

Feb. 4, 1936.

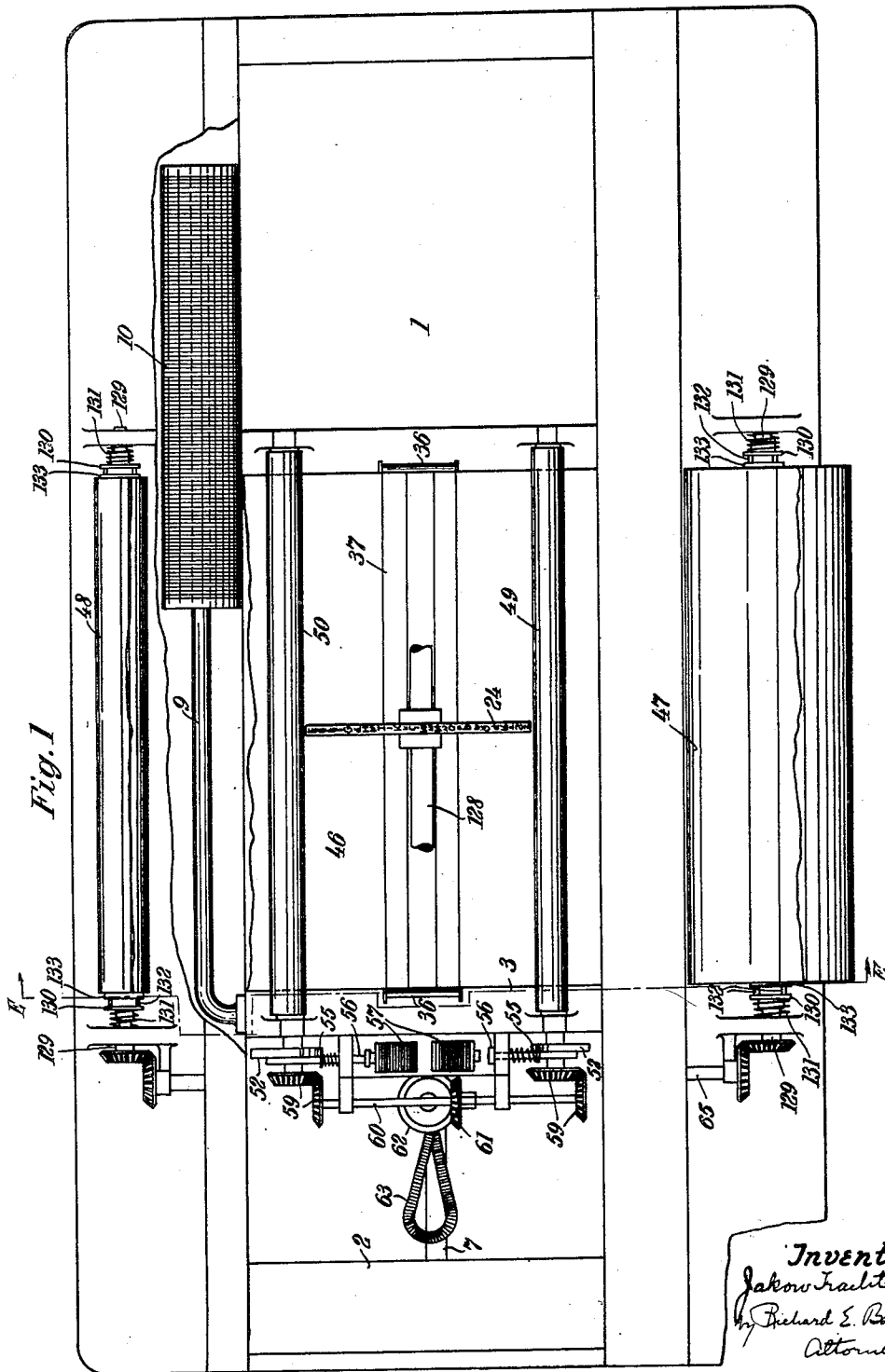
J. TRACHTENBERG

2,029,957

ELECTRICAL MULTIPLE TYPEWRITER

Filed Nov. 5, 1931

7 Sheets-Sheet 1



Feb. 4, 1936.

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ELECTRICAL MULTIPLE TYPEWRITER

