

Dec. 25, 1923.

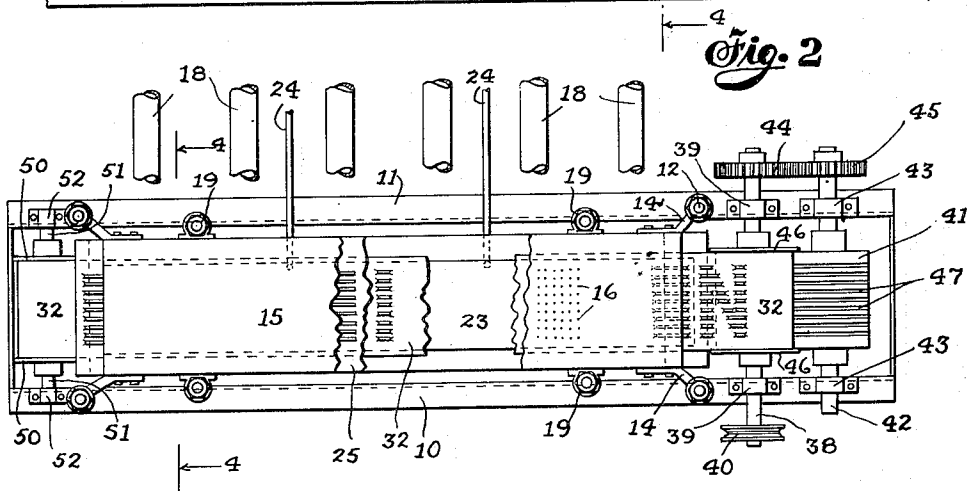
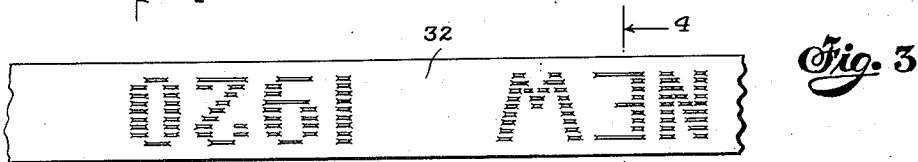
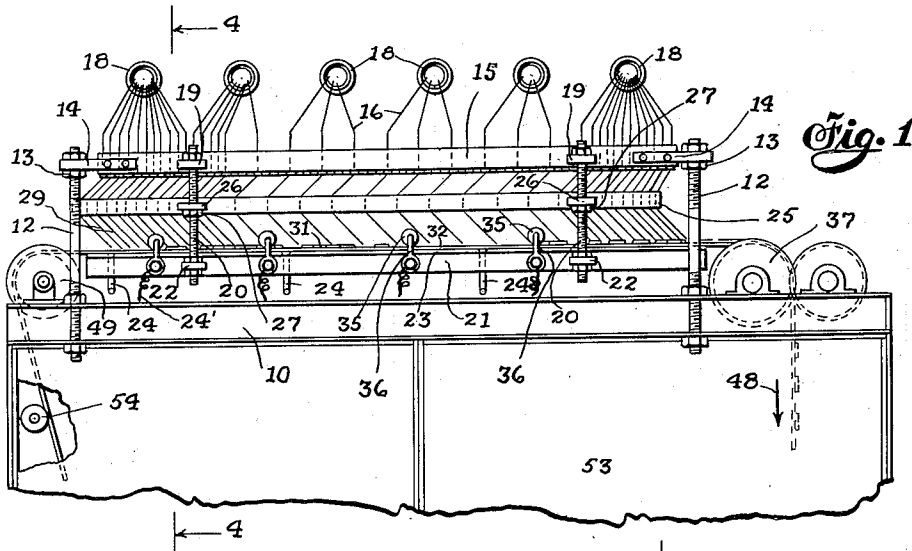
1,478,691

G. F. BAGGE

ELECTRIC DISPLAY CONTROLLING MECHANISM

Filed March 16. 1920

2 Sheets-Sheet 1



Inventor
Gustaf F. Bagge
By his Attorneys
Emery, Varney, Blair & Hognest.

