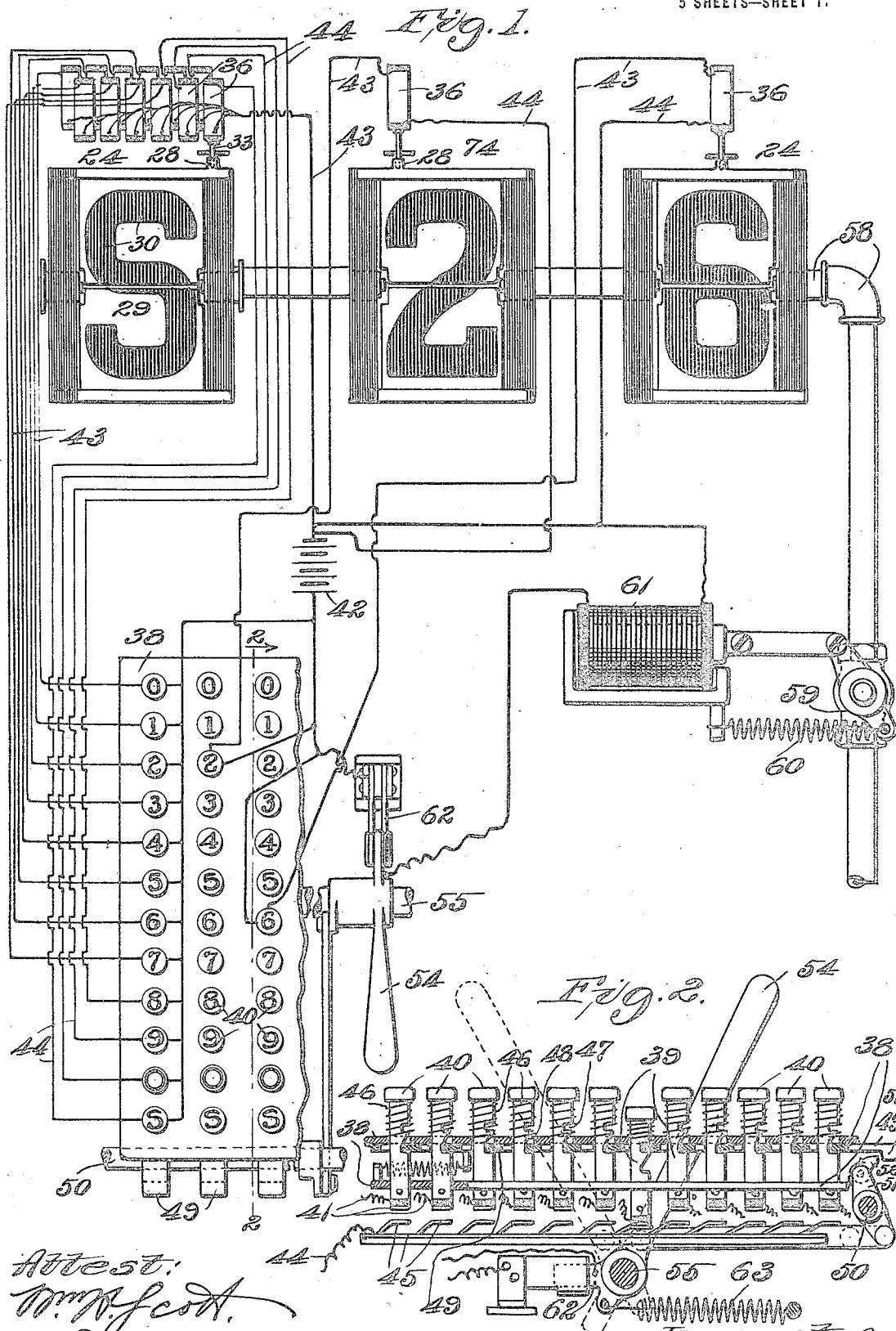


F. E. BENTLEY.
CHANGEABLE CHARACTER BULLETIN APPARATUS.
APPLICATION FILED FEB. 19, 1915.

1,219,693.

Patented Mar. 20, 1917.

5 SHEETS—SHEET 1.



Attest:
Wm. H. Ford.
E. L. Hallam.