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7 Sheets-Sheet 2

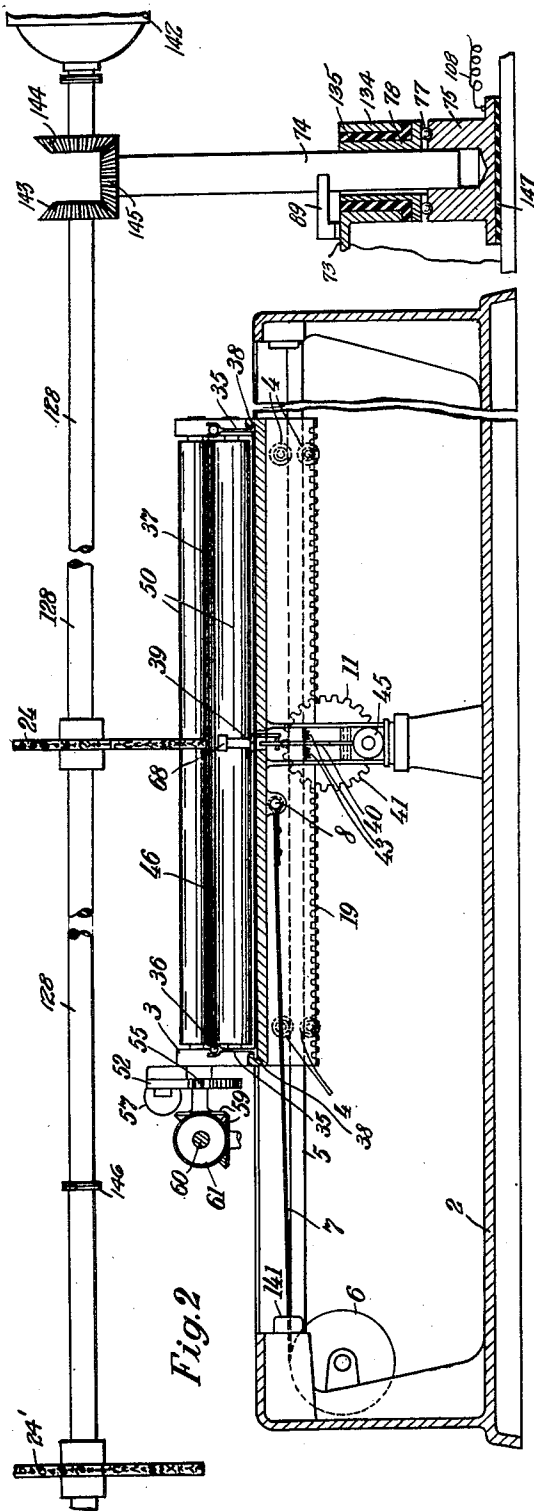


Fig. 2

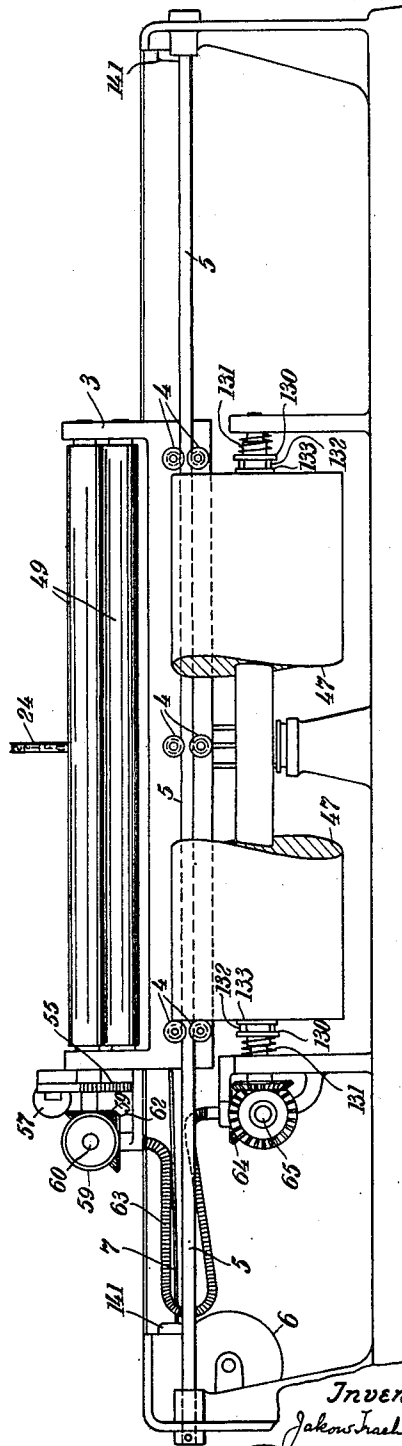


Fig. 3

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**Feb. 4, 1936.**

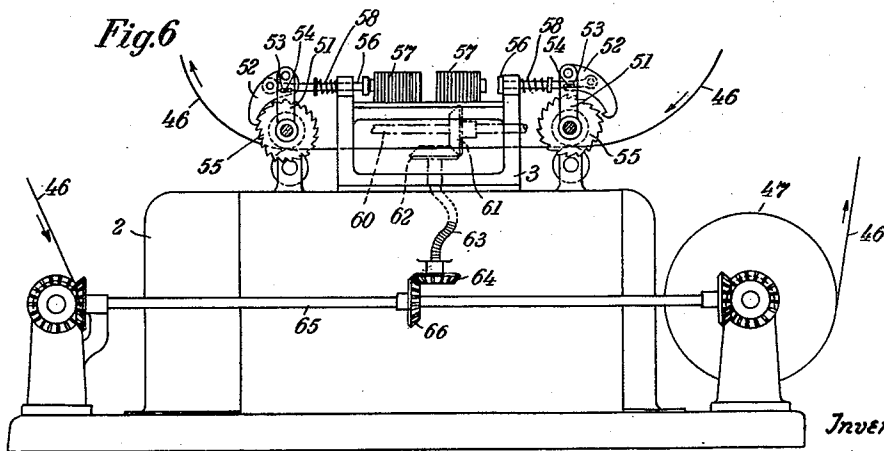
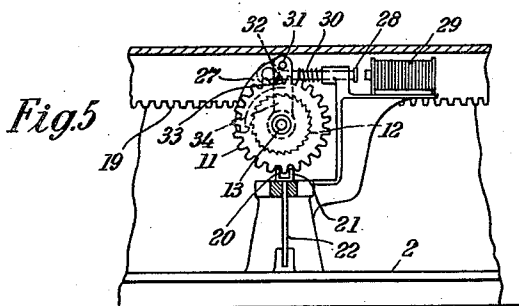
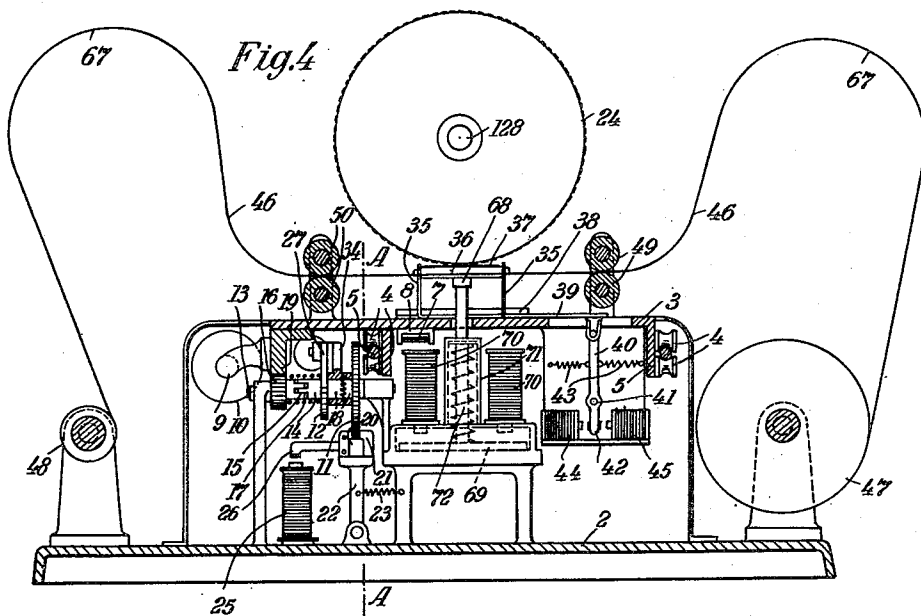
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## ELECTRICAL MULTIPLE TYPEWRITER

