

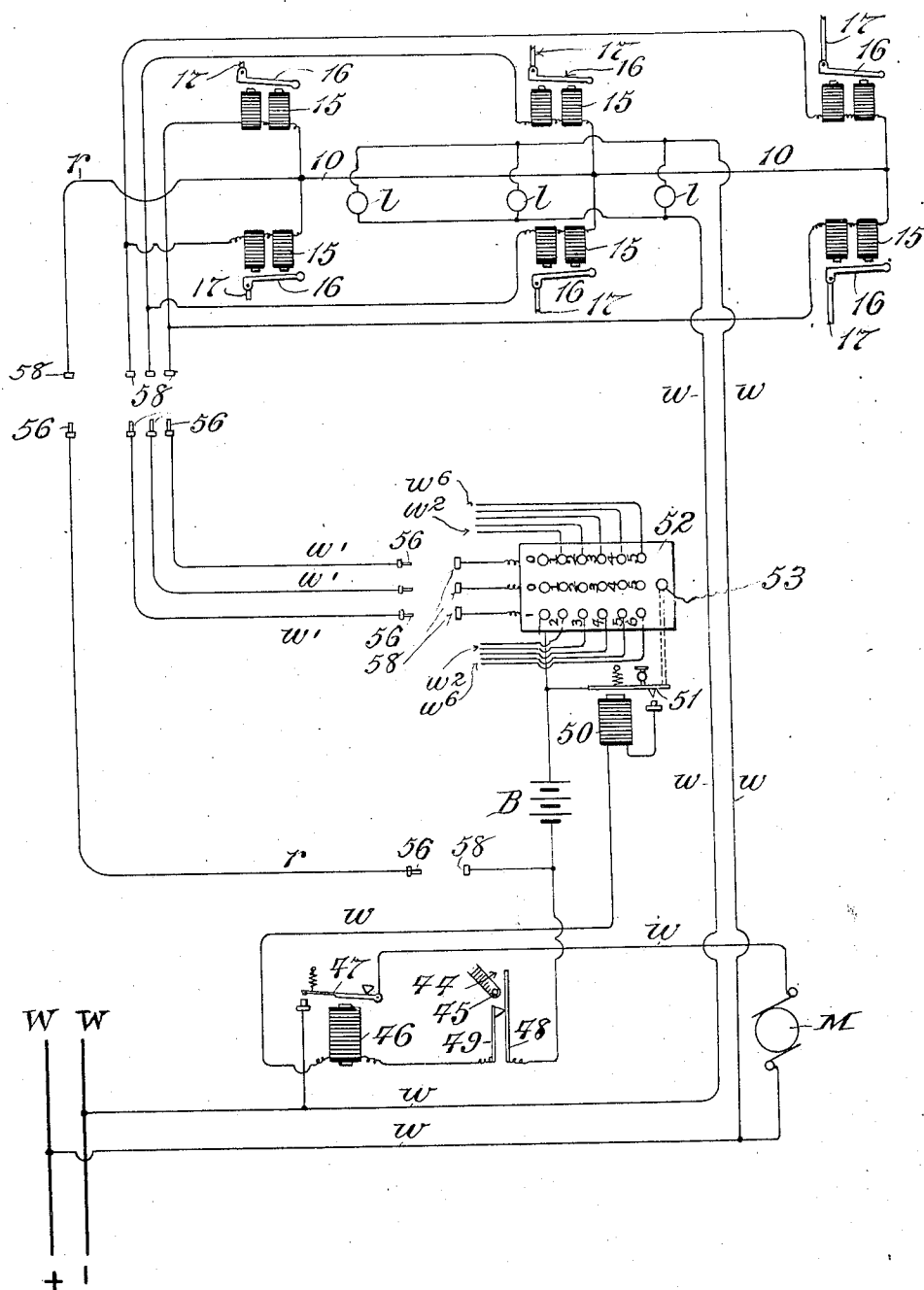
W. S. WOODRUFF.
ANNUNCIATOR OR INDICATOR.
APPLICATION FILED NOV. 3, 1910.

1,026,779.

Patented May 21, 1912.

4 SHEETS—SHEET 1.

Fig. 1.