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2 Sheets-Sheet 2

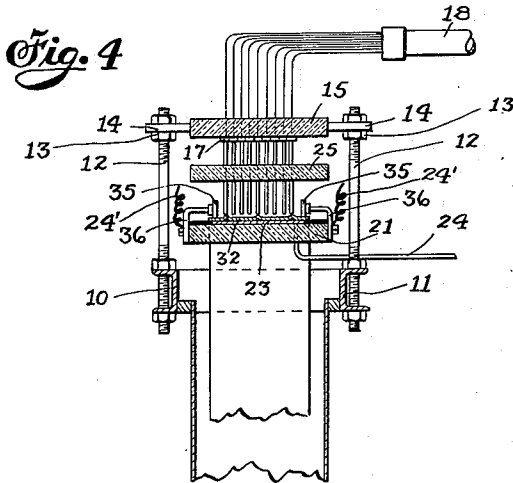


Fig. 5

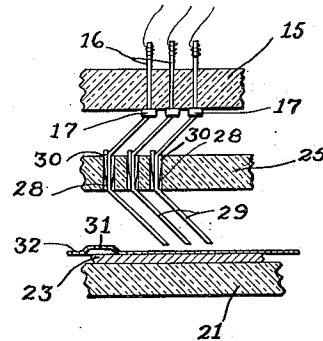


Fig. 6

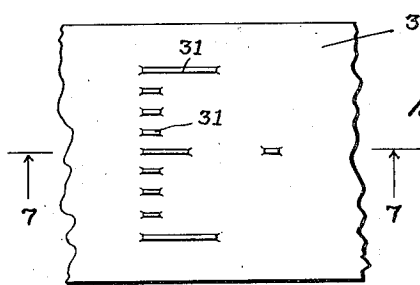


Fig. 7



Fig. 8

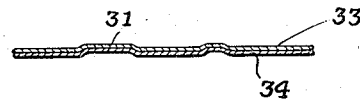
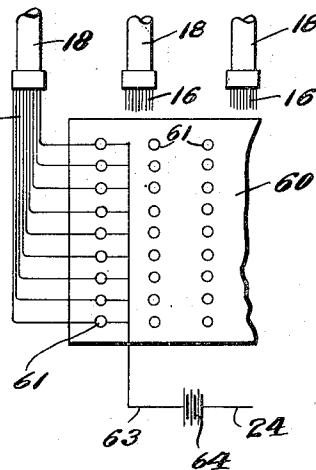


Fig. 9



Inventor
Jusaf F. Bagge
By his Attorneys
Emery, Varney, Blair & Hoag

UNITED STATES PATENT OFFICE.

GUSTAF F. BAGGE, OF NEW YORK, N. Y.

ELECTRIC-DISPLAY-CONTROLLING MECHANISM.

Application filed March 16, 1920. Serial No. 366,404.

To all whom it may concern:

Be it known that I, GUSTAF F. BAGGE, a subject of the King of Sweden, residing in the city of New York, county of New York, and State of New York, have invented an Improvement in Electric-Display-Controlling Mechanism, of which the following is a specification.

This invention relates to electric circuit controlling devices and more particularly to an electrical display or sign controlling mechanism.

One of the objects of this invention is to provide an electrical display controlling mechanism of durable construction and of effective and reliable action.

Another object is to provide an electric sign or display in which the illuminated characters or figures travel crosswise, preferably from right to left, and to provide a controlling mechanism for the electric circuits of rugged design, flexibility of construction and facility of adjustment.

Among the objects of this invention is also to provide a record tape for controlling the mechanism that will be simple and inexpensive in construction, of great resistance to wear and deterioration, and of positiveness of action in controlling the parts of the mechanism.

Other objects will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the structure hereinafter described and shown in the accompanying drawings and the scope of the application of which will be indicated in the appended claims.

In the drawings in which is shown by way of example a preferred embodiment of this invention,

Figure 1 shows the controlling mechanism in side elevation and with certain parts in section.

Figure 2 is a plan view of the controlling mechanism.

Figure 3 is a plan view of a portion of the record tape used in conjunction with the controlling mechanism, and,

Figure 4 is a cross sectional view of the mechanism taken along the line 4—4 of Figures 1 and 2.

Figure 5 is a portion of an enlarged longitudinal section showing the brush construction in detail and the relation thereof to the associated parts.

Figure 6 is an enlarged view of a section of a preferred embodiment of the record strip, and,

Figure 7 is a section of the record strip taken on the line 7—7 of Figure 6.

Figure 8 is a sectional view of a modified form of record strip, and,

Fig. 9 is a plan view of the lamp bank with a diagrammatic showing of the circuits for only the first row of lamps for simplicity of illustration.