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7 Sheets-Sheet 3



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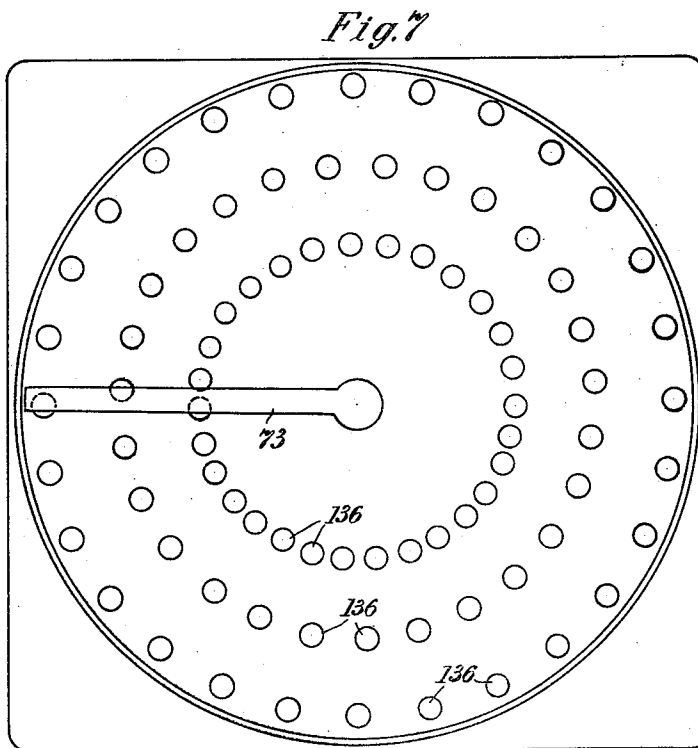
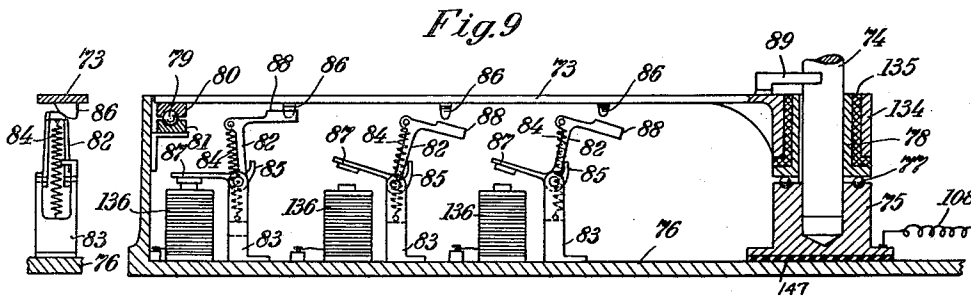
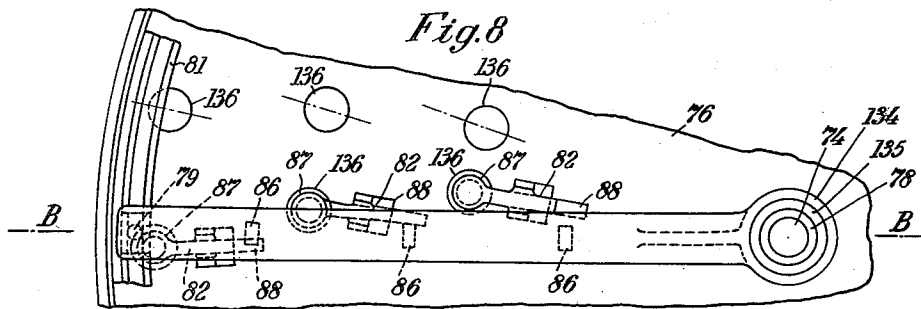
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ELECTRICAL MULTIPLE TYPEWRITER

Filed Nov. 5, 1931

7 Sheets-Sheet 4



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ELECTRICAL MULTIPLE TYPEWRITER

