No. 880,263. PATENTED FEB. 25, 1908.

I. YOUNG.

ELECTRIC SIGN.

APPLICATION FILED NOV. 7, 1903.

8 SHEETS—SHEET 1.

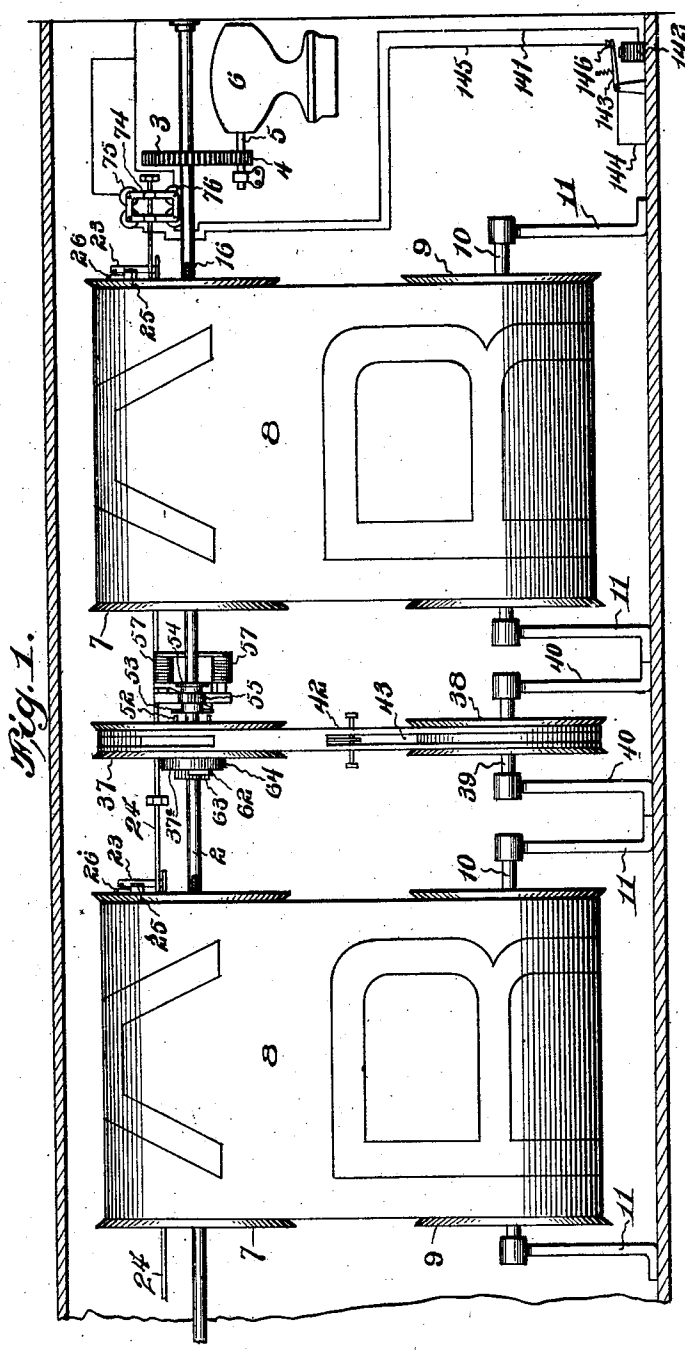


Fig. 1.

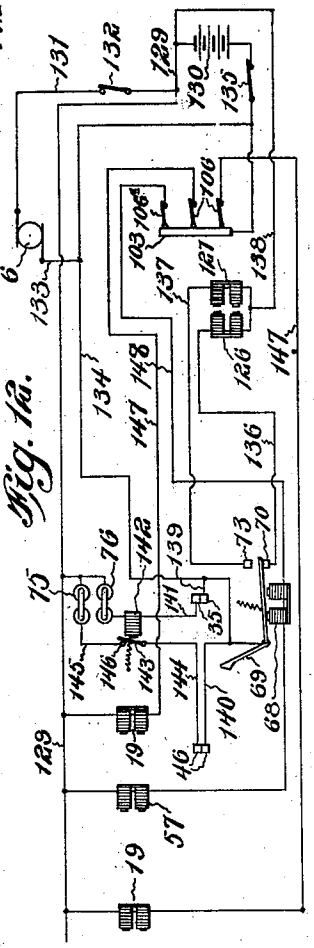


Fig. 1a.

Witnesses

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8 SHEETS—SHEET 2.

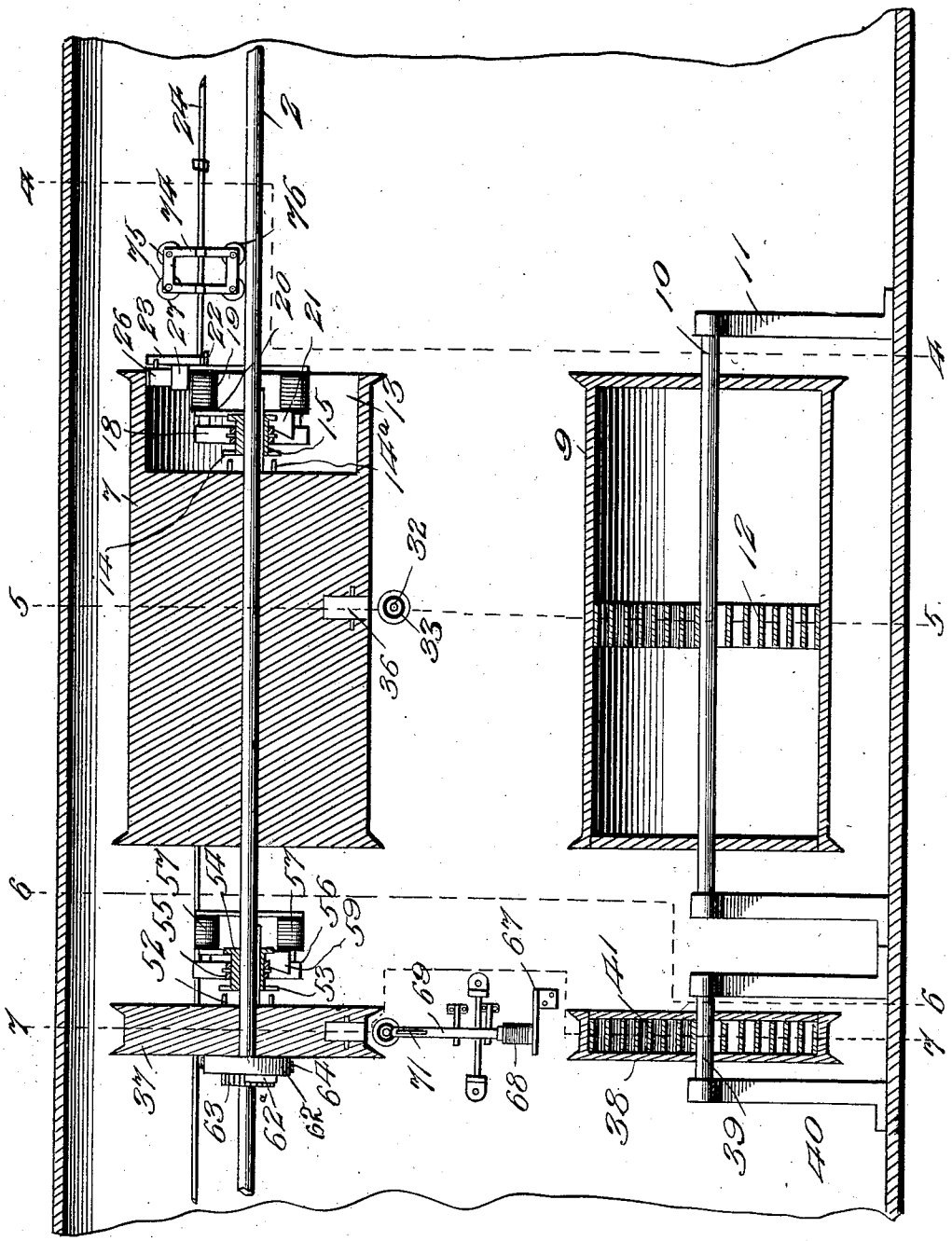


Fig. 2

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8 SHEETS—SHEET 3.