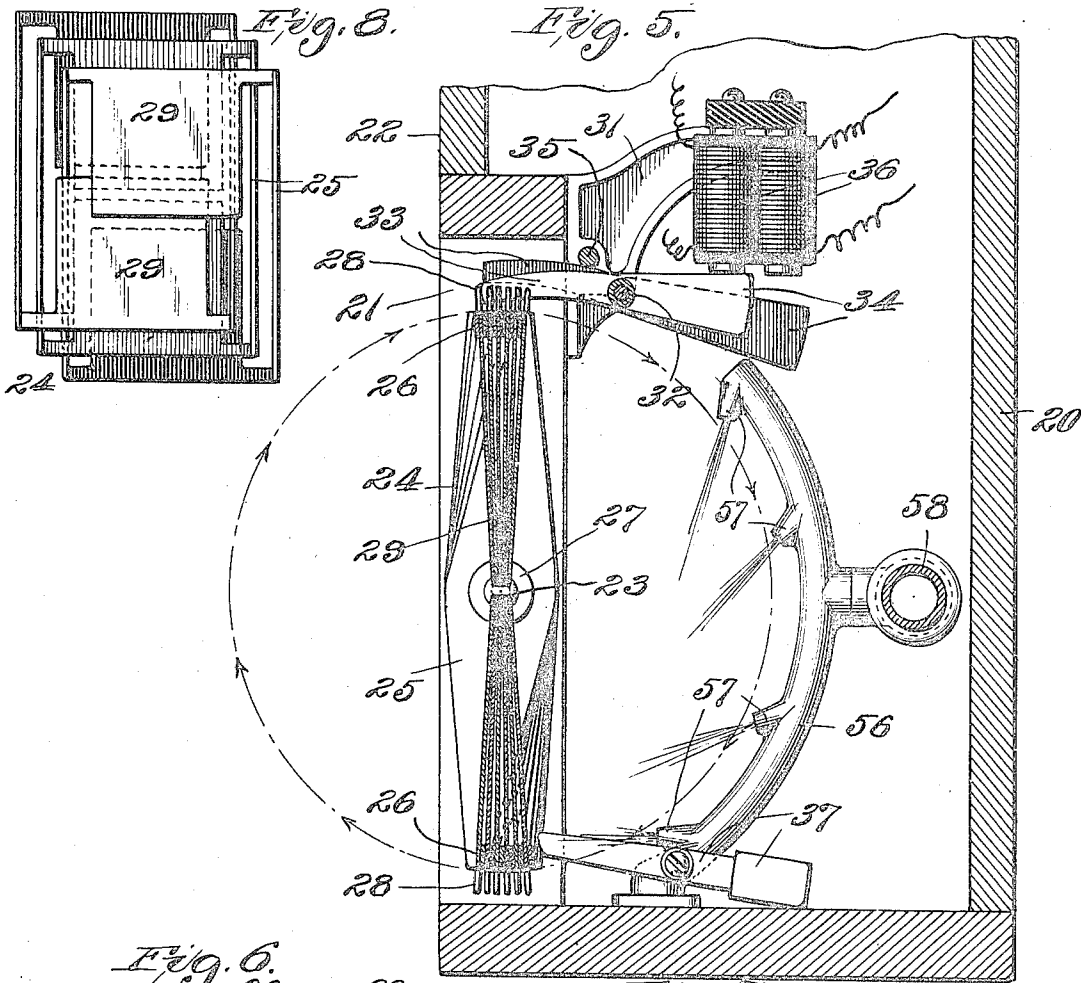
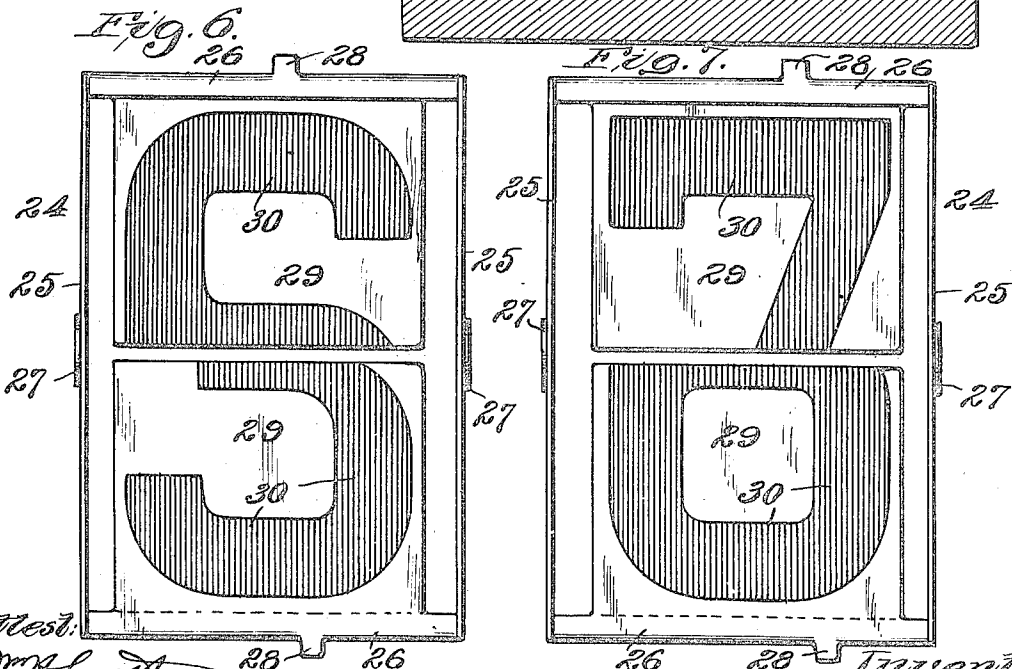
Inventor:
Frederick E. Bentley,
by Higdon & Longan Attys.