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*Fig. 10*

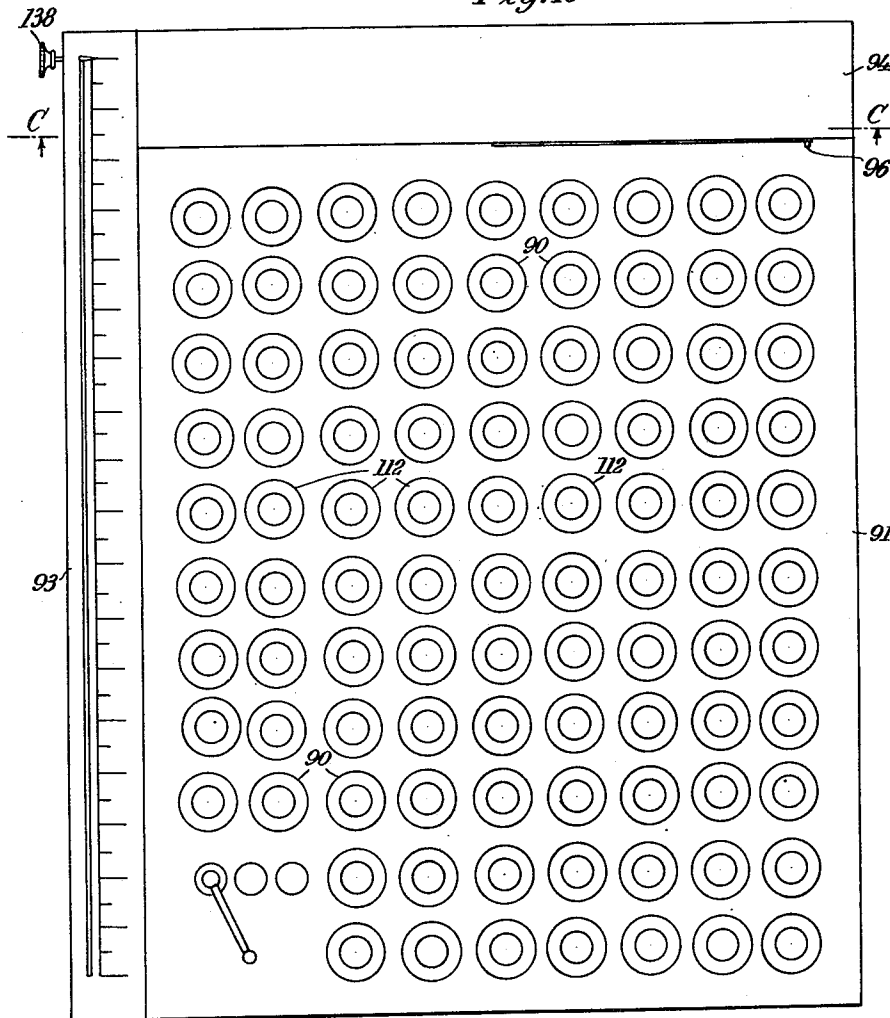
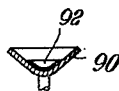


*Fig. 14*



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ELECTRICAL MULTIPLE TYPEWRITER

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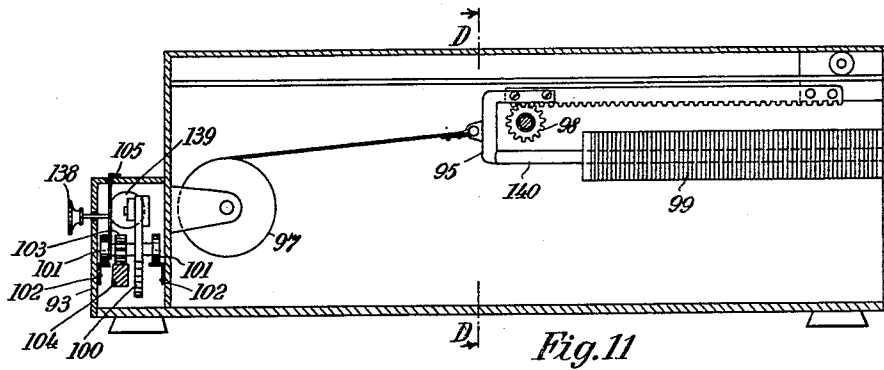