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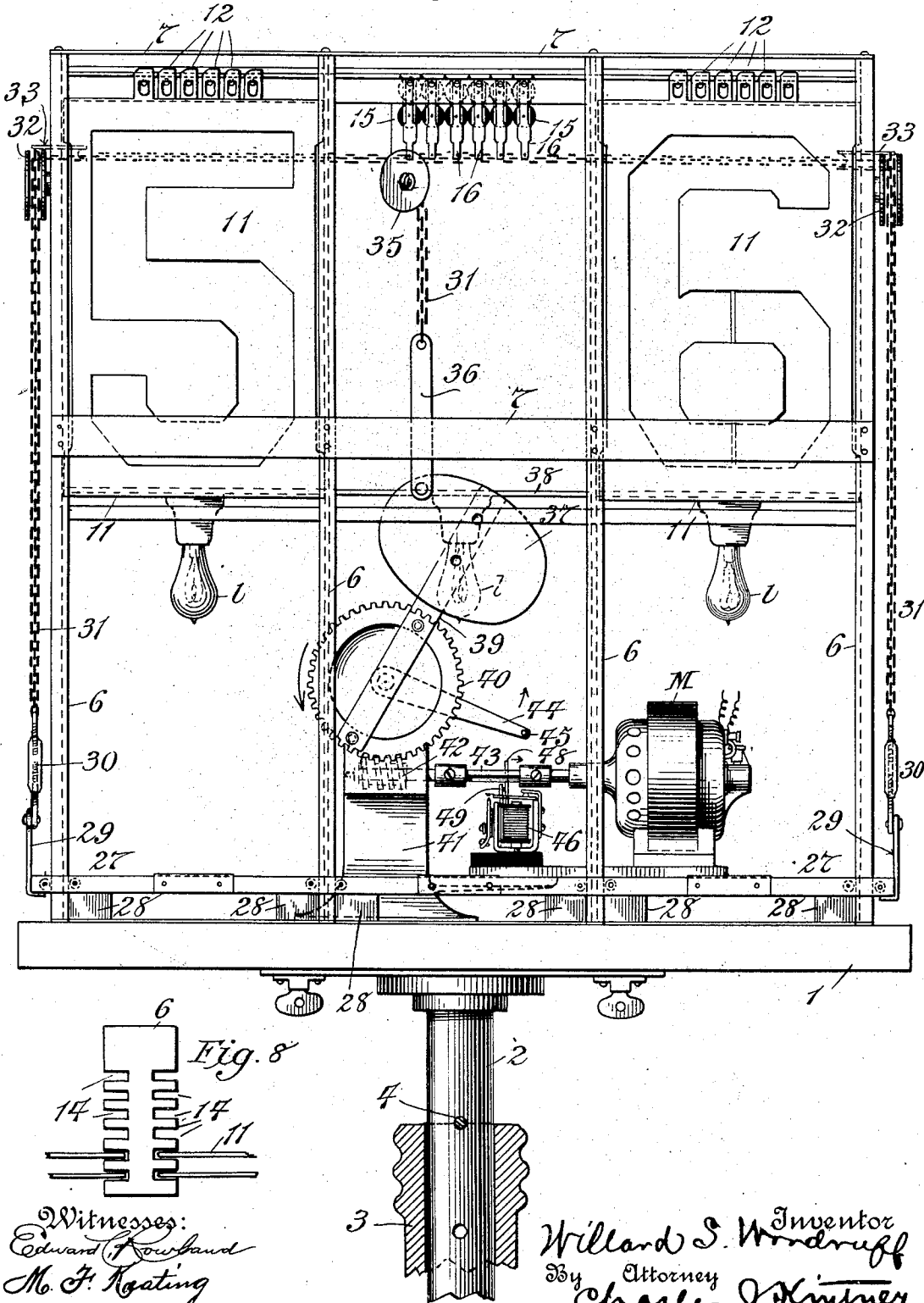
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4 SHEETS-SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