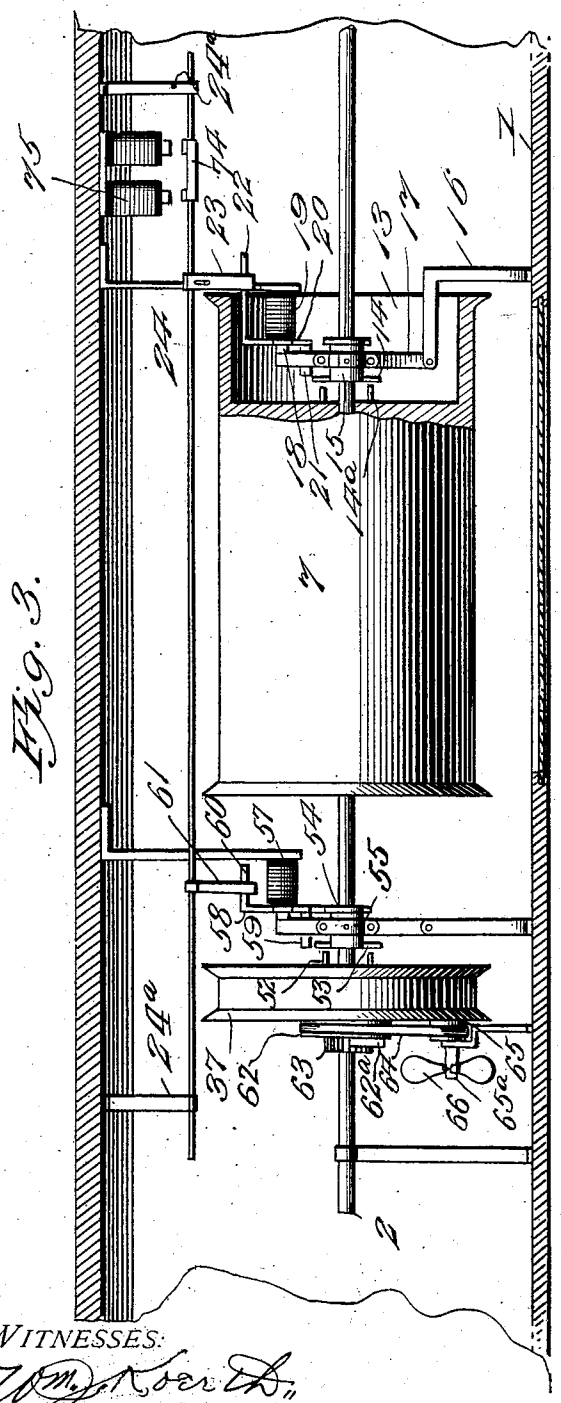


Fig. 3.

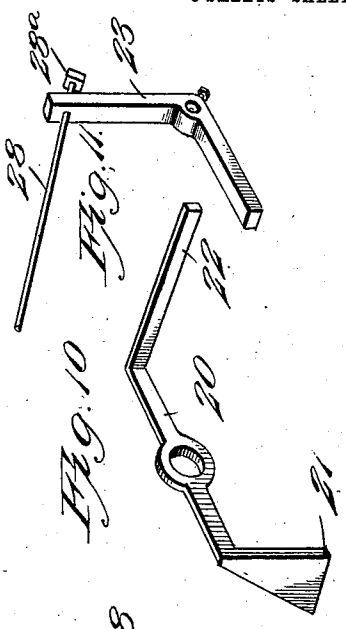


Fig. 11.

Fig. 10

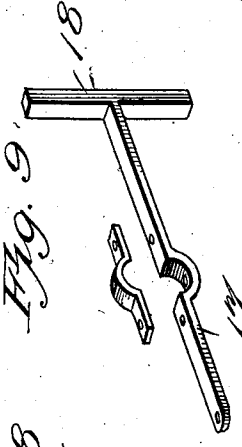


Fig. 9



Fig. 8

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8 SHEETS—SHEET 4.

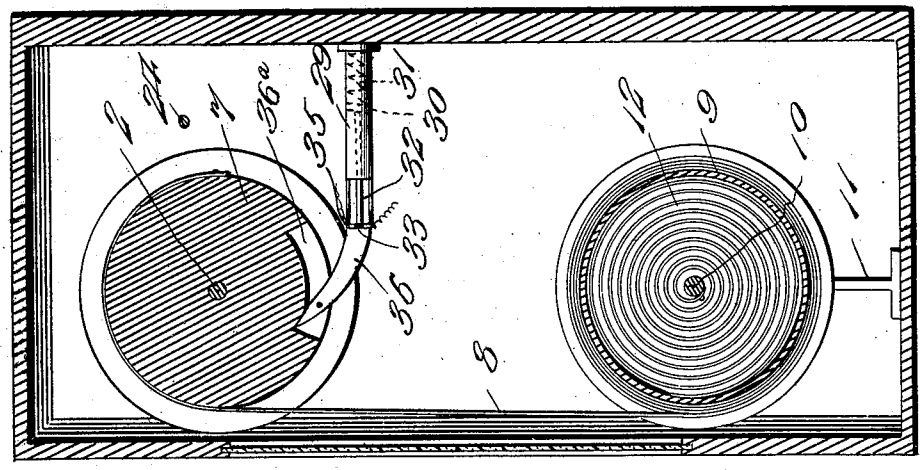


Fig. 5.

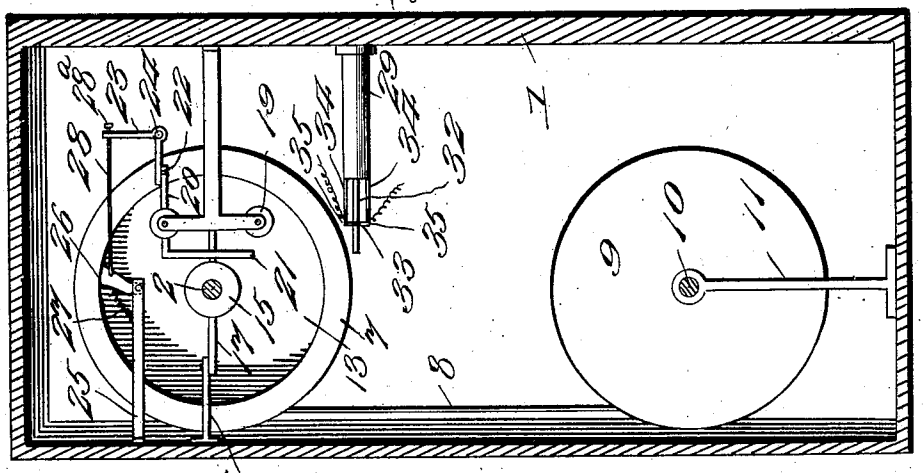


Fig. 4.

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8 SHEETS—SHEET 6.

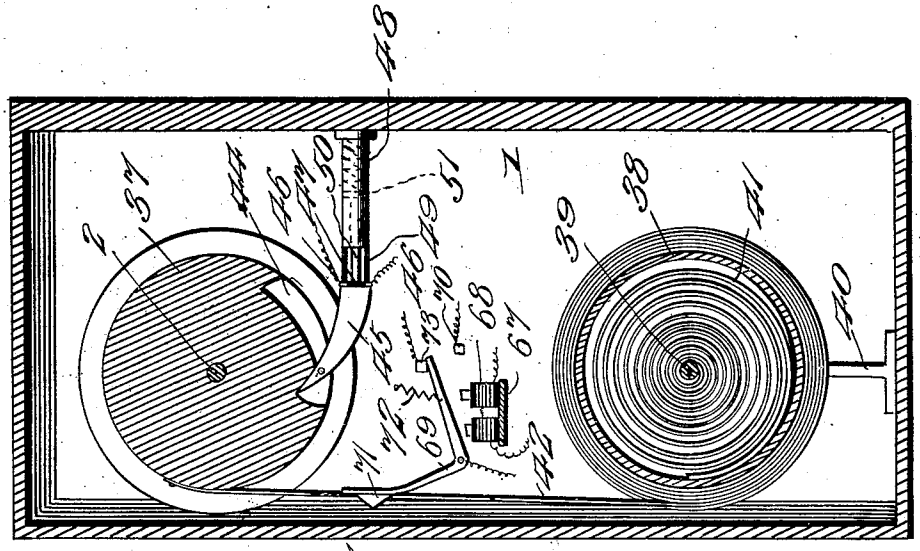


Fig. 7.