Fig. 11

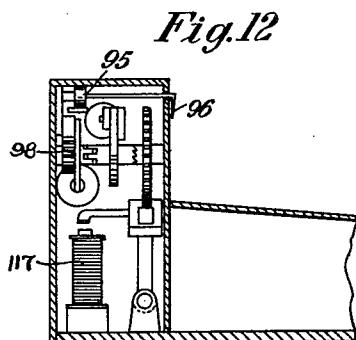


Fig. 12

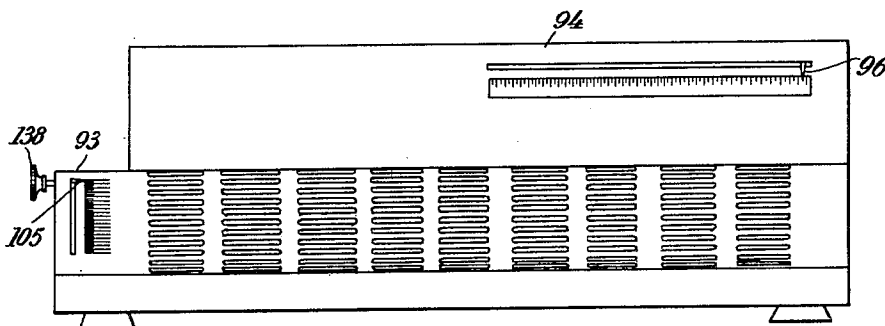


Fig. 13

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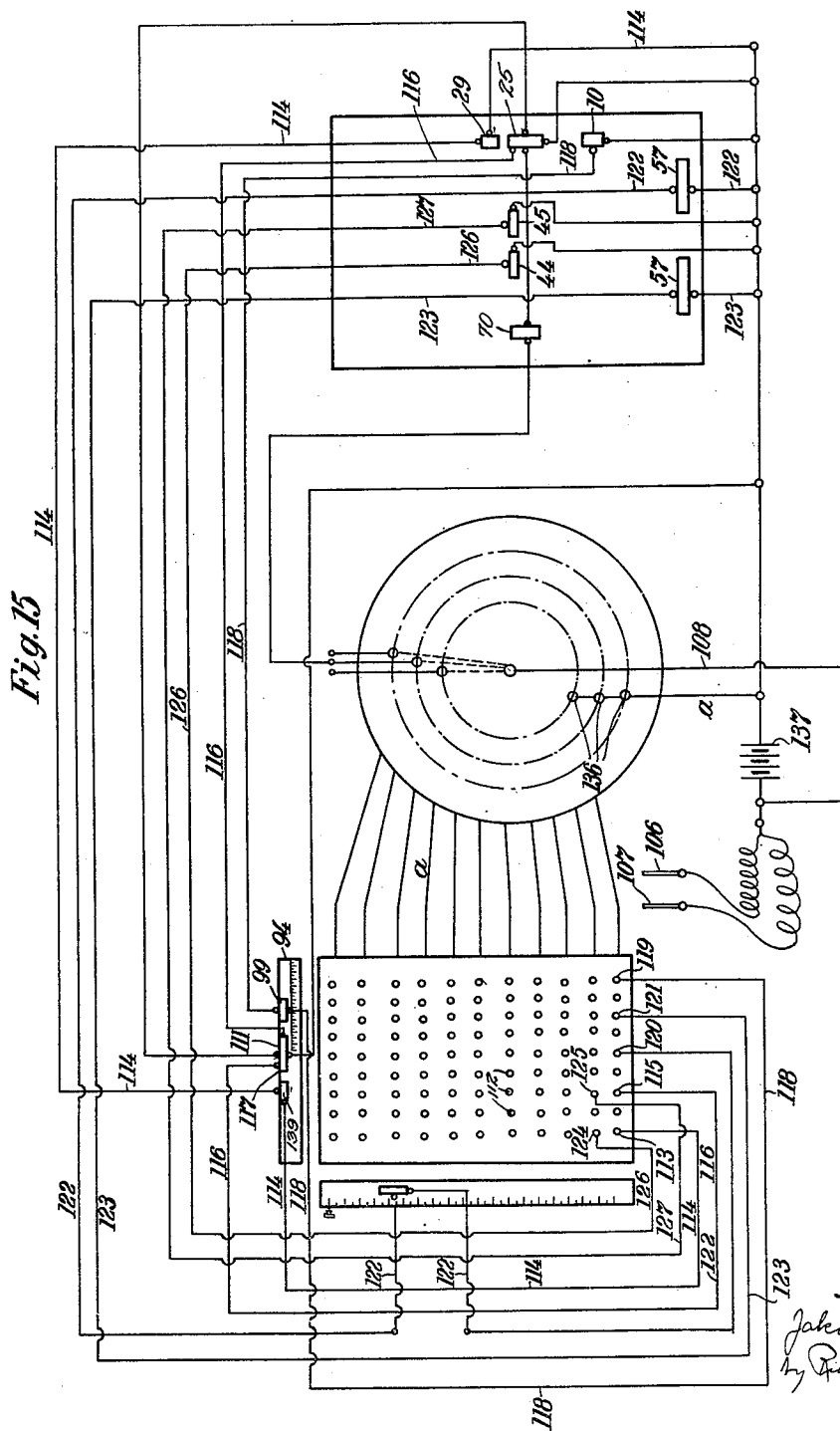
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ELECTRICAL MULTIPLE TYPEWRITER

Filed Nov. 5, 1931

7 Sheets-Sheet 7



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## UNITED STATES PATENT OFFICE

2,029,957

## ELECTRICAL MULTIPLE TYPEWRITER

Jakow Trachtenberg, Berlin-Charlottenburg,  
GermanyApplication November 5, 1931, Serial No. 573,235  
In Germany January 26, 1929

2 Claims. (Cl. 197—12)

The invention relates to an electrical multiple typewriter for making a plurality of original typewritten documents simultaneously.

Multiple typewriting machines are already known in which a plurality of original typewritten documents are made on a corresponding number of typewriters and wherein all the typewriters are electrically-controlled and are actuated from one keyboard. In this case, however, each separate typewriter is constructed in the manner of a complete typewriter, and furthermore provided with printing mechanism, selector mechanism for controlling the printing mechanism, and an electrical arrangement for remote control, so that the apparatus is extremely complicated and expensive.

As compared with this the new electrical multiple typewriter is characterized by the fact that, whilst employing the continuously rotating type-wheel with a synchronously rotating contact arm known in type-printing telegraphs, it is constructed in such a way that a main machine, is provided with a continually rotating type-wheel and a contact arm synchronously rotating with it. On the operation of a key of a keyboard consisting of a field of contacts, the contact arm closes a circuit in a certain position of the type-wheel by which the type-wheel is caused to strike a writing surface. The main machine is connected in such a way with a plurality of typing machines or devices which have essentially each only one type-wheel running synchronously with the main type-wheel, and a corresponding writing surface, that in them a contact of the type-wheel and writing surface is produced simultaneously with that of the main machine.