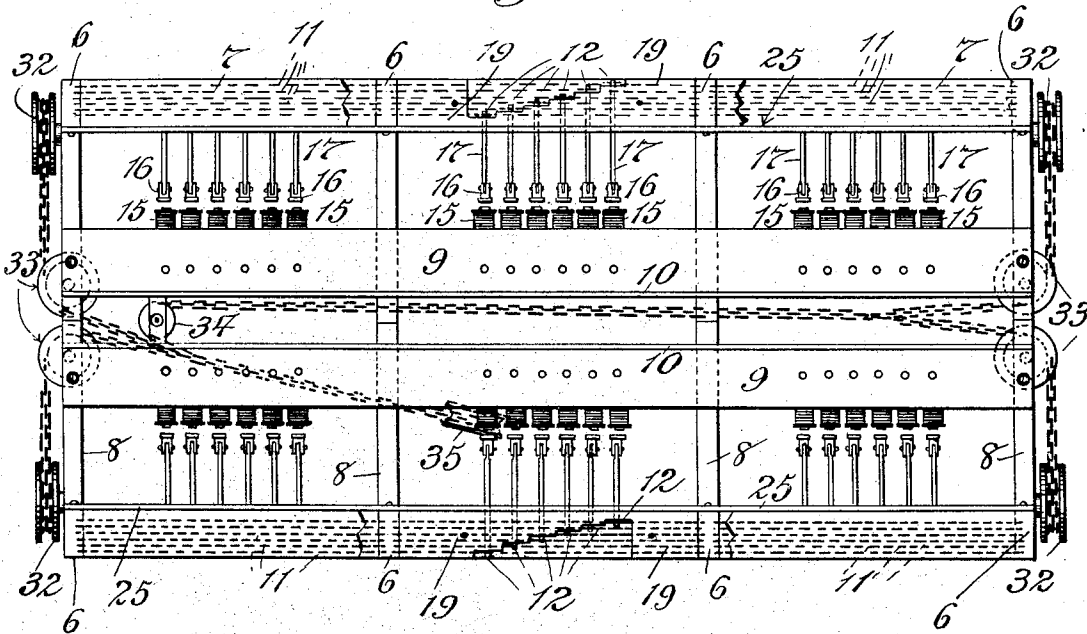


Fig. 9.

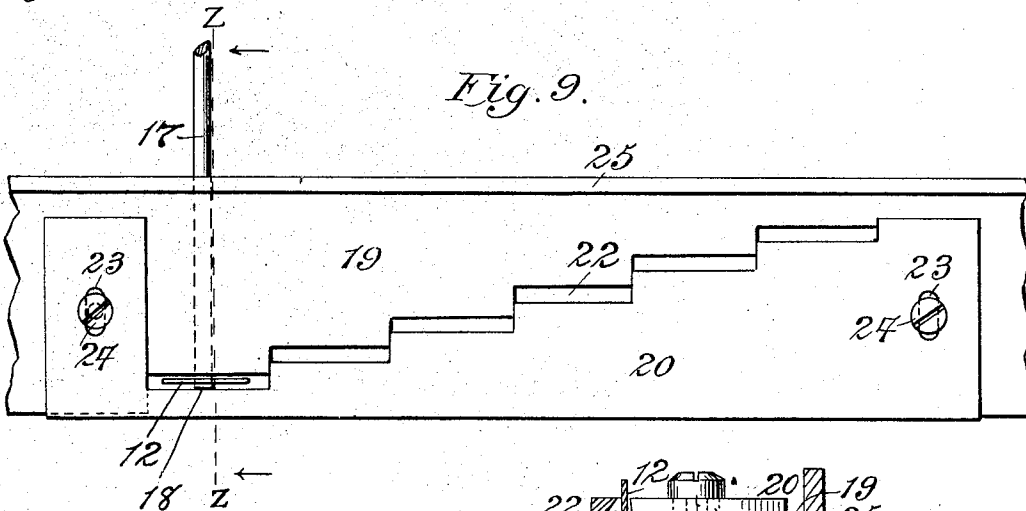


Fig. 10.

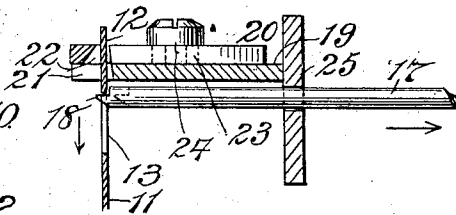


Fig. 11.

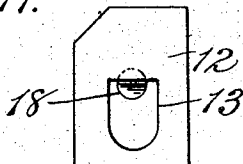
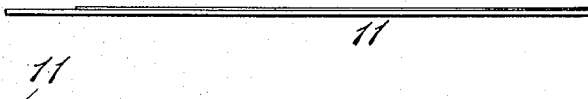


Fig. 12.



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UNITED STATES PATENT OFFICE.