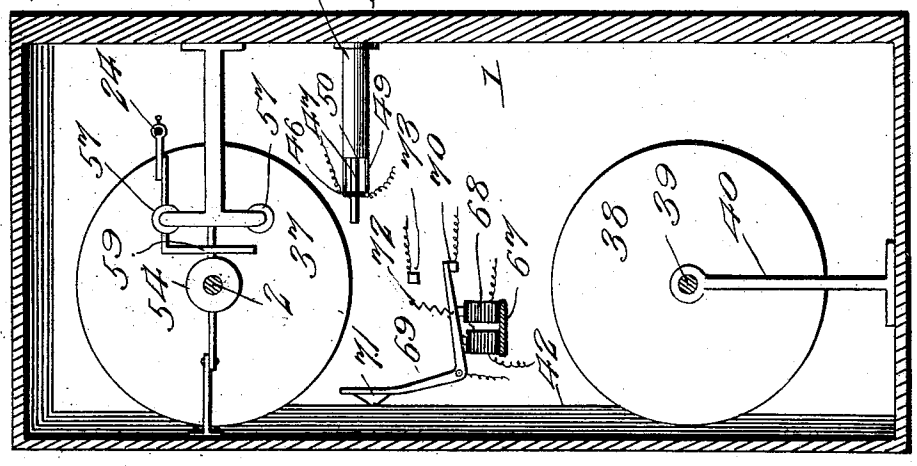


Fig. 6.

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APPLICATION FILED NOV. 7, 1903. 8 SHEETS—SHEET 6.

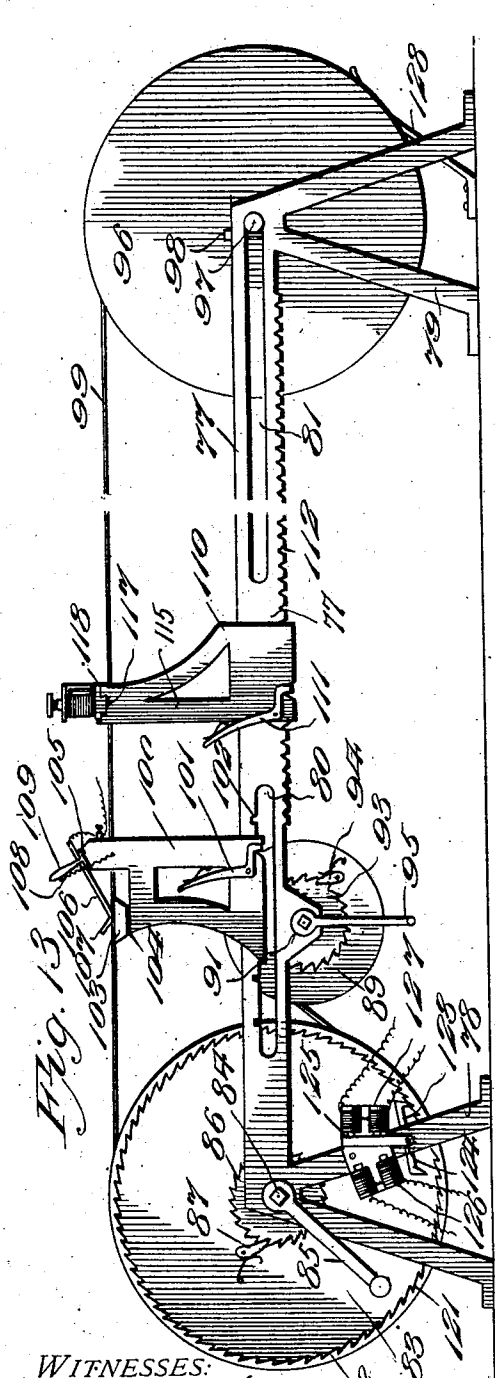


Fig. 13.

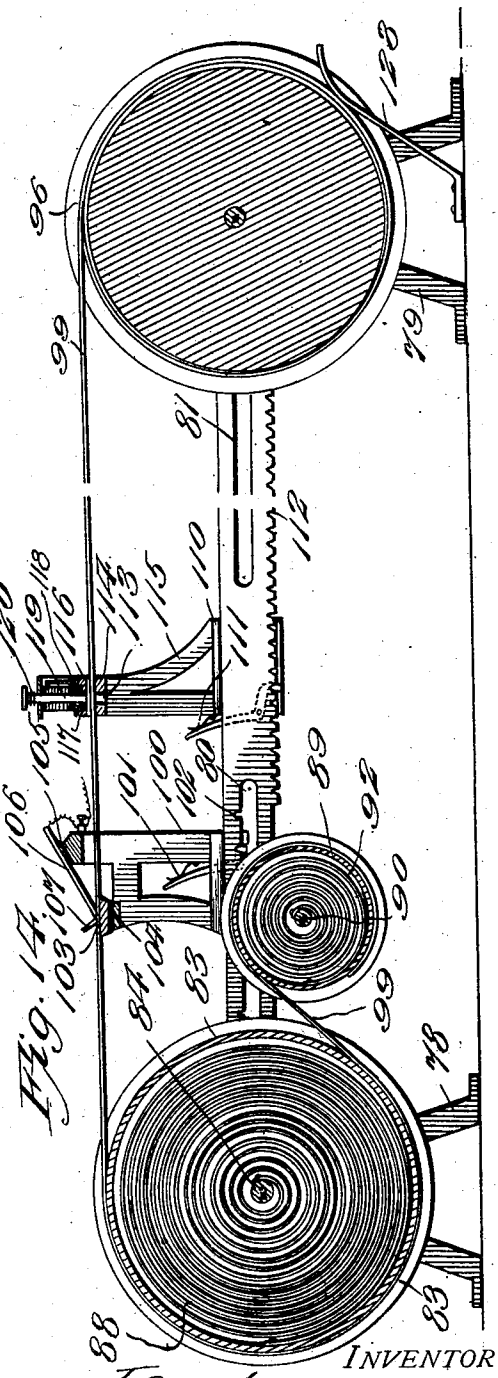


Fig. 14.

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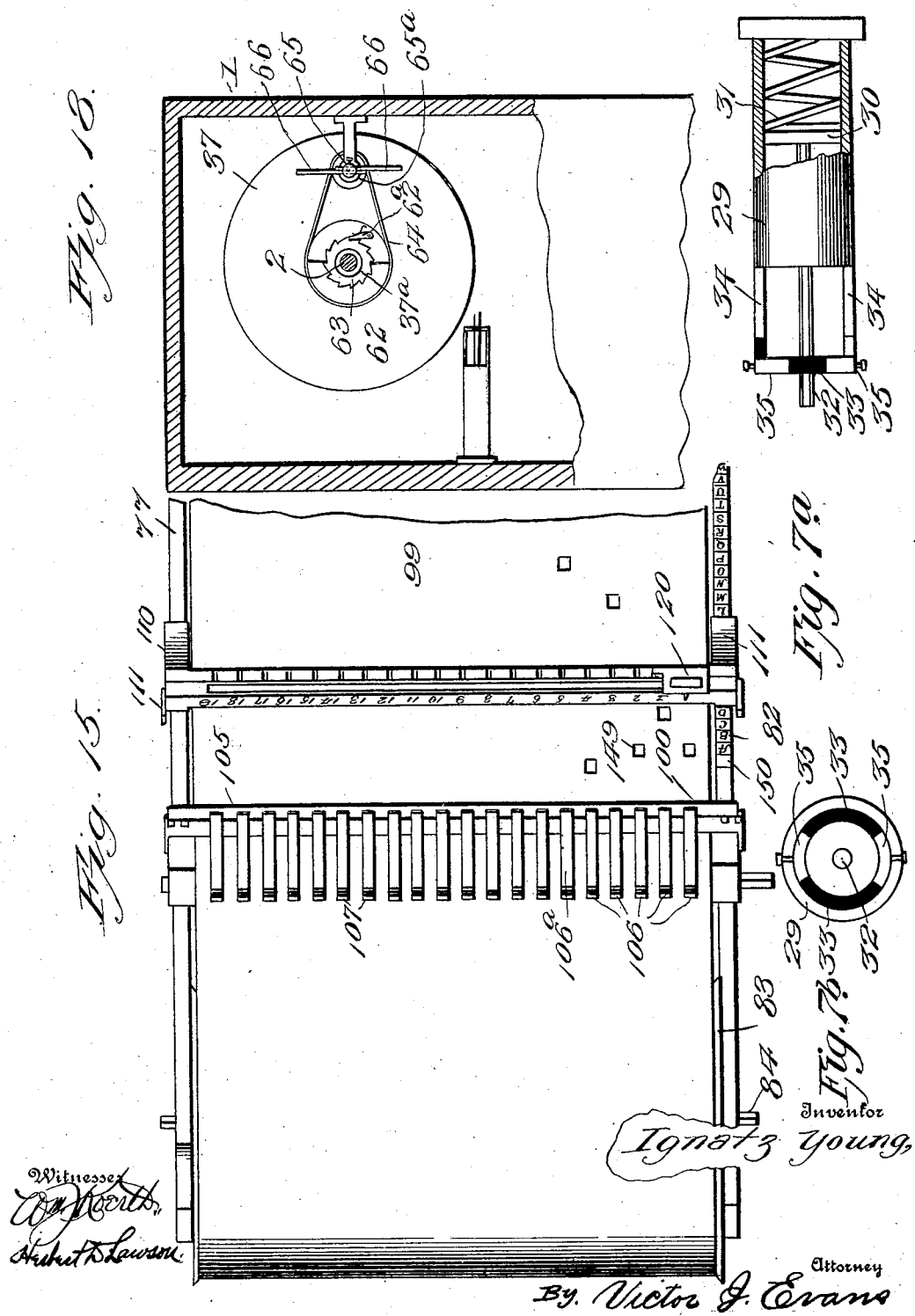
No. 880,263. PATENTED FEB. 25, 1908.

