for instance, are connected by fine wire 48, which is insulated to start with but which has a bit of the insulation scraped off at the point where it is passed between the contact piece 43 and the adjacent elastic spreader by which

it is secured in place against the contact. Similarly, every letter is provided with a wire, such as the wire 49 for the letter E, and as the stock letter is set up, the wiring of the letters of each line is done at the same time, and at the end of the setting up of that particular line, the wire devoted to each particular letter is connected to the letter strip 41, as by the binding screw 57 resting on the strip, so that it will be seen that each contact 43 is placed in its particular character circuit with the minimum amount of wiring and connections. Of course, there will be as many of these cross pieces 38 employed as are necessary to accommodate the particular stock letter of the concern by which it is to be used.

For the upper case letters, or characters operated by shift bars, if the particular machine for which the keyboard is adapted demands them, I provide the bars 50 and 51 secured to the outer sides of the rails 36. These bars are, of course, conductors, and are connected at each cross piece 38 with the cross bars 52 and 53. These cross bars 52 and 53 are also conductors, and are provided opposite each of the contacts 43 with the recesses 54, which are preferably square or rectangular in outline so as to receive the shank 55 of the shift contacts 56, which have their head portions arranged in position to be struck by the lateral arms of the contact 44 just in advance of the vertical arm striking the contact 43, so that the shift bar is operated in advance of the character to be printed. Of course, where the machine uses only one shift bar, one of the two shown on the drawings may be omitted, and I have shown the index plate 47 as, for convenience, secured to the shift bar 52. The character connecting wires for each letter of each cross piece 38 is conveniently secured where it crosses its proper strip 41, by means of the screws 57, and the heads of these screws 57 rest on the strips 41, as shown in Fig. 6. The set screws 58 may be employed for each cross piece 38 to squeeze the contacts 43 and the spacing pieces 45 together.

In Fig. 10, I have shown somewhat diagrammatically the arrangement of the circuits for the stock letter. The battery 59 is connected by the flexible conductor 60 with the sweeping key 34, which has the contacts 44 adapted to sweep over the contacts 43. When one of these contacts 43 is touched by the contact 44, the circuit is completed from the battery through the conductor 60, the contact 44, the conductor 43, whichever one of the wires, 48, 49, shown in Fig. 8, which engages the contact 43, the bar 41 belonging to that particular letter, a conductor 61, 61^a, 61^b, as the case may be, depending upon the letter the electromagnet 15 actuating the key lever for that type bar, and the conductor 62

leading to the battery. When the horizontally projecting portions of the contacts 44 engage with the contacts 56 attached to the conductor bars 52 and 53, respectively, the circuit is completed through the bars 50 or 51, as the case may be, and the conductors 50^a and 51^a leading from said bars to the magnets 15 which actuate the shift bars.

The setting up of the form letter for each machine will be readily understood. The stock letter having been furnished, each line is set up upon one of the cross pieces 38 the connections being made by the wires 48 and 49, and the contact pieces 56 being inserted at such points as the upper case letters or particular characters demand.

It will be readily apparent that by the use of such an apparatus, a comparatively unskilled operator upon an ordinary typewriting machine may, with a little practice, attain a great speed in writing the letters for any particular business, although the operator might not have the ability to develop into a rapid writer under the ordinary system.

While I have shown my improved electrically controlled keyboards as applied specifically to typewriting machines, it will be understood that they may be equally well applied to other similar machines employing keyboards for such purposes.

While I have shown and described my invention as embodied in the form which I at present consider best adapted to carry out its purposes, it will be understood it is capable of modifications, and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

What I claim as new, and desire to secure by Letters Patent of the United States is:

1. In a device of the class described, a keyboard consisting of a longitudinal holder, a line of contacts therein, an index associated therewith to designate the character corresponding to the contact, with a circuit closing contact adapted to be swept over the line of contacts, circuits corresponding to the different characters to be used and closed by the engagement of the sweeping contact with the stationary contacts, an electromagnet in each circuit, and an operating member attracted thereby when the circuit is closed.

2. In a device of the class described, the combination with a keyboard comprising a longitudinal holder, a line of contacts therein, insulating spacing members between said contacts, means for holding the contacts and spacing members in place, an index associated with the contacts to designate the character corresponding to each contact, with a circuit closing contact adapted to be swept over the line of contacts, circuits corresponding to the different characters to be

used closed by the engagement of the sweeping contact with the stationary contacts, an electromagnet in each circuit, and an operating member attracted thereby when the circuit is closed.