There is thus provided in the main machine only a contact which rotates synchronously with the type-wheels of all the typing machines, into the path of which contact, contact stops are brought in known manner by the actuation of a keyboard, which cause the striking of the writing surfaces against the type-wheels and the succeeding closing of the circuits effecting the return movement of the writing elements at the times in which the place of the separate type-wheels corresponding to the keys actuated stand opposite the various writing surfaces. The speed of rotation of the contact or of the type-wheels adopted is so high, that in the period of time necessary for seeking the next character, the contact has already effected the circuit closure for striking the writing surface against the type-wheel or the type-wheel against the writing

surface. A speed of about 400 revolutions per minute would fully suffice for these requirements. For obtaining a high speed of typing, the arrangement according to the invention is such, furthermore, that the contact arm itself returns into the position of repose, the contact stops are brought into its path by means of the keyboard after the circuit closure which effects the type-printing. An essential advantage of the new electrical multiple typewriter consists in that the separate writing machines controlled from the main machine, which can be provided in any suitable number, are very simple in their construction and therefore comparatively cheap. At the same time, the typing speed attainable is very high, and is in no way inferior to that attainable on ordinary typewriters. For example, by means of twenty machines controlled from one main machine 600 original letters of the same contents can be produced in an hour, if one assumes 2 minutes as the time for typing one letter. Of course, the new machine can also be used as an ordinary typewriter in case of need, and if desired with only one additional typewriter on which the duplicate is made for the files, so that the making of press-copies or carbon copies is dispensed with.

In the accompanying drawings, showing in a somewhat diagrammatic manner an example of construction of the invention—

Figure 1 is a plan view of the typing machine of the new multiple typewriter.

Figure 2 a longitudinal section through the typing machine and shows two continuously and synchronously rotating type-wheels and the contact arm partly broken away.

Figure 3 an elevation,

Figure 4 a cross section on the line E—E of Fig. 1.

Figure 5 is a section through the carriage lock on the line A—A of Fig. 4.

Figure 6 a side elevation of the paper-feeding means.

Figure 7 a plan view of the field of contact stops.

Figure 8 is a sector of the contact field shown in Fig. 7 drawn to a larger scale.

Figure 9 a section on the line B—B of Fig. 8.  
Figure 10 a plan view of the keyboard with indicating devices.

Figure 11 is a longitudinal section on the line C—C of Fig. 10.

Figure 12 a section on the line D—D of Fig. 10.

Figure 13 a front elevation of the keyboard with indicating devices.

Figure 14 a cross section of a key.

Figure 15 is a wiring diagram of the machine.

5 The machine consists in the example of construction of three separate parts, the actual typing machine or mechanism, the contact box, and the keyboard. The contact box and keyboard or the contact box and writing machine may be  
10 combined to correspond to particular requirements.

The typing machine 1 of the new electrical multiple typewriting machine comprises a stationary carriage bed 2 and a movable carriage 3, which is displaceably mounted on its two long sides by means of rollers 4 on the cross-rods 5 fixed to the stationary carriage bed 2. The forward movement of the carriage during the writing is effected by the spring 6, which is attached by  
20 a band 7 to the eye 8 on the carriage, while the return movement is effected by the drawing of the iron core 9 secured to the carriage into the coil 10. The ends of the two movements are checked by the rubber buffers 141.

25 The limitation of the forward movement in typing is effected in known manner by an escapement mechanism, which consists of a toothed wheel 11 which is coupled to a ratchet wheel 12 on the same shaft 13. This ratchet wheel 12, in its turn, is connected by means of tongues and slots 15 provided on its hub 14 with the correspondingly formed hub of the pinion 16 in such a manner that the ratchet wheel 12 without becoming disengaged from the pinion 16, can be  
30 displaced on the shaft 13. The hub parts 18 of the wheels 12 and 11 formed as a clutch are held in engagement by a spring 17. The pinion 16 engages in the toothed rack 19 of the carriage. The points 20 and 21 of a fork 22, mounted so as to rock, engage in the toothed wheel 11. The point 21 is staggered by half the width of a tooth with respect to the point 20. A spring 23 ensures the point 21 permanently engaging with the toothed wheel 11 on a stoppage of the machine.  
45 When typing, a current flows, on the contact of the typing surface with the type-wheel 24, through the winding of the electro-magnet 25, which attracts the armature 26 on the fork 22, and so causes the fork to rock. By this means the point 20 comes out of engagement with the toothed wheel 11 and the point 21 into engagement, whereby the toothed wheel in consequence of the displacement of the points 20 and 21 rotates through half the width of a tooth. On the interruption of the current flowing through the coil 25, the spring 23 draws the fork 22 back into its original position, so that the point 20 again comes into engagement and the toothed wheel further rotates by the width of another half  
50 tooth. The width of two half teeth corresponds to the width of one tooth, so that the carriage moves forward the width of a letter or character at each operation of the electro-magnet 25.

55 In order to move the carriage backwards by operation of a key 113 to the extent of the width of one or several characters, a rocking lever 34 is arranged on the hub 18 of the ratchet wheel 12, on the free end of which lever 27 with a hook is pivoted. On the latter lever the armature 28 is pivoted. In the position of repose, the hook of the lever 27 does not engage in the ratchet wheel 12. When however the circuit of the electro-magnet 29 is closed, the latter attracts the armature 28 against the action of a spring 30,  
70 so that the lever 27 rocks about the point 31 to

such an extent until its pin 33, which is guided in the bore 32 of the rocking lever 34, and is of less diameter than the bore, strikes the edge of the bore and rocks the rocking lever 34 with it. The hook of the lever 27 is thus brought into engagement with the ratchet wheel 12, so that this latter is carried along with it. The clutch members 18 of the wheels 11 and 12 come out of engagement during this backward rotation against the action of spring 17 owing to their teeth being bevelled at one side, so that the toothed wheel 11 cannot hinder the reverse movement of the carriage.