I. YOUNG.

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APPLICATION FILED NOV. 7, 1903.

8 SHEETS—SHEET 7.



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No. 880,263. PATENTED FEB. 25, 1908.

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8 SHEETS—SHEET 8.

Fig. 16.

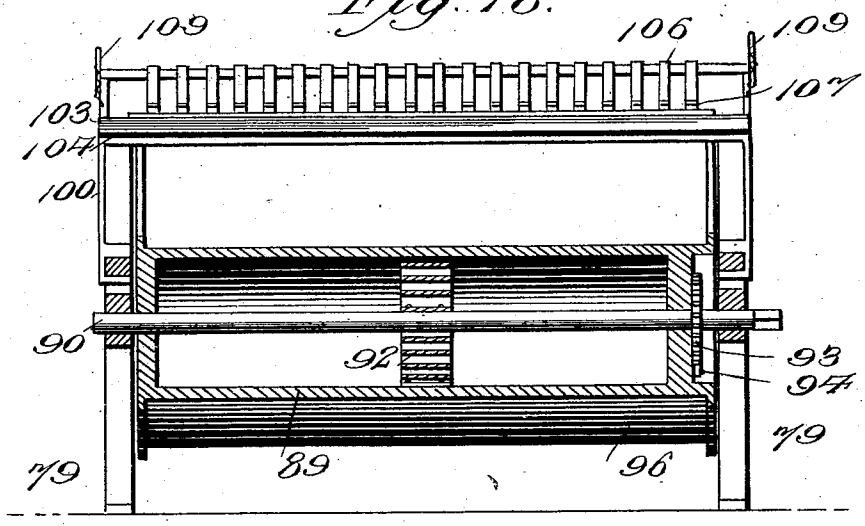
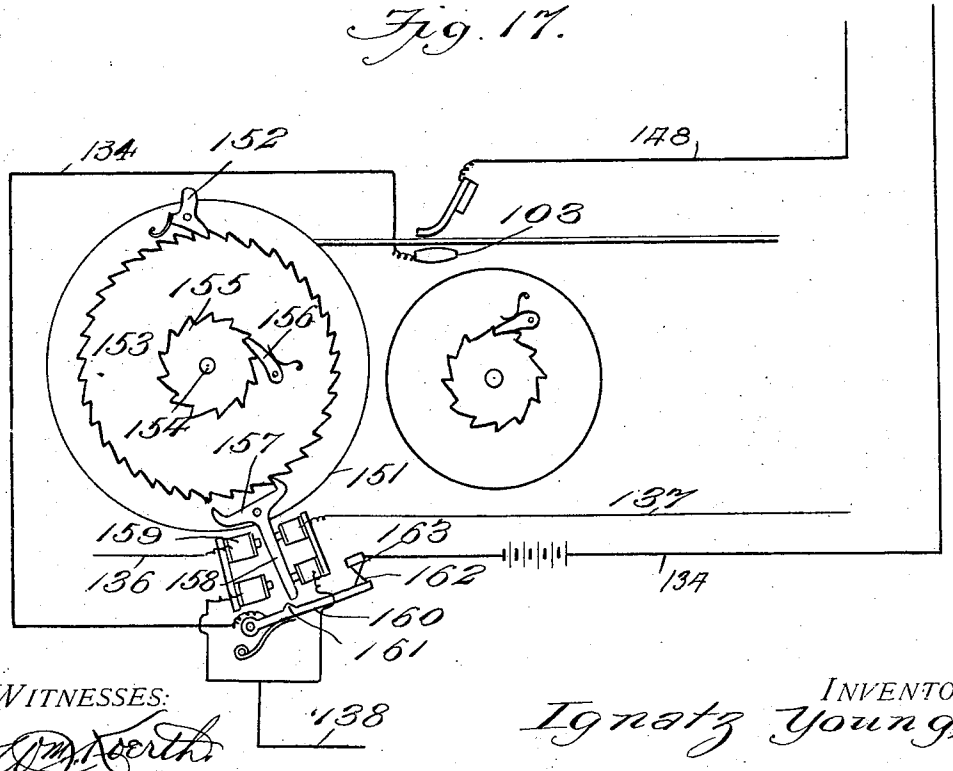


Fig. 17.



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ELECTRIC SIGN.

No. 880,263. Specification of Letters Patent. Patented Feb. 25, 1908.

Application filed November 7, 1903. Serial No. 180,226.

To all whom it may concern:

Be it known that I, IGNATZ YOUNG, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Electric Signs, of which the following is a specification.

My invention relates to a new and useful improvements in electric signs and in mechanism for operating the same. Its object is to provide a series of alphabet strips which are adapted to be rotated from a common shaft driven by a motor provided therefor.

Another object is to provide novel mechanism whereby the movement of each alphabet strip may be stopped when a desired letter is exposed so as to permit a series of strips to display letters which, when read together, spell the desired word or words.

Another object is to employ novel electrical apparatus for controlling the movements of the alphabet strips.

A further object is to provide a machine carrying a record sheet adapted to be perforated at desired points to establish electrical connections for moving the desired alphabet strip predetermined distances.

Another object is to employ electrical apparatus for operating the record carrying machine from the alphabet strip carrying mechanism, whereby the letters of the word to be indicated are automatically displayed successively.

With the above and other objects in view, the invention consists in the novel construction and combination of parts hereinafter more fully described and claimed and illustrated in the accompanying drawings showing the preferred form of my invention, and in which:—

Figure 1 is a front elevation of two alphabet strips and the mechanism connected thereto; Fig. 2 is a vertical longitudinal section through the mechanism illustrated in Fig. 1, showing one of the alphabet strips and coacting parts; Fig. 3 is a top plan view of said mechanism, the upper drum being broken away and showing the mechanism therein; Fig. 4 is a section on line 4—4, Fig. 2; Fig. 5 is a section on line 5—5, Fig. 2; Fig. 6 is a section on line 6—6, Fig. 2; Fig. 7 is a section on line 7—7, Fig. 2; Fig. 7^a is an enlarged side elevation of one of the cylinders and the parts connected thereto, the cylinder being shown partly in section; Fig. 7^b is an end elevation of the cylinder and showing the ring; Fig. 8 is a detail view of a clutch; Fig. 9 is a similar view of its retracting lever; Fig. 10 is a perspective view of the clutch operating wedge and parts connected thereto; Fig. 11 is a detail view of the bell crank lever employed for operating the wedge; Fig. 12 is a diagrammatical view showing the electrical connections between the various parts of the mechanism; Fig. 13 is a side elevation of the record carrying machine, the same being broken away at the center; Fig. 14 is a vertical longitudinal section therethrough; Fig. 15 is an enlarged plan view of the machine, one end thereof being broken away; Fig. 16 is a section through the punch of the record carrying machine; Fig. 17 is a diagrammatical view of a modified form of operating mechanism for said machine, said mechanism including devices for preventing sparking by the electrical current during the making and breaking of the circuit by the brushes of the machine; and Fig. 18 is a side elevation of one of the pulleys of the mechanism and the controlling fan connected thereto.