3. In a device of the class described, the combination with a keyboard consisting of a longitudinal holder having an undercut channel therein, a line of contacts therein, insulating spacing members separating said contacts, an index associated with each contact to designate the character corresponding thereto, of a sweeping contact adapted to be swept over the stationary contacts, circuits corresponding to the different characters to be used closed by the engagement of the sweeping contact with the stationary contacts, an electromagnet in each circuit, and an operating member attracted thereby when the circuit is closed.

4. In a device of the class described, the combination with a keyboard, consisting of a plurality of switch supports, each carrying a plurality of switches grouped about a center thereof adapted to be occupied by a finger so that by moving the finger in different directions different switches will be closed, a circuit for each switch, an actuating electromagnet in each circuit, an auxiliary keyboard consisting of a holder having plural lines of contact therein, an index associated with each line of contacts to designate the characters corresponding thereto, a circuit-closing contact adapted to be swept over any of the lines of contacts, spacing members between the contacts, wires constituting parts of the circuits for the switches on the main keyboard and adapted to be passed between a contact and one of its adjacent spacing members at each point that the character of the circuit appears in the lines of contacts in the auxiliary board, and an operating member in each circuit attracted by the electromagnet when the circuit is closed.

5. In a device of the class described, the combination with a keyboard consisting of a holder, plural lines of contacts therein, an index associated with each line of contacts to designate the characters corresponding thereto, a circuit closing contact adapted to be swept over any of the lines of contacts, circuits corresponding to the different characters to be used closed by the engagement of the sweeping contact with any of the contacts in the lines having the same characters, an electromagnet in each circuit, and an operating member attracted thereby when the circuit is closed.

6. In a device of the class described, the combination with the keyboard containing plural lines of contacts, insulating spacing members between the contacts, an index associated therewith to designate the character corresponding to each contact, a circuit

closing contact adapted to be swept over the lines of contacts, circuits corresponding to the different characters to be used closed by the engagement of the sweeping contact with the stationary contacts, a conductor for each character extending beneath all the lines of contacts and constituting a part of that character circuit, wires for each character constituting parts of said circuits and adapted to be passed between a contact and one of its spacing members at each point the character of the circuit appears in the line, an electromagnet in each circuit, and an operating member attracted thereby when the circuit is closed.

7. In a device of the class described, the combination with a keyboard consisting of a longitudinal holder and having a line of contacts therein, an index associated therewith to designate the character corresponding to the contact, an auxiliary line of special contacts set at one side of the main line and in staggered relation thereto, of a circuit closing contact adapted to be swept over the lines of contacts, circuits corresponding to the different characters to be used closed by the engagement of the sweeping contact with the contacts in the line, a special circuit closed by the engagement of any of the special contacts by the sweeping contact, an electromagnet in each circuit, and an operating member attracted thereby when the circuit is closed.

8. In a device of the class described, the combination with a keyboard consisting of a longitudinal holder and having a line of contacts therein, an index associated therewith to designate the character corresponding to the contact, an auxiliary line of adjustable special contacts set at one side of the main line and in staggered relation thereto, of a circuit closing contact adapted to be swept over the lines of contacts, circuits corresponding to the different characters to be used closed by the engagement of the sweeping contact with the contacts in the line, a special circuit closed by the engagement of any of the special contacts by the sweeping contact, an electromagnet in each circuit, and an operating member attracted thereby when the circuit is closed.

9. In a device of the class described, the combination with a plurality of character operating members, of an actuating electromagnet for each member, a character circuit for each electromagnet, a switch for each circuit adapted to be closed by direct manipulation, and a plurality of contacts in each of said circuits adapted to be associated with similar contacts in other character circuits, and a sweeping contact adapted to close the circuits rapidly by means of said associated contacts.

10. In a device of the class described, the

combination with the plurality of character operating members, of the corresponding plurality of actuating electromagnets, a keyboard containing the switch for each character, an auxiliary board containing contacts for the various characters associated to form words and phrases, a contact adapted to be swept over said associated contacts, and cir-

uits for each character including the electromagnets and contacts therefor. 10

In witness whereof, I have hereunto set my hand this 28th day of May, 1906.

HENRY C. HORSTMANN

In the presence of witnesses:

JOHN H. McELROY,

E. K. MANCHESTER.