WILLARD S. WOODRUFF, OF NEW YORK, N. Y.

ANNUNCIATOR OR INDICATOR.

1,026,779.

Specification of Letters Patent.

Patented May 21, 1912.

Application filed November 3, 1910. Serial No. 590,532.

To all whom it may concern:

Be it known that I, WILLARD S. WOODRUFF, a citizen of the United States, and resident of New York, borough of Brooklyn, county of Kings, and State of New York, have made a new and useful Invention in Annunciators or Indicators, of which the following is a specification.

My invention is directed particularly to improvements in electrically controlled annunciators or indicators of that type in which predetermined numbers, letters or characters are combined and arranged in definite order so as to give visual indications of the desired nature, and it has for its objects: first, to provide an apparatus of this nature in which the single numbers, letters, or characters to be combined in definite prearranged order shall be assembled as closely together as possible in concealment, and so arranged that they may be automatically successively released in any desired order and fall by their own weight into view; second, to provide an apparatus of this nature in which controlling electromagnets shall be relatively closely assembled and their armatures and releasing attachments so devised, and arranged as to surely effect the release of any of the numbers, letters, or characters and in any desired order; third, to provide an apparatus of this nature in which there shall be utilized a plurality of sets of indicating numbers, letters, or characters so located or arranged with relation to each other and their controlling electromagnets that two or more like combinations of individual numbers may be displayed simultaneously; that is to say, so that when any definite compound number, embracing two or more of such indicating numbers, letters or characters, are released they will appear on opposite or adjacent sides of the apparatus so as to give a wide range of observation; in other words, so that persons located differently with relation to the apparatus may simultaneously see a like indication or call; fourth, to provide an apparatus of this nature in which the controlling and operating mechanism proper for releasing and setting the individual numbers, letters or characters may be located at a definite point, as on the street, in a field, stadium, race-track, or the like, and the electrically operated controlling mechanism at a relatively distant point, both sets of apparatus being connected together by detachable conductors in

the nature of a compound cable provided with switch plug connections at both ends and all so arranged that the apparatus may be absolutely portable and set up for use anywhere; fifth, to provide an apparatus like that disclosed in the drawings which is especially applicable for use in carriage and cab call service at theatres, public halls and private residences in densely populated cities, the compact and portable nature of my improved apparatus making it especially useful in this particular.

Prior to my invention electrically controlled annunciators or indicators had been devised in which indicating numbers were located upon the surface of rotatable disks or wheels journaled upon a stationary shaft, there being as many numbers on the surface of each disk as it is desired to combine with other numbers for the purpose of making a relatively large number of calls; as, for instance, with a combination of ten disks and a combination of numbers running from 0 to 9 upon the surface of each disk it was possible to give a relatively large number of indications. Such an apparatus, however, while simple in its structure and mode of operation is open to the objection that where number disks of relatively large surface area are necessitated, as for instance in field service or generally in outdoor service where it is desired to give indications at relatively long distances, combinations of disk indicators of this nature necessarily make the apparatus unwieldy and cumbersome, because of the relatively large dimensions of the disks carrying the numbers to be exposed. My improvement is designed to overcome this objectionable feature, in that I can amass a large number of indicating numbers, letters or characters upon disks of relatively large superficial area and in a relatively very small space, as will be appreciated on reading the following specification in connection with the accompanying drawings, reference to which is now had for a full and clear understanding of the invention.

Figure 1 represents diagrammatically the circuit controlling relations of my improved apparatus as operatively connected with a push-button board or keyboard and a limited number of controlling magnets for the indicator numbers, together with the controlling generator for releasing the numbers, the electric motor and operative connections