F. E. BENTLEY.
CHANGEABLE CHARACTER BULLETIN APPARATUS.
APPLICATION FILED FEB. 19, 1915.

1,219,693.

Patented Mar. 20, 1917.

5 SHEETS—SHEET 3.



Attest:
Wm. H. Scott.
E. L. Haines.

Inventor.
Frederick E. Bentley.
By Higdon & Langan attys.

F. E. BENTLEY.

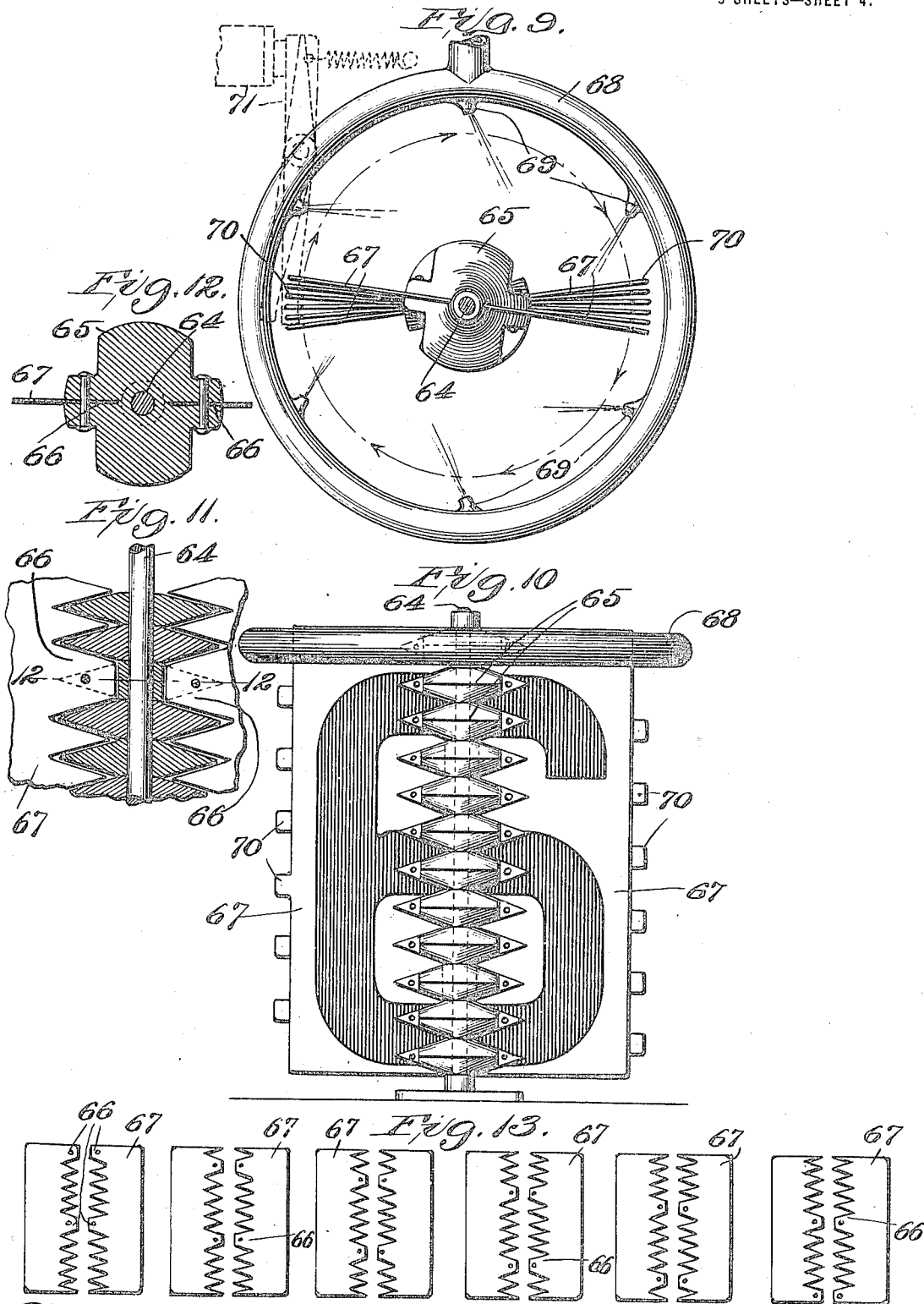
CHANGEABLE CHARACTER BULLETIN APPARATUS.

APPLICATION FILED FEB. 19, 1915.

1,219,693.

Patented Mar. 20, 1917.

5 SHEETS—SHEET 4.



Attest:
W. H. Scott.
E. L. Haller.

Inventor:
Frederick E. Bentley,
By J. H. Jones & Longman Attys.

1,219,693.

F. E. BENTLEY.
CHANGEABLE CHARACTER BULLETIN APPARATUS.
APPLICATION FILED FEB. 19, 1915.

Patented Mar. 20, 1917.
5 SHEETS—SHEET 5.

Fig. 14.

Fig. 15. Fig. 16.