Referring to the figures by numerals of reference, 1 is a casing of any desired length and having a longitudinally extending shaft 2 journaled therein and provided with a gear 3 which meshes with a similar gear 4 arranged on the shaft 5 of an electric motor 6. Arranged upon this shaft at desired intervals are drums 7 carrying flexible strips 8 having the letters of the alphabet arranged thereon successively from one end to the other. A drum 9 is arranged below and preferably in vertical alinement with each drum 7 and is loosely mounted on a shaft 10 supported by standards 11. One end of the strip 8 is secured to the drum 7, while the other end is secured to drum 9, and this strip is normally wound upon this last mentioned drum. A coiled spring 12 is located within drum 9, and its ends are secured to the shaft and drum, respectively, so that the strip 8 cannot be unwound from the drum without tensioning the spring.

Each drum 7 has a recessed end 13, and from the inner end of this recess extends a series of pins 14^a adapted to be engaged by laterally extending arms 14 which project from a sleeve 15 feathered upon the shaft 2. An L-shaped bracket 16 is fastened to the front of the casing 1 and projects into the

recess 13, and to this bracket is pivoted one end of a lever 17 having a T-shaped head 18 at its free end which forms the armature of magnets 19. Upon the core of one of these magnets is fulcrumed a lever 20 having a depending wedge-shaped arm 21 at one end, while at its other end is arranged a laterally extending arm 22 which projects under one arm of a bell crank lever 23. This lever is securely fastened to a rod 24 which is journaled in brackets 24[a] provided therefor in the casing 1 and extends longitudinally of said casing, preferably directly in rear of the drums 7. Another bracket 25 extends from the front of the casing into the recess 13, and pivoted to its inner end is a cam 26 normally held lightly in contact with the wall of the recess 13 by means of a coiled spring 27. This cam is connected by a rod 28 with the upwardly extending arm of bell crank lever 23, and said rod is slidably mounted in the lever and has a head 28[a] at its outer end.

A cylinder 29 formed of any suitable material extends under each drum 7 from the rear end of casing 1 and has a piston 30 therein. A coiled spring 31 is arranged within the cylinder 29 between one end thereof and the piston 30 and serves to hold this piston normally pressed outward toward the other end of the cylinder. A piston rod 32 extends from the piston and projects from the inner end of cylinder 29, and this rod normally projects through a ring 33 which is held removed from the end of cylinder 29 by parallel arms 34 which are insulated from the ring. This ring is of insulating material and has oppositely disposed contacts 35 which are normally contacted by a dog 36 pivoted within a recess 36[a] formed within the outer face of said drum 7. This dog is adapted to be held retracted within the recess 36[a] by the alphabet strip 8 when said strip is wound upon the drum.

Adjacent each drum 7 and loosely mounted on shaft 2 is a pulley 37 having a tubular extension or sleeve 37[a] at one end, and directly under this pulley is a hollow pulley 38 which is loosely mounted on a shaft 39 supported by standards 40. A coiled spring 41 is arranged in the pulley 38 and is secured at opposite ends to said pulley and the shaft 39, respectively. The opposite ends of a flexible strip 42 are connected to the pulleys 37 and 38, respectively, and this strip has longitudinally extending slots 43 therein which are in horizontal alinement with the characters upon strip 8 and are equal in length thereto. A recess 44 is formed within the curved face of pulley 37, and a dog 45 is pivoted therein and is adapted to be projected by gravity therefrom and to abut contacts 46 arranged at opposite sides of a ring 47 of insulating material. This ring is connected to a cylinder 48 by arms 49, and a piston rod 50 extends through the ring 47 and is connected to a piston 51 in cylinder 48. This piston is spring pressed for the purpose hereinafter more fully described. When the strip 43 is wound upon the pulley 37, the dog 45 is forced by said strip into the recess 44 so that it only swings outward from said recess after the strip has been unwound. Pins 52 extend from one face of the pulley 37 and are adapted to be engaged by arms 53 extending laterally from a sleeve 54 feathered in the shaft 2, and this sleeve is engaged by a lever 55 similar to the lever 17 hereinbefore referred to and having a T-shaped head 56 which serves as an armature for magnets 57. A lever 58, similar to the lever 20, is arranged adjacent the pulley 37 and has a wedge-shaped extension 59 one inclined edge of which bears upon the lever 55 and swings said lever upon its fulcrum when the extension 59 is swung with the lever 58. This movement of the lever 55 serves to throw the sleeve 54 toward the pulley 37 when raised. The foregoing operation of the lever and its extension is produced as follows: The lever has a laterally extending arm 60 which extends under an arm 61 secured to the rod 24, and when said arm is swung downward the lever is swung upon its fulcrum and the wedge-shaped extension, which is at the other side of the fulcrum of the lever, will, as is obvious, be swung upward and force the sleeve toward the pulley 37, thereby bringing the arms 53 of said sleeve into engagement with pins 52. A split pulley 62 is loosely mounted on the sleeve 37[a] and has a pawl 62[a] thereon which engages a ratchet wheel 63 secured to said sleeve 37[a]. A belt 64 is mounted on pulley 62 and extends over a smaller pulley 65 arranged on a shaft 65[a] in which are adjustably mounted oppositely extending fan blades 66.

Located between the pulleys 37 and 38 is a bracket 67, which is secured to the rear wall of the casing, as shown in Fig. 2, and upon which is mounted a magnet 68. A bell crank lever 69 is fulcrumed adjacent this magnet, and one of its arms forms an armature which, when contacted with the cores of the magnet 68, also rests upon a contact 70. The other arm of the bell crank lever 69 has a V-shaped extension 71 which is held normally in contact with strip 42 by means of a coiled spring 72. When one of the slots 43 in the strip is brought into position opposite the extension 71, spring 72 will throw said extension through the slot, thereby raising the oposite end of the lever 69 and causing it to bear upon a contact 73.

An armature 74 is secured to the rod 24 and extends over oppositely arranged magnets 75 and 76. These magnets and the armature are for the purpose hereinafter more fully described.

As hereinbefore stated, a series of alphabet

strips 8 is employed, and each of these strips has mechanism therefor such as hereinbefore described. The various strips within the series are controlled in their operation by means of a machine such as shown in Figs. 13 to 17. This machine comprises a bed 77 supported on standards 78 and 79, and this bed has slots 80 and 81 in the sides thereof, while the upper face of one of said sides is divided into spaces 82, each of which contains a letter of the alphabet or other desired character, said letters being arranged consecutively from one end to the other. A hollow drum 83 is mounted between the standards 78 and is loosely arranged on a shaft 84 adapted to be rotated by means of a crank 85. A ratchet wheel 86 is secured to this shaft and is normally engaged by a pawl 87 pivoted to the drum 83. A coiled spring 88 is arranged within drum 83, and the ends thereof are secured to said drum and to the shaft, respectively. A smaller drum 89 is loosely mounted on a shaft 90 journaled in hangers 91, and within this drum is secured one end of a coiled spring 92, the other end of said spring being fastened to the shaft 90. A ratchet wheel 93 is connected to the shaft 90 and is normally engaged by a pawl 94 pivoted to the drum 89. A crank 95 is fastened to shaft 90.