Referring to the drawings and more particularly to Figures 1, 2 and 3, it will be noted that the controlling mechanism is mounted on a main frame composed of a pair of frame members 10 and 11 preferably of channel section suitably spaced and rigidly held together by means of cross-braces (not shown) and supported by means of suitable standards. Mounted in the frame members 10 and 11 and suitably secured thereto as by nuts are two pairs of upright posts 12 supporting at their upper ends by means of the nuts 13 and the brackets 14 a rack 15 of insulating material. In the rack 15 is mounted a plurality of contact studs 16 preferably regularly and geometrically spaced throughout its length and throughout a substantial portion of its width. The contact studs 16, more clearly shown in Figure 5, are provided with heads 17 forming the regularly spaced contacts on the under or lower side of the rack 15 and the upper protruding ends of the contact studs 15 form convenient posts by which the contact heads 17 may be electrically connected, as by soldering, to the wires of cables 18.

A lamp bank, as shown in Fig. 9, upon which the electrical display is to be made, is provided in which the incandescent bulbs are preferably regularly positioned and more particularly are spaced uniformly in horizontal and vertical rows. The contact studs 16 with their exposed contact heads 17 are so arranged in the stud rack 15 that they form longitudinal and lateral rows, the number of which corresponds to the number of horizontal and vertical rows of lamps in the lamp bank respectively. Each lamp of the lamp bank 60 is thus provided with a contact 17 in the rack 15, and one

terminal or pole of each lamp of the bank is connected to a stud 16 having the same relative position in the stud rack 15 that its corresponding lamp has with respect to the lamp bank. The connection of the lamps to their respective contact studs is made by means of the wires of suitable cables 18, forming circuits for the lamps 61 and connected in any desired manner to a common terminal 63, leading to one terminal of the battery 64. The other terminal of the battery is connected by means of wire 24 to the metallic plate 23, as shown in Fig. 1. Thus each lamp of the lamp bank is electrically represented as to its position in the lamp bank by a correspondingly positioned contact stud 16 in the stud rack 15, as shown by the diagrammatic connections of the first row of lamps. I may substitute for each lamp a small group of lamps, each group corresponding to a contact stud 16 in the stud rack.

The stud rack 15 is provided with a pair of brackets 19 at each side thereof, each bracket 19 forming the support for a suspension bolt 20. The bolts 20 are preferably threaded throughout their entire length and support at their lower ends a frame 21 by means of brackets 22, substantially similar to the brackets 19 on the stud rack 15, and suitably secured to the frame 21. Suitable nuts are provided to securely fasten the several suspended parts in place.

The frame 21 is made of a non-conducting material and has mounted on its upper surface a common pole plate 23 extending throughout its length to an extent corresponding substantially to the longitudinal extent of the contact studs 16 in the stud rack 15 and having a width slightly in excess of the lateral extent of the regularly spaced contact studs 16. The pole plate 23 is preferably imbedded within the frame member 21 so that the surfaces of the two may substantially coincide or if desired the pole plate 23 may be mounted directly upon the upper surface of the frame member 21 and suitably surrounded by strips of insulating material of substantially the same thickness as itself. The common pole plate 23 is connected at suitable intervals throughout its length by means of the relatively heavy conductors 24 to one side of the source of current.

A brush rack 25 of insulating material and of dimensions substantially similar to the dimensions of the stud rack 15 is suspended by means of the lateral brackets 26 adjustably mounted between a pair of nuts 27 upon the bolts 20 at a position intermediate the stud rack 15 and the common pole plate 23. The brush rack 25 is provided with a series of apertures 28, there being one aperture for each contact stud 16, and the apertures 28 are spaced to cor-

respond with the spacing of the contact studs 16 in the stud rack 15. In each aperture 28 there is mounted a brush 29 securely held therein by means of wedges 30 or in any convenient manner. The brushes 29 are made of a conducting material having good resilient characteristics and are bent or formed into the shape shown more clearly in Figure 5. The configuration thus given the brushes 29 permits of a resilient or yielding contact to be made, as will be hereinafter more clearly described, the upper extensions contacting with the contact heads 17 of the studs 16 and each brush contacting with its correspondingly positioned stud head 17. The degree of contact between the brushes 29 and the contact 17 may be determined by adjusting the vertical distance between the stud rack 15 and the brush rack 25. This adjustment is readily brought about by means of the nuts 27 mounted on the suspending bolts 20 and supporting the brush rack 25 at the lateral brackets 26. Each contact stud is thus extended electrically by means of an associated brush 29 corresponding to it to a point in close proximity to the common pole plate 23 for a purpose hereinafter more clearly described. The proximity of the ends of the brushes 29 to the pole plate 23 may also be readily determined by proper adjustment of the frame member 21 vertically by means of the nuts supporting the side brackets 22 of the frame 21.