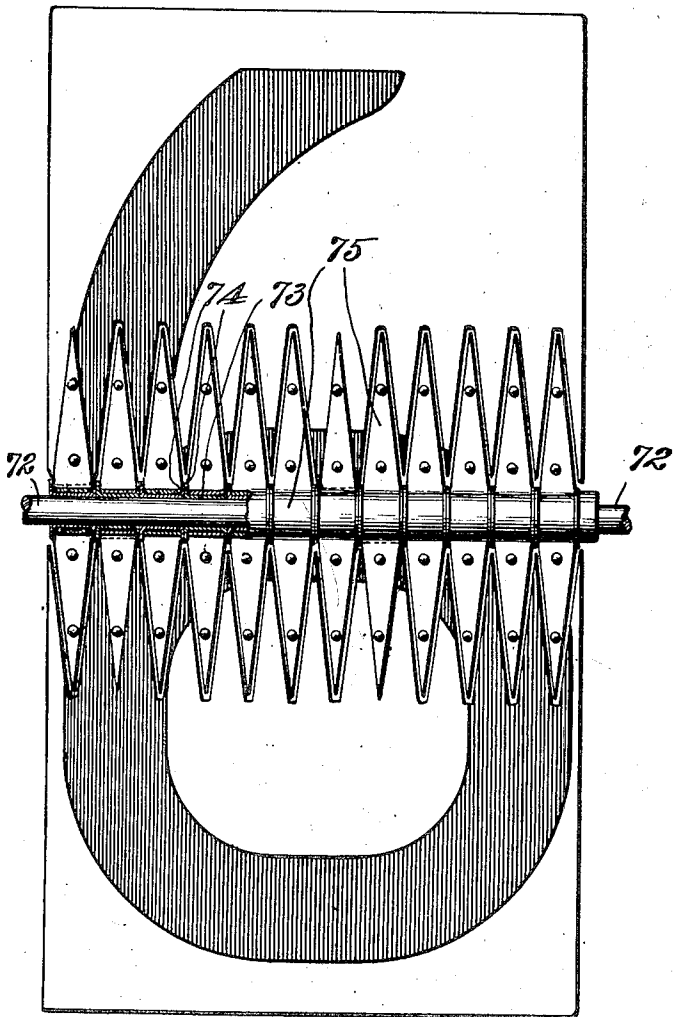
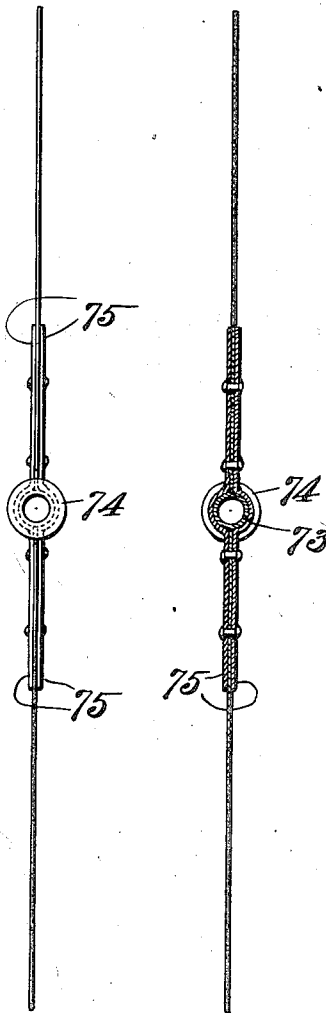
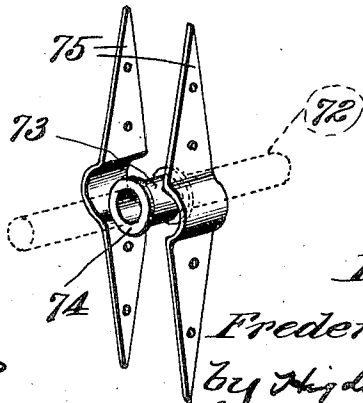


Fig. 17.



Attest:
W. A. Scott.
E. L. Haller.

Inventor:
Frederick E. Bentley,
by Higdon & Langan
Attys.

UNITED STATES PATENT OFFICE.

FREDERICK E. BENTLEY, OF MAPLEWOOD, MISSOURI.

CHANGEABLE-CHARACTER BULLETIN APPARATUS.

1,219,693.

Specification of Letters Patent.

Patented Mar. 20, 1917.

Application filed February 19, 1915. Serial No. 9,248.

To all whom it may concern:

Be it known that I, FREDERICK E. BENTLEY, a citizen of the United States, and resident of Maplewood, St. Louis county, Missouri, have invented certain new and useful Improvements in Changeable-Character Bulletin Apparatus, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in changeable character bulletin apparatuses, wherein a plurality of devices each bearing more than one character or matter for display are revolvably mounted on an axis common to all is employed in connection with a means for selecting any one of the devices and moving it into a position for displaying a number of the characters or matters which are properly related and moving the remaining devices from positions obscuring the selected device.

The primary object of my improvements is to construct an apparatus comprising multifaced devices independently mounted for movement on a support common to all and each device bearing a number of characters or matters for display and means for selectively relating certain of the characters or matters and moving the device bearing such selected characters or matters in position for display and moving the remaining devices from positions obscuring the selected device, whereby a maximum number of characters or matters may be made to occupy a minimum of space.