A drum 96 is arranged between the standards 79, and the shaft 97 thereof projects through the slots 81 and is held in proper position therein by means of pins 98. A flexible strip 99 is connected at opposite ends to the drums 96 and 89, respectively, and this strip extends around the drum 83, as shown, and is kept under tension by the spring 92 in drum 89. A slide 100 is mounted on the bed of the machine and extends from side to side thereof. This slide is adapted to be locked to said bed by means of a spring pressed lever 101 which engages one of a series of notches 102 formed in one edge of each slot 80. A plate 103 extends longitudinally of the slide 100 and is insulated therefrom by a strip 104 of rubber or other suitable material. A plate 105 is hinged along one edge of the slide 100 at a point above plate 104, and this plate is preferably formed of insulating material and has a series of brushes 106 and 106^a extending therefrom and having upwardly turned ends 107 forming shoulders which are adapted to contact with the plate 103. A spring 108 holds the brushes 106 and 106^a normally pressed upon the plate 103. The brush 106^a may be arranged at any desired point in the series of brushes. A handle 109 may be arranged at one end of the plate 105 for the purpose of raising the brushes 106 out of contact with the plate 103. A second slide 110 is mounted on the bed 77 and extends from side to side thereof, and this slide is adapted to be locked in adjusted position by means of a spring pressed lever 111 which engages any one of a series of notches 112 formed in the lower edge of each side of the bed 77. These notches are equal in number to the spaces 82 formed upon the upper faces of the sides of the bed and are in vertical alinement therewith. A series of apertures 113 is formed within a cross strip 114 supported by the standards 115 extending upward from the slide 110. These apertures are equal in number to the brushes 106 and are in alinement therewith. A passage 116 extends through the cross strip 114 to permit the flexible record strip 99 to slide therethrough. A dove-tail groove 117 is formed within the upper face of the cross strip 114, and a slide 118 is mounted therein and carries a punch 119 which is normally held removed from passage 116 by means of a spring 120. One brush 106 and aperture 113 is provided for each alphabet strip 8.

The drum 83 has a flange 121 at one end, the inner face of said flange being provided with teeth 122 adapted to be engaged by the hooked ends of a lever 123 which is connected at the center to a shaft 124 journaled in one of the standards 78. An arm 125 is connected to this shaft and is interposed between two sets of magnets 126 and 127, respectively, and forms an armature therefor. The spring strip 128 bears upon the drum 96 and serves to prevent it from rotating unless power is applied thereto.

In Fig. 12 I have shown the manner of connecting the machine above described with the mechanism of the alphabet strips. By referring to said figure it will be seen that a wire 129 extends from a source of electricity 130 to the magnets 75 and 76 and to the magnets 19 and 57. A wire 131 containing a circuit breaker 132 extends from wire 129 to the motor 6, and another wire 133 extends from this motor to a wire 134 connected to the source of electricity and containing a circuit breaker 135. This wire 134 is connected to the bell crank lever 69, and the contacts 70 and 73 of this bell crank lever are connected by means of wires 136 and 137 with the magnets 126 and 127, respectively, and both of these magnets are electrically connected to the wire 129 by means of a conductor 138. One of the contacts 35 is connected by a wire 139 to wire 134, and one of the contacts 46 is connected by a wire 140 to wire 134. The other contact 35 is connected by a wire 141 with the magnet 76, said wire being also connected with a magnet 142. The armature 143 of this magnet 142 is connected by a wire 144 of the other contact 46, and a wire 145 extends from the magnet 75 to a contact 146 arranged in the path of the armature 143. The brushes 106 and 106^a are electrically connected by means of wires 147 and 148 to the magnets 19 and 68, respectively.

A complete sign constructed in accordance

with my invention contains within the casing a number of alphabet strips 8 equal to the number of letters capable of being displayed at the same time. If the sign can display a word of five letters the apparatus will consist of five drums 7, five drums 9 and the mechanism connected thereto, one pulley 37, one operating motor 6 and one operating machine having six brushes. Five of these brushes 106 are connected to the respective magnets 19 by wires 147, and the remaining brush 106[a] is connected by means of a wire 148 to the magnets 68 and 57. In Fig. 12 I have shown the wire connections used where only two alphabet strips are employed, and it will be understood that where a sign of five strips is used other wires 147 will be necessary, one extending to the magnet 19 of the apparatus of each alphabet strip. Should it be desired to have the word "Adam" displayed by the sign the alphabet strips 8 are all wound upon the lower drums 9 which are their normal positions, and the arms 14[a] and 53 of the sleeves 15 and 54 are placed in engagement with the pins 14[a] and 52, respectively. These are the normal positions of the parts. The lever 111 of the punch frame 110 is released from engagement with the notches 112, and said frame is slid toward the brushes 106 until the same arrives in position above the letter "a" on the index 82. The frame 110 can be placed in proper position by moving lever 111 into engagement with the notch 112 directly below or registering with the letter desired. The punch 120 is then moved along the frame 110 until it is brought into alinement with the first brush 106, and an aperture 149 is then punched into the paper sheet 99. As there are two letters "a" in the word "Adam" it will be necessary to next move the punch 120 into position in alinement with the third brush 106 where another aperture 149 is cut into the paper sheet. The punch frame 110 is then drawn backward into a position over the letter "d" on the index 82, and subsequent to this operation the punch 120 is moved laterally until brought into alinement with the second brush 106. When the third aperture 149 is cut into the paper, the last letter of the word, to wit, "m" is then indicated by moving the punch frame 110 until the same is brought into position over the letter "m" on the index 82, and the punch 120 is then moved laterally into a position in alinement with the fourth brush, 106, and the paper 99 is punched. As the 5th alphabet strip 8 will not be employed owing to the fact that but four letters are in the word to be indicated it is unnecessary to operate said last mentioned strip, and therefore the punch frame is moved toward the brushes 106 until brought into position opposite the blank 150 formed adjacent the first letter on the index 82, and the punch is then slid laterally until brought into position in alinement with the fifth brush 106 where an aperture 149 is punched into the paper. It will be understood that this operation can be continued if more than five alphabet strips are employed, and after the proper word has been punched upon the paper strip and it is desired to form other characters therein which will appear subsequent to the sign first displayed, it will merely be necessary to move the sheet 99 longitudinally until the aperture 149 farthest removed from the brushes has been brought into position beyond them. After all of the apertures desired have been punched into the sheet 99 the cranks 85 and 95 are turned so as to wind the springs 88 and 92, and the switches 135 and 132 are then turned on.

The current will pass from the source of electricity through the wire 129, switch 132 and wire 131 to the motor 6, and thence back to the source of electricity through the wires 133 and 134 and switch 135. The shaft 2 will thus be rotated and will carry therewith all the parts connected thereto. The brush 106 of the fifth alphabet strip will contact with the bar 103 and will complete a circuit from the source of electricity through the wire 129 to the magnet 19 and from said magnet to the brush, through wire 147, thereby energizing the magnet of the apparatus belonging to the fifth alphabet strip and causing the armature 17 to remove the arms 14 from engagement with the pins 14[a]. The drums 7 and 9 of the fifth alphabet strip will not therefore rotate with the shaft 2 when the same is set in motion by the motor 6, but the other drums within the casing will rotate therewith as will the pulley 37. The strip 42 will, as is obvious, be wound upon the pulley 37 and will tension the spring in the lower pulley 38. When the first letter, to wit, "a" on the first alphabet strip 8 appears between the two drums 7 and 9 of said strip the first slot in strip 42 likewise appears between the two pulleys 37 and 38, and the lever extension 71 drops thereinto, and the lever swings against the contact 73, thereby establishing a circuit through wire 137, magnet 127, wire 138, the source of electricity, switch 135, wire 134 and bell crank lever 69. The magnet 127 will attract its armature and thereby move the escapement 123 and permit the roller 83 to move one notch of the toothed flange 121. The sheet of paper 99 will thus be moved so that the apertures 149 alining with the first and third brushes are brought into contact under said brushes and permit them to contact with bar 103 which will complete a circuit through the wire 147 to the magnet 19 of the first and third alphabet strips and thence to the source of electricity through wire 129 and then to the bar 103. When the magnet 19 is energized the drums 7 of their respective strips are re-

leased from the shaft 2 by reason of the fact that the sleeves 15 of said drums are retracted from engagement therewith by the energized magnet 19. The springs 12 in the drums 9 exert tensions upon the strips 8 on the released drums, and therefore said drums must be locked against return movement in some manner when released from the shaft. The cam 26 is provided for this purpose and serves to securely lock its drum against return movement after the same has been released from the shaft. When the cylinders 7 stop the letters "A" on the first and third alphabet strips 8 will appear between the cylinders 7 and 9 of said strips, and they will be held in such positions by the cams 26. The other two alphabet strips of the sign continue to rotate with the shaft 2, and the slotted strip 42 winds upon its pulley 37 as the shaft turns. These slots cause the bell crank lever 69 to swing upward and downward upon its fulcrum and bring it into position upon the contacts 70 and 73 alternately, thereby causing the escapement 123 to swing upon its fulcrum so as to wind the sheet 99 upon the drums 83 and 89. When the aperture 149 alining with the second brush arrives in position under said brush the operation above described is repeated in connection with the second alphabet strip, and said strip is stopped with the letter "D" in position between its drums 7 and 9. All of the drums will thus be released from the shaft 2 with the exception of the drum of the fourth alphabet strip, and this drum will not be stopped until the aperture 149 is brought into position under the fourth brush 106, when a circuit will be established in the manner above described with the magnet 19 of the fourth drum 7, and said drum will be stopped with the letter "M" in position between it and the drum 9.