for starting the motor and the circuit connections running from the motor to a street main or a trolley or other power service mains. Fig. 2 is a side elevational view of the indicating apparatus illustrating its portable nature by disclosing the fact that it is slidably sustained upon a portable standard. Fig. 3 represents a plan view of the apparatus, illustrated in Fig. 2 as seen looking thereat from the top toward the bottom of the drawing, the central top portion being broken away at the sides to better illustrate certain features of the operative parts of the controlling or releasing electromagnets. Fig. 4 is an end elevational view as seen looking at Fig. 2 from left to right. Fig. 5 is a detail plan view of a switch plug apparatus, illustrating connections for one end of a cable containing insulated conductors running between the keyboard apparatus actuated by the operator, and the indicating apparatus at the outlying point where the latter is located, there being one such switch plug apparatus at each end of the cable for thus effectually making the apparatus, as a whole, absolutely portable. Fig. 6 is a sectional view taken through Fig. 5 on the line X—X and as seen looking thereat from the bottom toward the top of the drawing; and, Fig. 7 is a similar sectional view of the receptive part of the apparatus for the switch plugs at each end of the cable and is particularly illustrated in sectional view on the line Y—Y at the upper left hand side of Fig. 4. Fig. 8 is an enlarged plan view of one of the upper ends of the grooved guide-ways for the number or annunciator disks, the edges of four such disks being shown in position. Fig. 9 is a greatly enlarged plan view illustrating the manner of adjusting the guides for the locking or sustaining lugs or ears of the indicating number disks, so that they will surely assume their locked position when lifted to their upper limit and with like certainty be released when their corresponding release magnets are energized. Fig. 10 is a sectional view taken through Fig. 9 on the line Z—Z and as seen looking thereat from left to right in the direction of the arrows. Fig. 11 is an enlarged detail elevational view of the upper end of one of the number disks showing also the locking lugs and the end of the locking rod which holds it in its upper or concealed position. Fig. 12 is an enlarged detail view of the lower edge of one of the stenciled number disks illustrating the fact that the outer face of such disk is painted black and the inner face thereof and stenciled numbers covered with a translucent medium, such as white silk or other very thin light conveying fabric widely different in color from the black face.

Referring now to the drawings in detail, 1 represents the base of the apparatus which

is preferably rectangular in form and is detachably supported by thumbscrews, as shown in Fig. 2, upon a standard 2 adapted to slide vertically in a portable base 3, 4 being a locking pin for locking it at any desired height. While I have illustrated this part of the apparatus as being sustained upon a portable base, such as a tripod, it will be understood that for use in connection with hotels, theaters or buildings generally in cities where large numbers of vehicles are to be called, it may be permanently secured to the top of a permanent post, such as a lamp-post, or may be secured in any preferred way, dependent upon the nature of the use to which it is to be put.

The reference numerals four 6—6, 6—6, etc., designate pairs of vertically disposed members secured at their lower ends directly to the base 1 and in parallel relation with each other and 7—7, 7—7, represent pairs of horizontally disposed members extending lengthwise and parallel with the base, the first pair being approximately midway between the base and the top of the apparatus and the second pair located on the tops of the members 6—6, 6—6.

8, 8, 8, 8 represent four interconnected metal trusses secured between the members 6—6, 6—6, etc., and 9—9 are parallel wooden members located closely adjacent to each other and secured to the aforesaid trusses, the vertical members 6—6, 6—6, horizontal members 7—7, 7—7, 9—9 and trusses 8, 8 constituting as a whole the entire supporting frame of the apparatus; 10, 10 being conducting bars constituting a part of the return circuit of the controlling generator secured at the inner edges of the members 9, 9, which are made preferably of wood or other insulating material.

11, 11 are number or character disks made preferably of rectangular structure and of relatively thin light sheet metal, the numbers or characters indicated being stenciled or cut out, as illustrated in Fig. 2, where two numbers are shown as 5 and 6. It will be noted that the central number disks between "5" and "6" have been left out in this view for the purpose of avoiding confusion and better illustrating other parts. Each one of these number disks is provided with a lug or ear 12 and an opening 13, said lug or ear as thus constructed constituting the means for simultaneously guiding it to its proper upper or concealed position, and also for enabling it to be held by the operative or control parts of the corresponding electromagnets, as will be described later on. It will be noticed that the lugs or ears for the disks of like number are located relatively closely to each other when assembled so that these disks in their upper or suspended position cover each other, while the lugs are disposed in offset relation to each

other, such an arrangement being very compact and especially economical as to space (see Fig. 3). The bars 17 are of different lengths whereby their shouldered ends 18 are disposed in offset relation for engaging with the offsetting lugs 12 of the disks.

The vertically disposed members 6-6, 6-6, are provided with grooves 14, 14, 14, the outer pairs of such members having said grooves in their inner sides, as shown in dotted lines Fig. 2, and the inner pairs of such members have oppositely disposed grooves of such nature, as clearly indicated in the enlarged view Fig. 8, by the number 14, the arrangement being such that these number disks when in position will have a free sliding action from the bottom of the apparatus to a concealed position at the top, as illustrated in Fig. 2, it being understood that in the actual instrument these disks are normally located behind an opaque surface in a case.