The colour band strip 37 consists of a strip the length of the width of a sheet of paper, and is mounted with its ends, which are guided in sleeves 36, on a fork-like frame 35 arranged at about the centre of the carriage. Instead of coloured band strips, colour-ribbon rolls wound on spools can of course also be used. The frame 35 is inserted  
20 in an easily displaceable manner in the slots 38 of the carriage frame. At about the middle of the frame an arm 39 is arranged to which is connected the end of the lever 40 formed as a fork. This lever 40 is revolvably mounted on the fixed axis 41 and has an arm 42 formed of an armature. Two springs 43 retain the lever 40 in its central position. In this position the middle colour of the three-colour coloured ribbon shown in the drawings lies below the type-wheel. According to the desired change of colour, the lever 40 is rocked to left or right by means of either the electro-magnet 44 or 45 so that a displacement of the colour ribbon occurs. If more than three colours are used, a suitable adjustment device which  
35 renders possible a further displacement will be provided.

The paper strip 46 is guided through below the colour ribbon strips 37. This paper strip is wound on the roller 47 and is conveyed by the rollers 49 and 50 to the roller 48. The rollers 49 and 50 are provided in pairs with a ratchet adjustment device formed to correspond to the device for backspacing. On the one roller shaft a lever 51 is mounted so as to rock, on the free end of which a lever 52 provided with a hook is fulcrumed. A pin 53 of this lever engages in a bore 54 of the lever 51 which exceeds the diameter of the pin. In the position of repose the lever 51 does not engage in the ratchet wheel. The actuation of the lever 52 is effected by the rod 56 pivoted to it and forming the armature for the electro-magnet 57, which rod when attracted by the electro-magnet 57 rocks the lever 52 to such an extent about its pivot point until  
55 the pin 53 strikes against the edge of the aperture 54 and so causes the lever 51 to rock about its pivot. Simultaneously the hook of the lever 52 has come into engagement with the ratchet wheel 55, so that on the further rocking of the lever 52 a rotation of the rollers takes place. The spring 58 effects the return into its original position of the hook 52 after the cutting out of the electro-magnet 57.

Such an arrangement is provided for each pair of rollers. In the pair of rollers 50 the device is so arranged that by the operation of the electro-magnet a movement is produced opposite to the direction of rotation of the other roller, which effects the feeding of the paper. Both groups of rollers are positively connected together by bevel wheels 59 mounted on a shaft 60. In the middle of this shaft 60 a further bevel wheel 61 is arranged which stands in mesh with the bevel wheel 62 of a flexible shaft 63 and  
75

transmits the movement of the roller through the bevel wheels 64 and 66 and the shaft 65 to the rollers 47 and 48. In this manner the winding up and unwinding of the paper is effected in the same proportion as the movement of the paper by the conveying rollers 49 and 50. The paper can therefore be introduced into the machine in such a way that it forms a loop 67 at the feed and delivery points, which makes it possible to move the carriage to and fro without injuring the paper strip whilst employing fixed winding and unwinding rollers.

The rollers 47 and 48 carrying the paper can be constructed in such a way that pins 129 are mounted in two bearings provided on the machine frame, the ends of which pins carry discs 130 provided with two projections 132. These projections 132 engage in corresponding holes of discs 133 on the core of the roller and are retained in engagement by springs 131. By displacement of the discs 130 against the action of the springs 131 towards the bearing the projections 132 come out of engagement so that the roller carrying the paper can be removed.

The striking of the writing surface against the type-wheel 24 is effected by the tappet 68, one end of which is connected with an armature 69. This armature 69 can be attracted by the electro-magnets 70. A spring 72 arranged in a fixed sleeve 71 is opposed to the force of attraction of the electro-magnets 70 and brings the tappet 68 back again to its position of repose after the stroke has taken place.

The shaft 128 of the type-wheel 24 according to Fig. 2 is positively connected at one side with the shaft 74 of the adjustment box 76 and the driving electro-motor 142 through the intermediary of the bevel wheels 143, 144, 145 whilst the other side is provided with a suitable clutch 146 for connection with the shaft 128 of the next adjacent type-wheel 24' comprising a typing surface (not shown), the parts 128, 24, 24', 73, 74 rotating continuously and synchronously.

The contact lever 73 serves for closing the circuit operating the tappet 68, which contact lever in the example of construction is arranged in a separate casing and rotates synchronously with the type-wheel in consequence of its positive connection therewith. The one end of the contact lever is formed as a sleeve 134 which is mounted by means of the insulating layer 135 in an insulated manner on the shaft 74. The shaft 74 is mounted, for example, in the foot-piece 75 arranged through the intermediary of the plate 147 of insulating material on the base plate 76 of the casing, and is supported by means of the ball-bearing 77 through the intermediary of the bush 78 keyed on the shaft. The free end of the contact arm is supported by means of the ball 79 provided in the cage 80, which ball runs in a circular rail 81 fastened to the casing.

The contact stops 82 are arranged in three circles in staggered relationship, so that on a radius there is only one contact stop. They are formed by a bell-crank lever 82 which is mounted so as to rock on a current rail 83 brought into the circuit. Springs 84 are connected to the bell-crank levers 82 and cause the levers 82 to be secured in their position after their oscillation through the dead-point until they are next caused to rock. A nose 85 prevents the lever 82 rocking too far. The closures of the circuits are effected by wedge-shaped projections 86 and in the position of repose of the contact stops 82 can move past the latter unimpededly. If however

a current is sent through the winding of the electro-magnet 136, the end 87 of the contact stop formed as an armature is attracted, and the end 81 serving as contact rocked into the path of the projection 86, and retained by the spring 84 in this position even on the interruption of the current, until the projection 86 strikes against the end 88 during the rotation of the contact lever 73 and presses the lever downwards so that it again assumes its original position. In this position it is also retained by the spring 84. On the contact of the projection 86 against the lever end 88 current flows from the battery 137 connected to the current rail 83 through the end 88 of the lever 82, the projection 86, contact lever 73, the sliding contact 89 fastened to the contact lever and sliding on the shaft 74, the shaft 74, and the foot-piece 75 to the typing machine.