In order to stop the operation of the sheet 99 subsequent to the display of the desired characters upon the sign it is necessary to employ an additional brush 106[a] which is connected by means of the wire 148 to the magnets 68 and 57. This brush is brought into contact with the bar 103, when an aperture 149 previously punched in the sheet 99 is brought into position thereunder. This current passing through the wire 148 will energize the magnets 68 and 57 and will draw the armature or bell crank lever 69 to said magnet 68 and hold the same so as to prevent further movement of the escapement 123. The magnet 57 will attract its armature 56 and withdraw the arms 53 of sleeve 54 from engagement with the pins on pulley 37, and the further operation of the device will thus be stopped. As soon as the pulley 37 is released in this manner the spring 41, being wound, will tend to wind the strip 42 on the pulley 38. The ratchet wheel 63 will thus be moved into engagement with the pawl 62[a], and the pulley 37 will be turned backward, its speed being regulated by the fan blades 66 operated thereby through the belt 64. When the strip 42 has been entirely unwound from the pulley 37, dog 45 drops by gravity from the recess 44 and strikes against the piston rod 50, and this piston rod is forced inward until the straight end of the dog 45 comes against the two contacts 46 upon the piston rod and completes a circuit through the magnets 75, through wires 144, 129 134 and 140. The armatures of these magnets will be attracted thereto and will turn the rod 24, and as the bell crank levers 23 are secured on this rod it is obvious that the same will pull the rods 28 outward and thereby loosen the cams 26 of all of the drums 7 in the sign and permit the tensioned springs 12 in the drums 9 to unwind the strips 8 from the drums 7. After these strips have been completely unwound from the drums 9 the dogs 26 will drop by gravity from their recesses 34 and will swing against the rods 32 and move into position upon the two contacts 35. When all of the dogs 36 arrive in position upon their respective contacts 35 a circuit is established from the source of electricity through the wires 134 and 139, the contacts 35, wires 141 and 129, thereby energizing the magnet 76. At the same time the magnet 142 will be energized and attract its armature thereto, and as this armature is included in the circuit in which the magnet 75 is located, it will be obvious that said circuit will be broken simultaneously with the energizing of the magnets 76. As the armature 74 is drawn to the magnet 76, the rod 24 will be rotated in a direction opposite to that caused by the energizing of the magnet 75, and the bell crank levers 23 will thus press downward upon the levers 20 and 58 and move the pins on the sleeves 15 and 54 into engagement with the pins 14[a] and 52 and thereby again lock the drums 7 and the pulley 37 upon the shaft 2, and the sign can then continue to operate to produce the same or any other characters for the production of which the sheet 99 has been properly punched. When these drums and the pulley rotate the dogs 36 and 45 promptly become reseated in their respective recesses and break the circuits including the contacts 35 and 46. The armatures 74 are thus free to move back to their normal positions such movement being caused by the weight of the arm 61 and bell crank levers 23, and the drums 7 will then rotate, and the operation heretofore described will be repeated. It will be understood that any number of different signs can be successively displayed by properly arranging the apertures 149 in the sheet 99. This sheet may be of any suitable length, and therefore any desired number of signs can be successively displayed by the use thereof. The entire apparatus may be

removed from circuit with the source 130 by means of the switches 132 and 135. It will thus be seen that the operation of the machine can be entirely stopped at any time desired.

In Fig. 17 I have shown diagrammatically a modified form of operating machine, the same being provided with mechanism for automatically breaking the current to prevent sparking when the brushes 106 and 106ª are removed from contact with the bar 103.

The drum 151 has a pawl 152 pivotally mounted upon one side thereof and normally engaging a ratchet wheel 53 loosely mounted on a shaft 154. Secured to this shaft is a ratchet wheel 155 which is normally engaged by a spring pressed pawl 156 mounted on the ratchet wheel 153. Ratchet wheel 153 is of such width that the pawl 152 only extends about one-half the distance across the periphery thereof, and the other half of the periphery is adapted to be engaged by an escapement 157 arranged at the end of an armature 158 which is interposed between oppositely disposed magnets 159. Pivoted adjacent the armature 158 is a lever 160 having a V-shaped projection 161 which is located equidistant between the magnets 159 and in the path of the armature 158. A contact 162 is located at the free end of the lever and is adapted to normally bear upon a contact 163 and the wire extending from strip 103 to battery 130 is broken at this point and connected to the contact 163 and lever 160, respectively. The current in passing from the source of electricity to the bar 103 must first pass through the lever 160. It will be seen that when either of the magnets 159 is energized the armature 158 will be drawn thereto and will contact with the projection 161, thereby forcing the lever 160 outward and breaking the contact between the parts 162 and 163. When the armature reaches the magnet attracting it, the brush 106 will have arrived in position above one of the apertures 149 and in contact with the bar 103. A spring similar to spring 88 is arranged within the drum 151 and is connected at its ends to said drum and to the shaft 154, respectively. The switches 132 and 135 may be located outside of the casing 1, at any point within convenient reach of the operator. The switch 132 is utilized solely for the purpose of controlling the operation of the motor, and the switch 135 is utilized for the purpose of controlling not only the motor 6 but all other circuits through all portions of the apparatus. It may be desired at times to cut out the operation of the motor 6, without cutting out the circuits through all portions of the apparatus, and to permit of this, I have arranged the said switch 132 whereby the motor may be controlled independently of all other circuits of the device.

In the foregoing description I have shown the preferred form of my invention, but I do not limit myself thereto as I am aware that modifications may he made therein without departing from the spirit or sacrificing any of the advantages thereof, and therefore reserve the right to make such changes as fairly fall within the scope of my invention as defined in the appended claims.

Having thus described the invention, what is claimed as new, is:—

1. In a sign of the character described, the combination with a revoluble shaft, and a plurality of drums connected thereto; of electrically operated means for disengaging one or more of said drums from the shaft when desired.

2. In an apparatus of the character described, the combination with a revoluble shaft; of a plurality of drums normally revoluble with the shaft, electrically operated mechanism for unlocking one or more of the drums from the shaft, and a locking device for each drum.

3. In an apparatus of the character described, the combination with a revoluble shaft, and a plurality of drums normally revoluble therewith; of electrically operated means for unlocking one or more of the drums from the shaft, an automatically operated brake for each drum, and mechanism for releasing the brakes simultaneously.

4. In an apparatus of the character described, the combination with a revoluble shaft; of a drum loosely mounted thereon, a locking device secured to the shaft and normally engaging the drum, an armature upon the locking device, a magnet therefor, and means for energizing the magnet.

5. In an apparatus of the character described, the combination with are voluble shaft, and a drum loosely mounted thereon; of a sleeve slidably mounted upon and revoluble with the shaft, arms upon the sleeve adapted to engage the drum, an armature connected to the sleeve, a magnet, a source of electricity electrically connected to the magnet, and means for automatically breaking and making a circuit from the source to the magnet.

6. In an apparatus of the character described, the combination with are voluble shaft having a drum loosely mounted thereon, and pins projecting from the drum; of a sleeve slidably mounted upon and revoluble with the shaft, arms upon the sleeve normally engaging the pins, a bracket, a lever connected to the bracket and engaging the sleeve, an armature on the lever, and a magnet for operating the armature.