15, 15, 15, 15 are pairs of electromagnets secured to the trusses 8, 8, 8, 8, as illustrated in Figs. 3 and 4, all in a common plane near the top of the apparatus, there being one such electromagnet for each number disk. These electromagnets are provided with the usual armature levers 16, 16; 17, 17 being locking rods pivotally supported at the upper ends of each of such armature levers and each provided with a beveled locking shoulder 18 at its free end adapted to hold its corresponding number disk 11 in its upper or concealed position by reason of its frictional or locking relation in connection with its corresponding lug or ear 12 when it extends through the opening 13, as will be clearly apparent on inspection of Figs. 10 and 11.

19 and 20 are pairs of metallic bars which are connected together and to horizontally disposed bars 25, 25 extending across the entire apparatus at the top thereof (see Figs. 4, 9 and 10) there being one pair of such bars for each of the six sets of electromagnets shown in Fig. 3. The bar 19 is provided with diagonally disposed notches 21 and the bar 20 is provided with corresponding diagonally disposed slots 22 having beveled shoulders (see Fig. 10) it being the function of these corresponding notches and slots to act as guide-ways for the holding lugs or ears 12 when they are forced upward into their concealed locked position, as will be described in connection with the description of the mode of operation. The bars 20 at their opposite ends are provided with slots 23 and the bars 19 at their opposite ends are provided with adjusting screws 24, 24 for adjusting the widths of the openings through which the lugs 12 are to pass.

It will be apparent on an examination of the central portion of Fig. 3 of the drawings

that the locking rods 17 connected to the armature levers 16 vary in length from left to right and from right to left respectively in both sets, and on an examination of Fig. 9 that the guide way openings between the bars 19 and 20 are correspondingly disposed, and also that the lugs 12 are arranged in like manner so that by such dispositions I am enabled to closely suspend a relatively large number of number disks in a relatively small space both longitudinally and laterally located, it being understood that all of these parts are correspondingly arranged in the corresponding parts of the apparatus illustrated in Fig. 3, there being in this figure of the drawings thirty-six of the controlling magnets 15 and with the number disks and operative parts all correspondingly assembled, so that all of these parts being arranged in duplicate the same combination number will be displayed on opposite sides of the apparatus at the same time after the proper numbers of the combination have been released.

27, 27 are horizontally disposed lifting bars which normally rest upon rubber buffers 28, 28, 28, 28, there being one such lifting bar at each end of the apparatus and operatively connected at their opposite ends through links 29, 29 and turn buckles 30, 30 with four chains 31, 31, 31, 31 running upward and over pairs of pulleys 32, 32 at the opposite sides and ends of the apparatus and inward through additional pairs of pulleys 33, 33 where they are connected to two single chains running over additional pulleys 34, 35 and then to a single chain downward to the upper end of a link 36 which in turn is connected to a counterweight 37 at the end of an arm 39 carried by a gear-wheel 40 journaled upon a shaft in the top of a standard 41 secured to the base 1, said gear-wheel being in mesh with a worm 42 carried by a shaft 43 connected to the armature of an electric motor M normally out of circuit.

44 is a rotatable arm secured at one end of the shaft which supports the gear-wheel 40 and 45 is a circuit breaking pin carried at the free end of said arm.

46 and 50 (see Figs. 1 and 2) are controlling magnets for placing the motor M in circuit with the current mains W, W of the street service or other source of relatively high potential energy and 47 and 51 are armature levers therefor.

48 and 49 are circuit breaking and circuit making arms, the arm 48 being longer than the arm 49 with its upper end located in the path of the circuit breaking pin 45 carried by the arm 44.

52 is a push-button board or key-board on which is located all of the push buttons for controlling the display of numbers in accordance with the wishes of the operator, and

53 is an individual push-button for effecting the restoration of the number disks after the numbers have been properly displayed.

- 54 illustrates the casing of a switch plug terminal embracing an insulating base 55 for the conducting plugs 56 electrically connected to the ends of the individual conductors of the cable C. 57 is a similar insulating base secured directly to one end of the apparatus as illustrated in Fig. 4 and adapted to be electrically connected with the circuits of the system through yielding terminals 58, 58, these conductors and terminals being illustrated diagrammatically in Fig. 1 of the drawings.

