May 1, 1951 L. GORDON 2,550,994

CYCLICLY INTERCHANGEABLE DISPLAY MEANS

Filed July 17, 1948 2 Sheets-Sheet 1

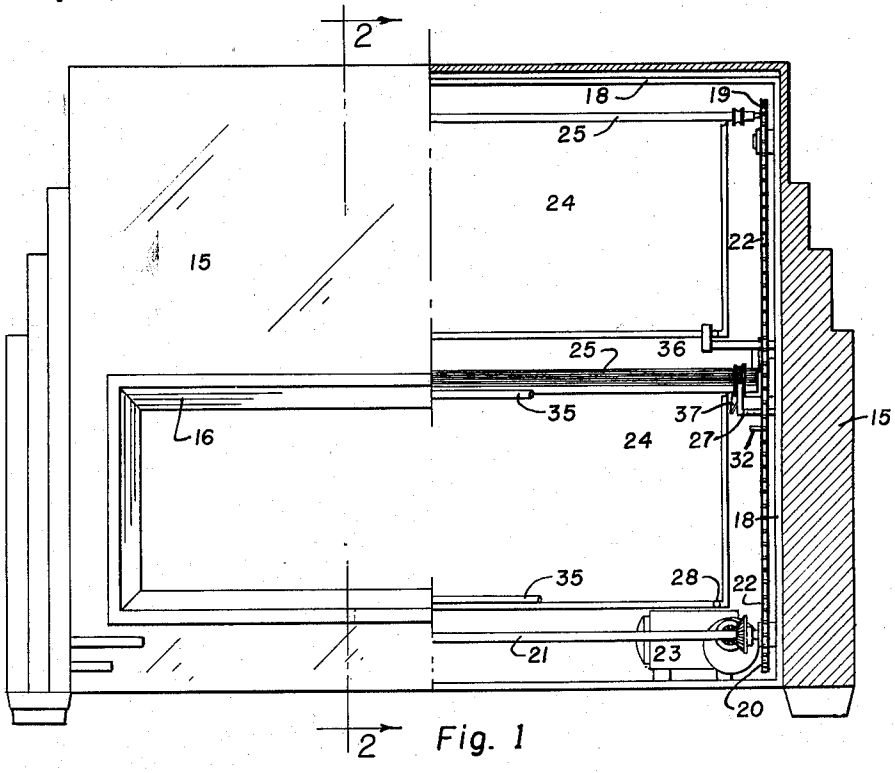


Fig. 1

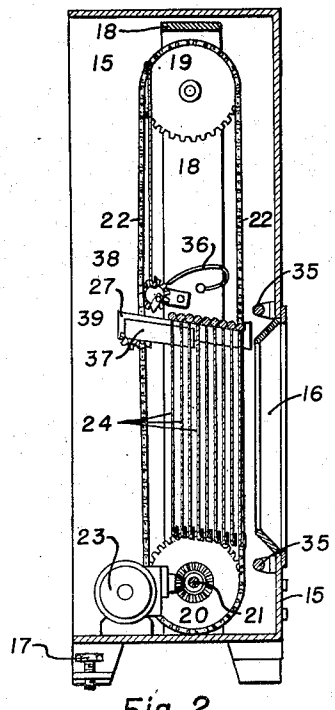


Fig. 2

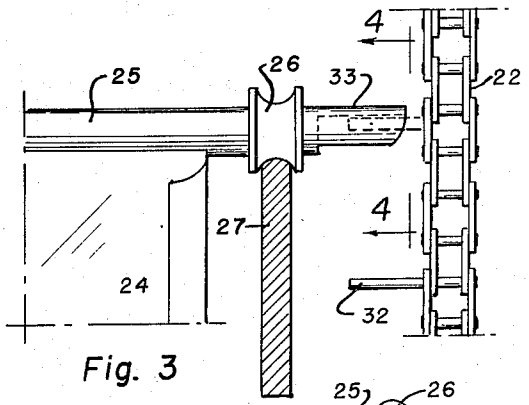


Fig. 3

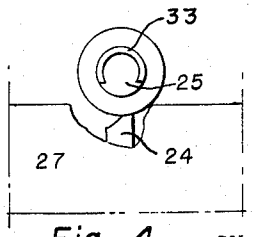


Fig. 4

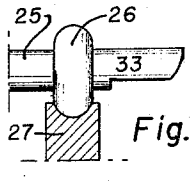


Fig. 5

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CYCLICLY INTERCHANGEABLE DISPLAY MEANS