With the above object in view, my invention consists in certain novel constructions and arrangement of parts hereinafter described in detail, pointed out in my claims and illustrated by the accompanying drawings, in which—

Figure 1 shows in diagram an apparatus embodying my invention;

Fig. 2 is a detail sectional view taken on the line 2—2 of Fig. 1 of the key-board and switch employed in my apparatus;

Fig. 3 is a plan, partly in section, of a number of display devices, and their releasing, holding and moving means;

Fig. 4 is a front elevation of the parts shown in Fig. 3;

Fig. 5 is a sectional, side view of the parts shown in Figs. 3 and 4;

Figs. 6 and 7 are front elevations of two of the display devices showing different characters thereon, and showing a different position of the stop devices thereon;

Fig. 8 is a view showing a group of nested display devices;

Fig. 9 shows in plan a modified form of display device and moving means;

Fig. 10 is a front elevation of the parts shown in Fig. 9;

Fig. 11 is a detail, fragmental vertical sectional view of the journals of the display devices;

Fig. 12 is a sectional view of the journal taken on the line 12—12 of Fig. 11;

Fig. 13 shows a group of companion pairs of display devices and the different positioning of their attaching points with their journal bearings;

Fig. 14 is a front elevation, partly in section, of a second modified form of display device;

Fig. 15 is an edge view of the modified form of the display device shown in Fig. 14;

Fig. 16 is a vertical sectional view of the display device shown in Figs. 14 and 15; and

Fig. 17 is a detail perspective of the journal bearing and display device attaching means of the form shown in Figs. 14, 15 and 16.

Referring by numerals to the accompanying drawings:

20 designates a cabinet, in which the display parts of my apparatus are placed, in the face of which there are the openings through which the display devices are visible and on the face portions, such as 22, are placed characters and matters readable with the changeable characters on the display devices.

In the form shown in Figs. 1 to 8, inclusive, wherein the pneumatic means for moving the display devices is arranged at one side of the display devices I contemplate the display of only one side or face of the devices, but in the forms shown in Figs. 9 to 17 inclusive, wherein the moving means is located above the display devices I contemplate the display of both sides or faces of the devices, so that they may be visible and readable from two sides, that is, opposite faces of the display devices may be simultaneously displayed with like characters on the opposite faces.

On opposite sides of each of the openings 21 in the form of device shown in Figs. 1 to 8, there are the stub shafts or journals 23 which support display devices 24, each of which comprises the arms 25, having their ends connected by the cross pieces 26, the arms and cross pieces forming a substantially rectangular frame, the arms each having at their longitudinal centers the journal bearings 27 and each cross piece having a stop 28. The stops 28 are all differently positioned for movement in distinct paths. Carried by each cross piece 26 is a plate 29, which is of sheet material, preferably metal, and each plate has on each of its faces a section 30 of a character for display. It is to be observed that the sections of characters appearing on the one display devices are unrelated and that the widths of frames thereof are substantially uniform, that the outermost arm 25 on the one side of the group of frames is the innermost arm on the other side of the group and that the foremost plate of the one frame at the top of the group has for a related companion the foremost plate, of another frame, at the bottom of the group.

In other words, each character for display is sectional, one section being on the face of a plate on one frame and its companion section being on the face of a plate on another frame. Assuming all of the plates at the one end of the frames to be one group and the plates at the other end of the frames to be another group, a certain character will have its upper section on the foremost plate of the upper group and its lower section on the foremost plate of the lower group.

Inside the cabinet 20 and secured to the frame of the opening 21 adjacent its top is a bracket 31, which carries a shaft 32, extending transversely of the opening 21, on which is mounted a plurality of pawls 33, the one end of each pawl, arranged to be swung into the path of a certain stop 28 of a display device and the opposite end of each pawl being an armature 34 and weighted to normally hold the pawl out of the path of the stop 28.

In order to limit the movements of the pawls I arrange a pin 35 extending transversely of the opening against which the forward ends of the pawls engage. Supported by the bracket 31 are a number of electro-magnets 36, there being a magnet for each pawl 33. These pawls are for the purpose of stopping all of the display devices from movement in one direction and to prevent movement of the display devices in the opposite direction I employ a gravity pawl 37 arranged in opposition to the pawls 33. The pawls 33 are selective with relation to the display devices, while the pawl 37 is common to all.