The record tape for controlling the circuits of the various lamps in the lamp bank 60 is composed of a thin flexible sheet metal upon which the various characters, figures or letters are formed by means of a series of raised portions or projections 31 (Figures 6 and 7). The projections or protrusions may be made by punching or by raising in any suitable manner a portion of the sheet metal of the tape 32, as is clearly indicated in Figure 7, leaving the sheet metal of the record strip 32 preferably unbroken. The various characters or figures are formed by properly relating a series of protrusions to form, for example, the letter "E" as is clearly shown in Figure 6.

Sections of letters, such as the top or base portions of the letter "E" of Figure 6, may be formed by a series of overlapping raised portions 31 to form a substantially unbroken longitudinally extending projection of the desired length or extent. In Figure 3 is shown a record strip 32 on which is formed a group of letters and figures formed by a series of projections or protrusions as hereinbefore described.

In Figure 8 is shown a section of a record strip of modified form composed of a sheet metal conducting member 33 of substantially the same characteristics and construction as the record strip 32 hereinbefore de-

scribed and a reinforcing member 34 suitably secured to the under side thereof. The member 34 may be composed of a flexible material such as paper or fabric, for example. The various characters are formed by a series of raised portions as 31 and as heretofore described.

The complete record of figures, words or characters having been made upon the record strip 32, as illustrated in Figure 3, the completed record strip, which may be of any length corresponding to the number of words and characters thereon, is then ready to be associated with the controlling mechanism.

It will be noted that the various characters upon the record strip 32 are made up of projections extending in nine lateral series. The number of lateral series of raised portions on the record strip 32 corresponds to the number of longitudinal rows of brushes 29 in the brush rack 25, there being one lateral series for each row of brushes. While in the embodiment herein disclosed, nine such lateral series are shown, it will be understood that any number commensurate with the width of the lamp bank and the number of horizontal rows of lamps therein may be made.

The record strip 32 is passed between the common pole plate 23 mounted in the frame 21 and the downwardly extending inclined brushes. Guide rollers 35 suitably spaced lengthwise of the lateral portions of the frame 21 and suitably mounted in brackets 36 engage the upper surface of the lateral marginal portions of the record tape 32 and maintain the tape in substantially close mechanical and electrical contact with the common pole plate 23. A driving roller 37 preferably electrically non-conductive mounted upon the shaft 38 suitably mounted in the bearings 39 in the main frame members and driven by means of the pulley 40 from any convenient source of power cooperates with an auxiliary roller 41 preferably of insulating material mounted on the shaft 42 in turn mounted in suitable bearings 43 in the main frame members and driven from the main shaft 38 by means of the spur gears 44 and 45. The main roller 37 is of a width substantially equal to the width of the record tape 32 and is provided with flanges 46 to suitably guide the record tape 32 and to maintain the proper lateral position of the tape with respect to the brushes 29. The roller 41 is provided with a series of grooves 47, there being one groove for each lateral series of projections on the record tape. The roller 41 is adapted to press against the roller 37, so that the record tape 32 extending between the rollers 37 and 41 may be positively moved by counter clockwise rotation of roller 37 in the direction indicated by the arrow 48 in Figure 1 to cause a longitudinal movement of the record tape

in a direction from left to right between the common pole plate 23 and the downwardly extending brushes 29. During such driving operation of the rollers 37 and 41, the grooves 47 in roller 41 accommodate the protrusions or raised portions of the record strip and prevent injury thereto while permitting intermediate portions of the strip to be held in driving contact with the roller 37. At the opposite ends of the frame members 10 and 11 there is mounted an insulated guide roller 49 suitably flanged as at 50 and mounted upon the shaft 51 in the bearings 52. The flanged guide roller 49 is positioned with respect to the flanged guide and driving roller 37 and with respect to the brushes 29 so that each lateral series of projections is in substantial registry with its corresponding longitudinally extending series or row of brushes 29 in the brush rack 25.