- 59, 59 represent four metallic standards secured directly to the top of the base 1 and connected together at their tops by cross-bars, as shown, said parts constituting means of support for three electric lamps 1, 1, 1, which lamps are secured directly to a transverse strip of insulating material, 38, and also for translucent glass plates 60, the lamps being located between the plates as clearly shown in Fig. 4 so as to disclose the released number combinations of numbers on opposite sides, as will be more clearly pointed out in connection with the description of the mode of operation.

61, 61 are cleats for holding the two glasses in permanent position behind the number disks.

- Referring now to Fig. 1 of the drawings I will describe the electrical circuits in which W, W represent the current mains of a house circuit or trolley circuit or other source of electrical power supply operatively connected through branch conductors w , w , running in multiple relation to the lamps 1, 1, 1 and to the motor M, but normally open in the motor branch at the contact point of the armature 47. w^1 , w^1 , w^1 , etc., w^2 , w^2 , etc., represent the respective sets of conductors running from the controlling battery B to and through the controlling magnets 15 when the proper circuits are closed at the key-board, there being illustrated a sufficient number of circuits upon this figure of the drawings to effect the display of any combination of numbers which may be utilized from the 18 push buttons shown on the key-board 52, it being understood that the necessary magnets and operative circuit connections for those circuits represented by the letters w^2 to w^6 inclusive are identical in all respects to those disclosed at the upper end of Fig. 1, r being a common return circuit for all of the circuits connected to the conducting bars 10, 10 at the top of the apparatus and to the negative pole of the battery B.

- I will now describe the operation of the apparatus as disclosed in the drawings:— Suppose for instance it is desired to make a

display of the number "100" on both sides of the apparatus simultaneously; that is to say, the front and rear of the apparatus illustrated in Fig. 2, in which event the numerals "1" "0" "0" will appear when dropped from their concealed position in the manner hereinafter described. The operator first pushes the "unit" button in the top row and indicated by the numeral "1", thereby closing the circuit of the battery B through the lower conductor w^1 and the lower left-hand electromagnet 15, back by return conductor r and bars 10 to the battery at starting point. At the same time a multiple branch circuit is closed through the upper right hand magnet 15 and back by the return conductor r and bars 10 to the starting point. It will thus be understood that unit disk No. 1 on the left of the front face, as seen looking at Fig. 2, will be released and will fall to its lower or exposed position, and also that the similar unit disk No. 1 on the rear of the apparatus will be released and fall to its lower or exposed position, it being obvious that the numbers on that side will read from left to right to a person who can view it from that side only; while the numbers on the front side will also read from left to right to a person on that side. The operator next pushes the first "tens" button marked "0" in the second vertical row and closes in a similar manner the circuit through the central conductor w^1 to the upper and lower central magnets 15, 15, thus releasing the "tens" number disks "0" on opposite sides of the apparatus. He then closes the last or "hundreds" push button marked "0" through the upper conductor w^1 and energizes the upper left hand and lower right hand magnets 15, releasing the last "0" disks so that on both sides of the apparatus the number "100" is exposed, being readable from left to right from each of the respective sides. After an alarm has been sounded either through an electric gong operatively controlled by a push-button on the key-board and circuit through the battery B, or by a horn, or in any preferred manner designed to attract the attention of the party to be called, the operator restores the six disks thus dropped by operating the push-button 53, causing the contact at the end of the armature 51 of magnet 50 to make electrical contact from the battery B through the magnet 50 by way of the conductor w through magnet 46, contacts 49 and 48 to the starting point. When the magnet 50 is energized it obviously energizes the armature 51 and holds the circuit closed. When the magnet 46 was energized the armature 47 was drawn to its forward contact so that a circuit was closed from the current mains W, W through the restoring motor M, thus starting the motor in operation. As the armature of the motor