The cabinet 20, the exterior faces of which constitute the bulletin board, is mounted in some conspicuous position while the means by which the operator causes changes to be made on the bulletin board is located, if desired, remote from the bulletin board and preferably in an inclosure, for the comfort of the operator, and the protection of the operating means.

This operating means comprises a pair of plates, hereinafter termed the keyboard 38, through which there are extended the stems 39 of a series of keys 40, each of which is electrically connected with one of the electro-magnets 36, of the bulletin board, by means of a conductor 41 leading from each key stem to a battery 42, a conductor 43 leading from the battery to each electro-magnet and a conductor 44 leading from each electro-magnet to a contact 45 associated with each stem.

Each of the keys is held normally elevated or removed from its companion contact by a spring 46 and each key stem is provided with a notch 47 beneath which there is a cam face 48.

Between the plates 38 constituting the key board is a bar 49 slotted to receive the key stems and normally spring held against the cam faces of the key stems so that when any one key is depressed the bar 49 will be shifted by the cam face of the key stem to a position where it will seat in the notch 47 in order to lock the key stem depressed and in engagement with its companion contact 45, thereby establishing a circuit which energizes a certain electro-magnet 36 and actuating a pawl 33, through the medium of its armature 34 to a position where its free end will stand in the path of movement of the display device corresponding with the key depressed.

At one end of the key board there is a shaft 50 having thereon a rocking lever 51 for each bar 49, and carried by each rocking lever is a spring-pawl 52 which engages a hook 53 on each bar.

54 designates a lever mounted for oscillation on a bearing 55 and which lever is connected by means of a link with the shaft 50 so that when said lever 54 is oscillated all of the bars 49 will be moved to release the depressed keys.

The means for moving the display devices, after their selection by the means just described, comprises a blower arranged adjacent each group of display devices and which blower consists of an arcuate tube 56 having at intervals the jet openings 57 discharging in the direction of the rotation of movement of the display devices. These tubes are all connected with an air pipe 58, connected with a source of air, under pressure, in which pipe there is a valve 59, normally held closed by a spring 60.

For automatically operating this air valve so that the various groups of display devices may be moved to display the selected character, I have provided a solenoid magnet 61, the core of which connects with the valve 59 and moves the valve to open position in opposition to the spring 60.

This solenoid magnet is actuated by a knife switch 62, whose fixed element is in circuit with the battery 42 and the magnet and whose movable element is connected with the lever 54 previously described.

This lever is automatically restored to its initial position after manipulation by a spring 63.

In Figs. 9 to 13 I illustrate a modified form of display device, the axis 64 about which the display devices revolve is vertically disposed and on which axis there is revolubly mounted a number of disks 65, which are substantially convexo-convex in cross section, and each of which is slotted on diametrically opposite sides to receive marginal projections 66 of the display devices 67, which devices are of oblong, rectangular shape, having their one side margin shaped to fit over the disks.

In Fig. 13 the arrangement of the marginal projections is shown, and it is to be understood that each display device is secured to a pair of disks, and that each disk is connected with a pair of the display devices.

In this form of apparatus I employ just twice the number of display devices as in the other form described and contemplate the placing of duplicate characters or matters for display on the display devices so that the matter may be readable from opposite sides of the bulletin board.

In this form of apparatus the moving means for the display devices comprises a tubular ring 68, having jet openings 69 at intervals and which tubular ring is arranged near the one end of the display devices, preferably the upper end as shown, so as to not obscure the characters of the display devices. As in the other form each display device carries a stop 70 which operates in conjunction with a series of electro-magnetically operated pawls, shown only by dotted lines in Fig. 9, and designated by the numeral 71.

These pawls in construction and operation are the counterpart of the pawls shown and described in the other form of apparatus, and differ only therefrom in position.

In Figs. 14 to 17 I illustrate a second modification in the construction of the display devices, wherein there is a horizontal axis 72 over which there is slipped a number of sleeves 73, each of which has at each of its ends an annular outstanding flange 74. Over each sleeve there is placed a pair of straps 75, which journal on said sleeves and to which the display devices are secured. The inner margin of each display device of

this form is substantially the same as is shown in detail in Fig. 13.