The keys 90 of the keyboard 91 are preferably of funnel shape, and provided at their bottom with the conducting attachment 92 which effects the closure of the circuit.

On the side and at the top of the keyboard indicator devices 93 and 94 respectively are arranged. The indicating device 94 serves to make visible the length of the typed line whilst the lateral indicating device serves for counting the lines. The indicating device 94 consists of a carriage 95, which carries a pointer 96. The movement mechanism of this indicating device corresponds exactly with that of the carriage 2 of the typewriter. It consists of the spring 97, the lock 98, and the coil 99 which draws in the carriage part 140 formed as an iron core. The said parts are connected in the same circuit with the corresponding parts serving for the movement of the carriage, so that the movements take place exactly simultaneously.

In the indicating device 93 a ratchet adjustment device 100, identical with that of the ratchet device for the movement of the paper rollers, is arranged on a little carriage, which with its rollers 101 can travel on the angle-iron 102 provided in the casing of the indicating device. A toothed wheel 103 mounted on the shaft driven by the ratchet adjustment mechanism engages in a fixed toothed rack-bar 104 so that the adjustment movement causes a forward movement of the little carriage which carries the pointer 105. The scale of this indicating device corresponds to the number of lines which can be written on a sheet of paper of normal size. The moving back of the indicating device 93 is effected manually in the example of construction described by means of a finger-piece 138. It could however also be effected electro-magnetically.

The mode of working of the new apparatus is as follows:—

By means of the two typing pins 106 and 107 the key of the corresponding character is touched on the keyboard of the machine. By this means the circuit indicated by *a* in Fig. 15 is closed which energizes the electro-magnets 136. The current can be taken from a battery or the mains. These electro-magnets in their turn attract the armature 87 of the contact stops, which oscillate and bring their contact 88 into the path of the projections 86 of the rotating contact 73. On the interruption of the circuit *a*, the spring 84 retains the contact stop so long in the position mentioned until the projection 86 strikes against the contact 88 and now closes the circuit, and current flows from the battery 137 through the conductor 108, shaft 74, contact lever 73, its projections 86, the contact stop 82 75

and the current rail 83 to the tappet 70 striking the writing surface against the type-wheel, and to the carriage lock 25, as well as the corresponding parts 111 of the indicating device 94. When a word is written, the necessary spacing between the words is effected by means of the spacing keys 112, which takes place by bringing a corresponding contact stop into the path of rotating contact 73. A row, say in the middle of the keyboard, is occupied with keys 112. The key 113 serves as a return key. By it the circuit 114 is closed in which is situated the coil 29 and the coil 69 corresponding to it of the indicating device 93.

The circuit 116 closed by the key 115 effects the optional forward movement of the carriage 2 as well as that of the carriage of the indicating device 94 when insetting the line and the like. In this circuit 116 there is simply the magnet coil 25 as well as the corresponding coil 117 of the indicating device 94. The return movement of the carriage is effected by the circuit 118, which is closed by means of key 119, whereby a current flows through the coil 10 and the coil 99 and the latter draw in the iron cores 9 and 140 of the typewriter carriage as well as the indicating device 94. For the forward and backward movement of the paper, circuits 122 and 123 are employed closed by the keys 120 and 121, of which circuits the circuit 122, which serves for the forward movement of the paper, serves at the same time also for the operation of the indicating device 93 and through the coil 139 of which as well as one of the coils 57 current flows. The return of the indicating device 93 is effected by hand, it could however also be performed electro-magnetically in a similar manner to the indicating device 94.

For changing the colour ribbon keys 124 and 125 are provided. These keys belong to the circuits 126 and 127 in which are situated the coils 44 and 45, by which when supplied with current the colour ribbon is displaced correspondingly to left or to right.

It is preferable to combine the switch box with

the rotating contact 73 with the typing machine so that no rotating parts have to be carried through the rooms of the office but simply a cable serving for the supply of current leads from the keyboard to the typing machine. Of course, a switch box for several typing machines coupled together can be provided.

I claim:

1. An electrical multiple typewriter comprising a continuously rotatable typewheel, a platen, electro-magnetic typing means for bringing the platen into contact with a definite type on the typewheel, a contact arm rotating continuously and synchronously with the typewheel, a plurality of contact stops, a keyboard comprising a plurality of keys, electro-magnetic means operated by the keys and adapted to bring the contact stops into the path of the rotating contact arm, a circuit closed by the contact of the stops and the contact arm and operating the electro-magnetic typing means, and means whereby the rotating contact arm returns the contact stops to their position of repose after closing said circuit.

2. An electrical multiple typewriter comprising a continuously rotatable typewheel, a platen, a laterally movable carriage supporting the platen, electro-magnetic typing means for bringing the platen into contact with a definite type on the typewheel, paper feeding means to feed paper between the typewheel and the platen, a keyboard comprising a plurality of keys, means operated by certain of said keys to operate said electro-magnetic typing means, means operated by other of said keys to effect displacement of said carriage, means operated by a further key to effect return of said carriage, means operated by still other of said keys to operate said paper feeding means, and indicating devices mounted on the keyboard operated by said paper feeding means and said carriage displacing means, and indicating the position of the typed sheet with respect to the typewheel.

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