The frame 21 supporting the pole plate 23 upon which the record tape is supported during this longitudinal movement is aligned with the rollers 37 and 49 to insure the proper feeding of the record tape to the pole plate 23 and the brushes 29 acted upon thereby. Such alignment is conveniently secured by adjustment of the nuts 13 on the supporting posts 12 and it will be noted that such adjustment may be made without disturbing any previous adjustment of the brushes with respect to the pole plate or with respect to the contact studs in the rack 15.

The inactive portions of the record tape 32 pass downwardly between the driving rollers 37 and 47 into a receptacle 53 of suitable construction and preferably lined with an insulating material. From the opposite end of the receptacle 53 the tape 32 is fed to the operating mechanism over a guide roller 54 suitably mounted and insulated within the receptacle and aligned with the guide insulated roller 49 in order to insure the proper feeding and guiding of the tape to the guide roller 49. The record strip 32 is preferably made into an endless loop, so that its operation with the mechanisms may be continuous.

As has been previously pointed out the plate 23 is connected to one side of the source of current, and one terminal of each lamp is connected to the other side of the source. The remaining terminal of each lamp is connected by means of the conductors of cables 18 to the contact studs 16 in the manner heretofore described, such that each contact stud represents by its position in the stud rack 15 the corresponding lamp to which it is connected. As the record tape passes in the direction from left to right, it is held in positive electrical contact with the common pole plate 23 by means of the series of marginal rollers 35 so that it forms in effect a live travelling portion of the electrical cir-

cuits. As the various projections travel longitudinally underneath the brushes, individual projections being made preferably of a length such that each will contact substantially continuously with at least two brushes 29, each projection closes successively the circuits to two lamps in the lamp bank, the individual lamps whose circuits are closed being in the row corresponding to the particular row of brushes 29 acted upon by a single projection during its longitudinal travel.

The circuits to the lamps are thus closed through the individual projections on the record tape forming the electrical interconnection between the downwardly extending brushes 29 and the common pole plate 23 connected to one side of the source of current. The circuits to as many lamps in the lamp bank will be closed as there are brushes 29, electrically connected to corresponding lamps, operated upon by the projections 31 in the record tape 32 to complete the electrical circuits through the common pole plate 23. There will thus be continuously illuminated as many lamps in the bank as there are projections 31 contacting with the brushes 29 at any particular moment. As the record tape 32 continues its travel from left to right, the circuits to these lamps will be successively closed and the characters or figures made upon the lamp bank by the illumination of lamps positioned to correspond with the brushes 29 which are acted upon by the projections 31 on the tape 32 will be made to travel crosswise of the lamp bank at a rate of speed corresponding to the rate of movement of the record tape 32. The various figures and characters on the record tape are illuminously reproduced on the lamp bank, the projections in any one lateral series on the tape acting upon a corresponding row of brushes, and take a movement corresponding to the movement of the record tape itself.

Sufficient space intervenes the lower extremities of the brushes 29 and the pole plate 23 so that the record tape 32 may be readily passed therebetween and so that the protrusions or raised portions 31 may make contact with the downwardly extending brushes 29. This intervening space may be adjusted by adjusting the vertical distance between the pole plate frame 21 and the brush rack 25 by means of the nuts on the suspension bolts 20 supporting the frame 21 at the lateral brackets 22. The degree of contact between the brushes 29 and the protrusions 31 of the record tape may thus be adjusted to any desired extent and may readily be made positive. The record tape 32 is held in close mechanical and electrical contact with the pole plate 23 by means of the lateral guide rollers 35 so that the brushes 29 and the pole plate 23 may be bridged to insure good elec-

trical inter-connection therebetween. The record tape, being in close mechanical contact with the pole plate 23, is given a positive support thereby so that the raised portions 31 may positively act upon the brushes 29.

In case the modified form of record strip 33 of Figure 8 is employed, the lateral rollers 35 function in a manner as heretofore described, and are in addition connected to the conductors 24' connected to bracket 36 and leading to the one side of the source of current. The electrical circuits are thus completed through the guide rollers 35 and bracket 36 rather than through the pole plate 23, which may be dispensed with as part of the electrical circuits if desired.