All of the forms of display apparatus shown operate in substantially the same manner, hence I will limit the following description of operation to the form shown in Figs. 1 to 8.

This illustration and description is limited to a single unit, and by this term I mean a single series of the groups of the display devices which are correlated to make a single announcement, but do not wish to be understood as limiting myself to this single series of display devices, for in a single bulletin apparatus I contemplate the use of a unit of such devices for each independent subject for announcement.

It is to be observed that in the unit illustrated the keyboard shows three rows of keys, which are designated "0, 1, 2, 3, 4, 5, 6, 7, 8, 9", a blank key and the letter "S", and it is to be understood that the display devices bear similar characters. When the unit is inactive or not announcing, the display devices which are plain or blank are the outermost of each group. For example, I have arbitrarily selected "S 26" as the group of characters for display.

In order to bring about the display of such a group of characters, the key "S" of the first row of keys is depressed and this key is held depressed by the bar 49 which engages in the notch 47 of the stem of the key. In the second row of keys the key "2" is depressed, and it is held depressed by its bar 49, in like manner the key "6" of the third row is depressed and held by its bar 49. As each key is depressed, its stem engages one of the contacts 45 and an electric circuit is established, which energizes a magnet 36, at each group of display devices, which magnet operates a pawl 33 to stand in the path of movement of a certain display device, whose stop 28 will be engaged by said pawl when the display device is rotated.

For bringing about this rotation of the display devices, the handle 54 is thrown, whereby to operate an electric switch which is in circuit with a solenoid magnet, the core of which is connected with a valve in an air pipe leading from a source of supply to a blower at each group of display devices. When this solenoid magnet is energized, the valve is opened and the display devices all blown until stopped by the pawls 33 and stops 28. These stops and pawls hold the display devices against movement in the direction of the air blast and the gravity pawls 37 hold each group of display devices against retrograde movement.

As soon as the air has been released, the operator releases the lever 54, whereupon it is restored to its initial position by the spring 63, which restoring breaks the circuit

at the switch, deenergizing the solenoid magnet and permitting the spring at the air valve to close the valve.

When this lever 54 is moved the bars 49 are moved so that the keys which were held depressed may be released to rise to their normal positions.

Having thus described my invention, what I desire to secure by Letters Patent of the United States is:

1. In a changeable character bulletin apparatus, a plurality of devices each of which bears more than one character or matter for display, means for supporting the devices whereby they may be relatively moved, a stop on each device, said stops being in different relative positions, means for moving said devices, and a selective element movable into or out of the path of movement of said stops whereby to arrest the movement of any selected device, and means for holding said selected device against retrograde movement.

2. In a changeable character bulletin apparatus, a frame, a shaft supported in said frame, a plurality of display devices revolubly mounted on said shaft, means for revolving said devices, different relatively positioned stops on said devices, and an electromechanically operated element arranged to be moved into or out of the path of movement of each stop.

3. In a changeable character bulletin apparatus, a plurality of revolubly mounted display devices, means for rotating said devices, different relatively positioned stops on the said devices, selective electromechanically operated means movable into and out of the path of said stops whereby to stop the movement of the devices in one direc-

tion, and a single automatic means for holding said devices against movement in a retrograde direction.

4. In a changeable character bulletin apparatus, a revolubly mounted series of display devices, a blower arranged contiguous to the path of movement of said devices, whereby a jet of air therefrom will cause said devices to be moved, selective means for holding anyone of said devices against movement by said jet of air, and means for holding said selected device against retrograde movement.

5. In a changeable character bulletin apparatus, a series of movably mounted display devices, a controllable means for an induced fluid current for the movement of said devices located contiguous to the path of movement of said devices, selective means for holding any one of said devices against movement by the induced fluid current and means for holding said display devices against retrograde movement.

6. In a changeable character bulletin apparatus, a frame, a shaft supported in said frame, a plurality of display devices revolubly mounted on said frame, a controllable means for an induced fluid current for revolving said devices, different relatively positioned stops on said devices, and electro mechanically operated elements arranged to be moved into or out of the path of movement of each of said stops.

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

FREDERICK E. BENTLEY.

Witnesses:

E. L. WALLACE,
EDWARD E. LONGAN.