7. In an apparatus of the character described, the combination with a revoluble shaft, and a drum loosely mounted thereon; of a sleeve slidably mounted upon and revoluble with the shaft and normally engaging the drum, an armature connected to the

sleeve, a magnet for operating the armature, a rod revolubly mounted adjacent the drum, electrically operated means for rocking the rod, and mechanism operated by the rod for moving the sleeve into engagement with the drum.

8. In an apparatus of the character described, the combination with a revoluble shaft, and a drum loosely mounted thereon; of a sleeve slidably mounted upon and revoluble with the shaft, an armature connected to the sleeve, a magnet for attracting the armature and withdrawing the sleeve from engagement with the drum, a revoluble rod, rocking armatures secured thereon, magnets for the armatures, a sleeve shifting wedge, and an arm upon the rod for operating the wedge and moving the sleeve into engagement with the drum.

9. In an apparatus of the character described, the combination with a revoluble shaft having a drum loosely mounted thereon, a spring controlled drum adjacent thereto, and a flexible strip connected to and adapted to be wound upon the drums; of a locking device slidably mounted upon and revoluble with the shaft and adapted to engage the first mentioned drum, whereby the strip is wound upon the first mentioned drum and the spring is tensioned, and electrically operated means for releasing the drum from the shaft.

10. In an apparatus of the character described, the combination with a revoluble shaft having a drum loosely mounted thereon, a spring controlled drum adjacent thereto, and a flexible strip connected to and adapted to be wound upon the drums; of a locking device slidably mounted upon and revoluble with the shaft and adapted to engage the first mentioned drum, whereby the strip is wound upon the first mentioned drum and the spring is tensioned, electrically operated means for disengaging the locking device from the drum on the shaft, and an automatic brake for preventing winding of the strip upon the drum by the tensioned spring.

11. In an apparatus of the character described, the combination with a revoluble shaft having a drum loosely mounted thereon, and a drum locking device slidably mounted upon and revoluble with the shaft; of shifting mechanism connected to said locking device, a bell crank lever contacting therewith, a revoluble rod engaging and adapted to operate the lever, magnets, armatures connected to the rod and adapted to be attracted by the magnets successively, contacts included in a circuit with one of the magnets, and a dog pivoted to the drum and adapted to bear upon the contacts and complete a circuit to said magnet, whereby the locking device is shifted into engagement with the drum.

12. In an apparatus of the character described, the combination with a revoluble shaft; of a drum loosely mounted thereon and having a recess in its periphery, a dog pivoted within the recess, a flexible strip connected to the drum and adapted to be wound thereon and hold the dog within the recess, a cylinder, a spring controlled plunger slidably mounted therein, contacts upon the cylinder adapted to be contacted by the dog when the strip is unwound from its drum, a drum locking device upon the shaft, and means included in a circuit with the contacts for operating the locking device.

13. In an apparatus of the character described, the combination with a revoluble shaft, and means for rotating the same; of a plurality of drums loosely mounted upon said shaft, a set of spring controlled drums equal in number to and alining with the first mentioned drums, flexible strips connected at opposite ends to the drums on the shaft and the spring controlled drums, respectively, locking devices upon the shaft for securing the drums thereto, electrically operated means for releasing said drums from the shaft at predetermined periods, and a brake for each drum upon the shaft to prevent the unwinding thereof.

14. In an apparatus of the character described, the combination with a revoluble shaft having a plurality of drums loosely mounted thereon; of a series of spring controlled drums equal in number to and alining with the drums on the shaft, flexible strips connected at their ends to the spring controlled drums and the drums on the shaft, locking devices upon the shaft for securing the drums thereto, electrically operated means for independently releasing the drums at predetermined periods, an automatic brake for each drum upon the shaft to prevent unwinding thereof, and automatic means for simultaneously releasing the brakes.

15. In an apparatus of the character described, the combination with a revoluble shaft, and drums mounted thereon; of a pulley mounted upon and adapted to rotate with the shaft, a slotted strip connected thereto, contacts adjacent the strip, an armature mounted between and adapted to alternately bear upon said contacts, said armature bearing against the slotted strip, a drum, a ratchet wheel connected thereto, a flexible strip adapted to be wound upon the drum, an escapement engaging the ratchet teeth, an armature connected thereto, and magnets disposed at opposite sides of the armature and in circuit with the contacts, respectively.

16. In an apparatus of the character described, the combination with a revoluble shaft having a series of drums mounted thereon, and character bearing strips upon

the drums; of a pulley upon and adapted to rotate with the shaft, a spring controlled pulley adjacent thereto, a strip secured upon and adapted to be wound on the pulleys and having a series of slots therein, a bell crank lever bearing upon the strip and adapted to drop into the slots therein, contacts adapted to be successively contacted by the bell crank lever, a drum, a ratchet wheel connected thereto, an escapement engaging the ratchet wheel, an armature projecting therefrom, oppositely disposed magnets adjacent said armature and electrically connected to the contacts, respectively, a source of electricity connected to the contacts and to the bell crank lever, and a flexible strip adapted to be wound upon the last mentioned drum.

17. In an apparatus of the character described, the combination with a revoluble shaft having a plurality of drums loosely mounted thereon, and locking devices upon the shaft and normally engaging the drums; of an armature connected to each locking device, a magnet therefor, a drum, means operated by the shaft for permitting the rotation of the last mentioned drum, an apertured flexible strip adapted to be wound upon said drum, a conducting plate thereunder, and brushes bearing upon the strip and adapted to contact with the conducting plate, said brushes and plate being included in circuits with a source of electricity and the magnets of the armatures.

18. In an apparatus of the character described, the combination with a revolubie shaft having drums and a pulley loosely mounted thereon, and locking devices normally engaging said drums and pulley; of armatures connected to said locking devices, a magnet for each armature, a slotted strip adapted to be wound upon the pulley, a drum, a ratchet wheel connected thereto, a flexible strip adapted to be wound upon said drum, mechanism controlled by the slotted strip for rotating said drum, a conducting plate, and brushes adapted to contact therewith, the flexible strip being interposed between the brushes and plate and having apertures therein, said brushes and conducting plate being included in a circuit with a source of electricity and the magnets.

19. In an apparatus of the character described, the combination with a revoluble shaft having a drum loosely mounted thereon; of a sleeve slidably mounted upon and revoluble with the shaft, electrically operated means for moving the sleeve into engagement with the drum, a bracket, and a cam pivoted upon the bracket and arranged within and normally contacted with the drum, said cam serving to prevent rotation of the drum in one direction.

20. In a sign display apparatus, a driving means, a plurality of character-bearing elements, locking devices for operatively connecting the elements with the said means, an electric motor for driving said means, a record apparatus, and electric means controlled by the record apparatus for releasing the locking devices to permit the character-bearing elements to stop in a predetermined relation.

21. In a sign display apparatus, a movable character bearing element, electrical means for operating the same, a record apparatus for automatically controlling said electrical means, and means associated with said record apparatus for preparing a desired record for use.

22. In a sign display apparatus, a movable character bearing element, electrical means for operating the same, a record apparatus including an automatically operating record sheet for controlling said circuit, and means associated with said apparatus for preparing a desired record sheet.

23. In a sign display apparatus, a movable character bearing element, electrical means for operating the same, switches controlling said electrical means, a record apparatus including an automatically operated traveling record sheet perforated for coaction with and to control said switches, and means associated with said apparatus for preparing a record sheet with perforations properly arranged to coöperate with the respective switches.

24. In a sign display apparatus, the combination of a rotatable shaft, a series of drums loosely mounted thereon, character bearing strips actuated by the drums, a record apparatus, and electrical means automatically controlled by the record apparatus for connecting the drums with the shaft, for permitting said drums to have prescribed movement and for releasing said drums from the shaft when the drums have moved to the desired extent to bring the characters thereon into position to form the desired sign.

25. In a sign the combination with a constantly rotating member, of a plurality of independent relatively movable members carrying characters adapted to spell words successively, clutches disposed in operative relation to said rotating member and said relatively movable members to lock the latter with the former, electrically actuated means controlling said clutches, and independently actuated means controlling the electric circuits controlling said clutches.

In testimony whereof, I affix my signature in presence of two witnesses.

IGNATZ YOUNG.

Witnesses:
JOHN L. MAGINNIS,
WM. G. PENNYCOOK.