The record tape may be made of any suitable metal, preferably one of good conductivity, and preferably also one which is not readily oxidized or corroded. In case a metal is employed, such as sheet steel for example, which is readily affected by moisture, the record tape may be varnished at points intermediate or intervening the series of raised portions, leaving such portions as are necessary to form electrical contacts uncoated. Such uncoated portions forming part of the electrical path by direct contact with other parts of the mechanism will be maintained in a substantially polished condition appropriate to good electrical conductivity by the frictional contact with the various brushes and other parts of the mechanism. A metallic record strip such as provided for in this invention is of great durability, since it has great resistance to wear, is not readily torn, and is not affected by moisture. Likewise it is not subject to the disadvantages inherent in a paper record as has been heretofore customarily used. Furthermore, the record tape is immune to serious injury by sparking or arcing at the brush contacts and danger from burning or seriously affecting the body of the record tape, were the latter made of paper, for example, is eliminated.

It will be noted that the several parts are readily adjustable with respect to one another to insure positive electrical action and that the several frames and racks are readily removable to permit of repair and of replacement of parts.

As various possible embodiments may be made of this invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In a continuous sign flashing system having a bank of electric lamps, and electric circuits for said lamps, a plurality of adjustably mounted brushes included in said circuits, and a metallic record tape having

raised portions on its surface for controlling said circuits through said brushes.

2. In a continuous sign flashing system having a bank of electric lamps, and circuits for said lamps, a plurality of brushes mounted for adjustment in their entirety included in said circuits, one brush of which is included in the circuit of each lamp of said bank, and a metallic record strip having raised portions thereon for selectively closing the circuits to individual lamps through brushes corresponding to said lamps.

3. In a continuous sign flashing system having a bank of electric lamps arranged in rows, a plurality of brushes corresponding in number to the number of said electric lamps and arranged in rows to correspond to the rows of said lamps, contacts on said brushes for connecting said lamps with said brushes, and a metallic record tape having projections thereon for selectively closing the circuits to said lamps through said brushes, said brushes being capable of adjustment whereby record tapes having varying sizes of projections may be used.

4. In a continuous sign flashing system having a bank of electric lamps, and circuits for said lamps, a plurality of double-ended brushes mounted for adjustment in their entirety, one brush of which is included in the circuit of each lamp of said bank by means of one end thereof, and an electrically conductive record strip having raised portions thereon for selectively closing the circuits to the lamps of said bank through the other ends of said brushes.

5. In a continuous sign flashing system having a bank of lamps arranged in vertical and horizontal rows and circuits for said lamps, a plurality of brushes arranged in rows to correspond to the rows of said lamps, the circuit of each lamp including one of said brushes, an electrically conductive record strip having protrusions thereon for selectively closing the circuits to said lamps through corresponding brushes, and means positioned adjacent to and bearing against said record strip whereby said record strip is maintained in positive electrical connection with a source of current for its full operating length.

6. In a continuous sign flashing system having a bank of electric lamps, circuits for said lamps, a plurality of brushes similarly disposed as said lamps in said bank, each circuit including one of said lamps and one of said brushes, an electrically conductive plate in proximity to said brushes, an electrically conductive record tape supported by said plate and extending between said brushes and said plate, and means for moving said record tape, said record tape having raised portions thereon for selectively closing said lamp circuits through said brushes and said plate, said brushes being

adjustable in their entirety whereby record tapes having projections of varying depths may be utilized.

7. In apparatus of the class described, in combination, a rack for supporting a plurality of contact studs, an auxiliary rack supported underneath said stud rack and having upwardly extending brushes mounted thereon for contacting with said studs in said stud rack, said brushes also having downwardly extending ends, a supporting frame mounted in proximity to said downwardly extending ends of said brushes, and a record tape having raised portions thereon supported upon said frame, said raised portions being adapted to selectively contact with said downwardly extending ends of said brushes.

8. In apparatus of the class described, in combination, a rack having mounted therein a plurality of regularly arranged contact studs, an auxiliary rack having mounted therein a plurality of brushes having upwardly and downwardly extending contacting portions, said upwardly extending portions contacting with said contact studs in said rack, a supporting frame adjustably mounted in proximity to said downwardly extending portions of said brushes, and a record strip having raised portions thereon supported on said frame, said raised portions being adapted to contact with said downwardly extending portions of said brushes.

9. In apparatus of the class described, in combination, a rack having mounted therein a plurality of contact studs, an auxiliary rack adjustably mounted with respect to said stud rack and having mounted therein a plurality of brushes similarly disposed as said contact studs for contacting therewith, said brushes also having downwardly extending contacting portions, a supporting plate mounted in proximity to said downwardly extending brush portions, and a record tape supported by said plate and having raised portions thereon for selectively contacting with said downwardly extending brush portions.