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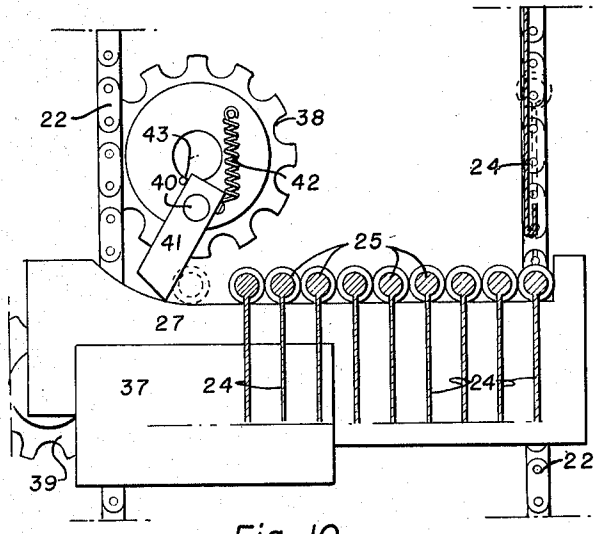


Fig. 10

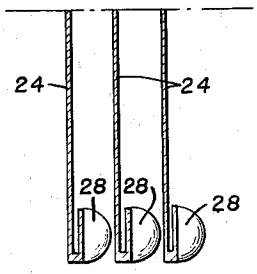


Fig. 9

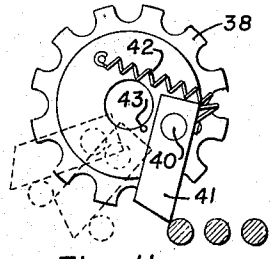


Fig. 11

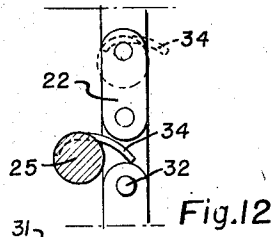


Fig. 12

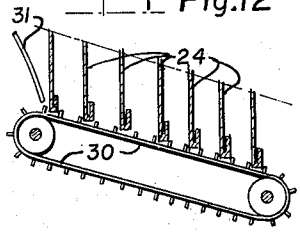


Fig. 8

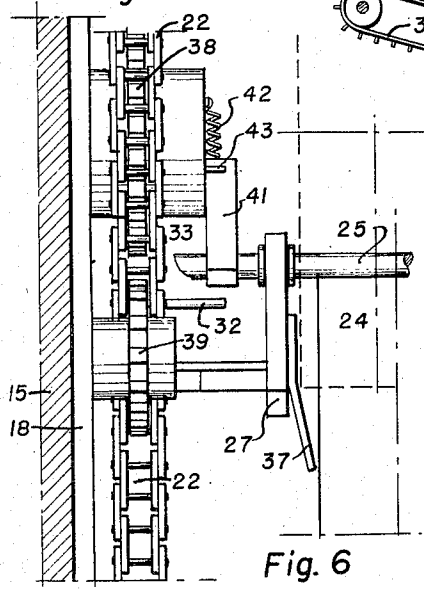


Fig. 6

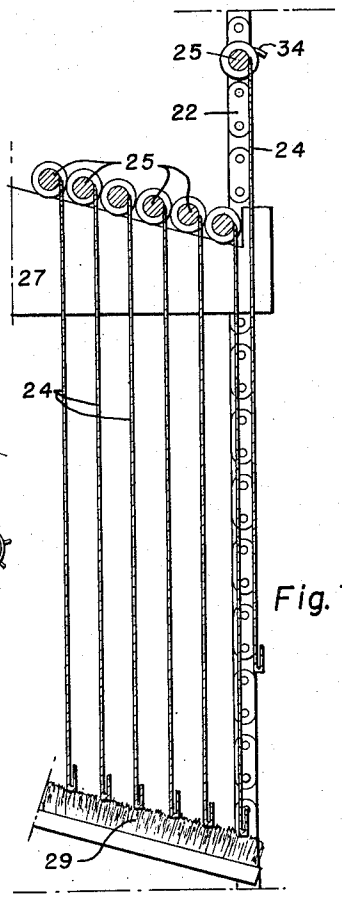


Fig. 7

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CYCLICLY INTERCHANGEABLE DISPLAY MEANS

Leo Gordon, Denver, Colo.

Application July 17, 1948, Serial No. 39,313

7 Claims. (Cl. 40—36)

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This invention relates to apparatus and devices for the display and automatic periodic interchange of panel-type signs and pictorial representations such as are commonly employed for advertising purposes, and has as an object to provide an improved such device in unitary, self-contained, readily-movable form.