rotates it drives the screw 42 and hence the gear-wheel 40 meshing therewith in the direction of the arrows (see Figs. 1 and 2); consequently, the counter-weight 37 passes to the left and carries with it the link 36 drawing downward the chains 31 over the pulley 34, which chain, acting through the interconnecting branches thereof and over the pulleys 34, 35, 32 and 33, lifts the horizontally disposed lifting bars 27 carrying with them the three exposed number disks that had been dropped by the operation above described. As the counter-weight 37 moves to the left it aids in the lifting of the number disks and finally when the lugs 12 of the disks reach their upper limit they are guided through their guide-ways or slots 22, 22 between the adjustable bars 19 and 20, ultimately being locked by the locking shoulders 18 at the outer ends of the rods 17 carried by the armatures 16 of the releasing magnets 15. At the instant that the number disks were thus restored in their locked concealed position the locking pin 45 on the rotating arm 44 interrupted the motor circuit at the circuit breaking arm 48 and the apparatus assumed the position shown in Fig. 2 with the motor normally out of circuit and the push-button 53 in its normal or released position, owing to the deenergizing of the magnet 50.

It will be understood that in view of the fact that the number disks 11 are painted black on their outer surfaces and are covered on the inner surfaces with white silk or equivalent translucent material, as shown in Fig. 12, the numbers displayed will be equally visible at night by reason of the light from the electric lamps 1, as well as in the day time by reason of the contrast of the white and dark surfaces. It will also be apparent that any compound number of such number disks and operating or controlling appliances may be assembled in the manner disclosed, it being only necessary to increase the numbers of such appliances in a manner which will at once be obvious in view of the illustration and description hereinbefore made.

I do not limit my invention to the especial details of construction illustrated in the accompanying drawings and hereinbefore described, as obviously a number of the features thereof may be materially departed from and still come within my claims hereinafter made, the essence of my invention lying in the construction of an appliance in the manner described so that great compactness of parts is had and speed in the operation thereof is attained, and that the apparatus may either be portable or stationary, in accordance with the necessities of the use to which it is to be put. Nor do I limit myself to the operation of the indicating apparatus hereinbefore dis-

closed electrically, as a number of the features thereof embody such generic principles that in the case of portable devices where the operator is located upon the street, or in the open, the individual numbers may be released manually by mechanical means, or directly by hand, and reset by rotating the motor shaft manually, this method of control being obviously within the scope of a number of the claims hereinafter. It is also obvious that for outdoor use in such places as race-tracks and the like, where grandstands are of relatively great length, the apparatus might be so constructed as to give simultaneous indications on adjacent sides thereof; that is to say, the apparatus might be placed with one of its corners toward the center of the grandstand, so that people looking in each direction toward the adjoining faces could have a proper view of the numbers indicated after each operation.

Having thus described my invention what I claim and desire to secure by Letters Patent of the United States is—

1. An annunciator or indicator comprising a suitable casing; a plurality of character disks mounted to have vertical movement in said casing; devices for holding the disks individually in raised position; electrically controlled means for actuating the holding devices individually to selectively release said disks; and means for raising the released disks comprising a vertically movable member, a weighted lever fulcrumed in the casing, connections between said weighted lever and the movable member, and electrical means for restoring said weighted lever to normal position, substantially as described.

2. An annunciator or indicator comprising a suitable casing; a plurality of character disks mounted to have vertical movement in said casing; devices for holding the disks individually in raised position; electrically controlled means for actuating the holding devices individually to selectively release said disks; and means for raising the released disks comprising a vertically movable bar, a weighted lever fulcrumed in the casing, a flexible connection between said weighted lever and the vertically movable bar, an electric motor connected to actuate said lever, and a device associated with said lever for automatically cutting off the motor current, substantially as described.

3. An annunciator or indicator comprising a suitable casing; a plurality of groups of character disks, said groups disposed in opposite pairs in said casing, the disks of each group arranged in close vertical relation; vertically disposed guide-ways in said casing provided with grooves within which said disks have vertical movement; a plu-

rality of laterally movable bars for each group of said disks, each of said bars adapted to engage with one of said disks and hold said disk in raised position; adjustable devices for guiding the raised disks
5 located adjacent said disk holding bars; electromagnets for actuating said bars to release said disks selectively; a vertically movable bar disposed beneath the groups of
10 disks on either side of said casing; a weighted lever fulcrumed in the casing; flexible connections between said bars and said lever whereby to move said bars to raise the

released disks; an electric motor mounted in the casing; and a gearing between said 15 weighted lever and the motor whereby to restore said weighted lever to normal position, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of 20 two subscribing witnesses.

WILLARD S. WOODRUFF

Witnesses:

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M. F. KEATING.