10. In apparatus of the class described, in combination, a main frame, a roller mounted upon each end of said main frame, a rack mounted upon said main frame intermediate said rollers for supporting a plurality of downwardly extending brushes, a supporting plate suspended from said brush rack in proximity to said downwardly extending brushes, a record tape adapted to be passed over said rollers and said supporting plate and having raised portions thereon for selectively contacting with said brushes, and means for aligning said supporting plate with said rollers.

11. In apparatus of the class described, in combination, a main frame, a roller

mounted at each end of said frame, a rack mounted upon said frame intermediate said rollers for supporting a plurality of downwardly extending brushes, a plate supported from said rack and in proximity to said downwardly extending brushes, a record tape passed over said rollers and said plate and supported thereby, said record tape having projections thereon for selectively contacting with said downwardly extending brushes, means for adjusting the proximity of said plate to said brushes, and means for aligning said plate with said rollers.

12. In apparatus of the class described, in combination, a main frame, a roller mounted at each end of said frame, a stud rack mounted upon said frame intermediate said rollers and having mounted therein a plurality of contact studs, a brush rack supporting a plurality of double-ended brushes and adjustably mounted with respect to said stud rack, the upwardly extending ends of said brushes contacting with said studs, a supporting plate mounted in proximity to the downwardly extending ends of said brushes, a record tape passing over said rollers and said plate and supported thereby, said record tape having protrusions thereon for selectively contacting with said brushes, means for adjusting the proximity of said plate to said brushes, and means for aligning said plate with said rollers.

13. In a continuous sign flashing system having a bank of electric lamps and circuits for said lamps, a plurality of brushes included in said circuits, one brush of which is included in the circuit of each lamp of said bank, and an electrically conductive record tape having raised portions thereon arranged to form the outline of characters for selectively closing said circuits through said brushes.

14. In apparatus of the class described, in combination, a plurality of brushes arranged in rows, a record tape having electrically conductive contacts thereon projecting beyond the plane of said tape and arranged in rows to correspond to said rows of brushes for selectively contacting with said brushes, a plate for supporting said tape, and a pair of driving rollers for moving said tape, said tape extending between said rollers, one of said rollers being provided with a plurality of grooves to receive said rows of projecting contact portions.

15. In apparatus of the class described, in combination, a plurality of brushes, a record tape having a plurality of parallel electrically conductive contacts thereon projecting beyond its plane, a plate for supporting said record tape in operative relation to said brushes, a flanged driving roller for moving and guiding said tape with re-

spect to said brushes, and an auxiliary roller for maintaining said tape in driving contact with said driving roller, said auxiliary roller having grooves thereon for accommodating said parallel projecting contacts on said tape.

16. In apparatus of the class described, in combination, a plurality of brushes, a metallic record tape having projecting contact portions thereon for selectively engaging said brushes, a metallic plate for supporting said record tape in operative relation to said brushes, means for continuously moving said tape with respect to said brushes, and guide rollers adjacent said metallic plate for engaging portions of the upper surface of said record tape whereby said record tape is maintained in intimate electrical contact with said plate.

17. In apparatus of the class described, in combination, a plurality of brushes mounted for adjustment in their entirety, a metallic record tape having projecting contacts thereon for selectively engaging said brushes, a plate for supporting said record tape in operative relation to said brushes, means for continuously moving said tape with respect to said brushes, and guide rollers engaging portions of the upper surface of said tape for making electrical contact with said tape.

18. In a sign flashing system having a bank of electric lamps and circuits for said lamps, a plurality of contact studs, one stud of which is included in the circuit of a lamp of said bank, a plurality of double-ended brushes supported intermediate their ends and capable of adjustment by said supporting means, one end of each of which brushes contacts with one of said contact studs, and a record tape having contact portions thereon for selectively closing the circuits to the lamps of said bank through the other ends of said brushes.

19. In apparatus of the class described, in combination, a plurality of brushes, an electrically conductive record tape having contacts thereon for contacting selectively with said brushes, a plate for supporting said record tape in operative relation to said brushes, and insulated driving rollers for continuously moving and guiding said tape with respect to said brushes, one of said rollers being insulated, and a plurality of guide rollers secured adjacent the sides of said tape supporting plate and bearing against said record tape whereby the tape is retained in positive electrical contact with said plate.

In testimony whereof, I have signed my name to this specification this 15th day of March 1920.

GUSTAF F. BAGGE.