A further object of the invention is to provide improved, cabinet-housed apparatus adapted to successively frame for view and automatically interchange a plurality of display panels associated therewith.

A further object of the invention is to provide an improved mounting for a bank of display panels susceptible of successive and repetitious exposure through a cabinet sight window.

A further object of the invention is to provide improved means for positioning and framing successive display panels of a bank thereof relative to and for view through a cabinet sight window.

A further object of the invention is to provide improved means for periodically advancing a bank of display panels toward a cabinet sight window in synchronism with the cyclic interchange of said panels.

A further object of the invention is to provide improved uniformly-actuated means operable to automatically and successively interchange display panel units of a cabinet-housed bank thereof through a continuing, repetitious cycle characterized by view exposure of each panel.

A further object of the invention is to provide an improved, unitary, panel-display device susceptible of construction in any desired size for either interior or exterior installation and for the accommodation of any desired reasonable number of independent panels, that is relatively simple and inexpensive of manufacture as a self-contained entity facilitating installation, that is positive and efficient in continuous, automatic, cyclic operation, and that is adaptable to the attention-inviting display of an infinite variety of messages capable of visual registration.

With the foregoing and other objects in view, my invention consists in the construction, arrangement, and combination of elements hereinafter set forth, pointed out in my claims, and illustrated by the accompanying drawings, in which—

Figure 1 is a front elevation, partially in vertical section to show otherwise concealed construction, of a typical unit embodying the principles of the invention. Figure 2 is a cross section taken substantially on the indicated line 2—2 of

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Figure 1. Figure 3 is a fragmentary, detail elevation, partly in section and on an enlarged scale, of panel supporting and shifting means employed in duplicate in the organization according to the preceding views. Figure 4 is a cross section taken substantially on the indicated line 4—4 of Figure 3. Figure 5 is a fragmentary, detail elevation, partly in section, of a panel track mounting alternative to that shown in Figure 3. Figure 6 is a fragmentary, detail elevation, partly in section and on an enlarged scale, of panel positioning and advancing means employed in duplicate in the organization according to the preceding views. Figure 7 is a vertical section transversely through a typical panel bank as associated with means for damping out panel oscillations. Figure 8 is a section through the lower end of a typical panel bank as associated with alternative oscillation-damping means. Figure 9 is a section through the lower end of a panel bank wherein the individual panels are equipped with oscillation-minimizing spacer elements. Figure 10 is a vertical section transversely through an alternatively-supported panel bank upper end in operative association with automatic panel-advancing means. Figure 11 is a somewhat diagrammatic elevation of the panel-advancing means of the preceding view in a subsequent stage of its operative cycle. Figure 12 is a fragmentary, detail section through one end of a panel support illustrating alternative means for automatically engaging the panel with and for elevation by the actuating means of the apparatus.

In the construction of the improvement as shown, a cabinet 15, of any desired particular material or construction, is provided with a sight window or view aperture 16 opening through the lower portion of its forward face in a size appropriate for framing of the panel-mounted messages to be displayed, is preferably equipped with suitable adjustable supporting devices 17 whereby the base of the cabinet may be leveled in its position of installation, and is proportioned to define a hollow, unobstructed interior having a clear height more than twice the corresponding dimension of the sight window. A suitable, rigid frame 18 approximates the interior, vertical plane outline of the cabinet interior and is fixed therein with its spacedly-parallel legs upstanding along central vertical areas of the cabinet end wall inner surfaces and its transverse base member spanning the cabinet length inwardly adjacent the cabinet top closure. Like chain sprockets 19 are mounted for free, independent

rotation in spacedly-parallel, coaxial relation on and inwardly adjacent upper ends of the frame 18 vertical legs, and similar sprockets 20 coplanar with the sprockets 19 are spaced apart on and fixed to a shaft 21 rotatably bridging between lower ends of said frame vertical legs beneath the lower margin of the sight window 16, so that endless chains 22 operatively engaged with and about each set of coplanar sprockets 19—20 correspondingly and synchronously react to rotation of the shaft 21 with like travel of their forward reaches inwardly paralleling the cabinet front wall and corresponding rotation of the idler sprockets 19. An electric motor 23, or equivalent source of power, housed within the cabinet base operatively engages, as through a speed reducer and bevel gear set, with and to rotatively drive the shaft 21 at desired speed, the direction of such shaft drive being determined to effect upward travel of the chain 22 reaches more nearly adjacent the cabinet front wall and downward travel of the chain reaches remote from said wall.

The messages to be displayed are delineated, in any suitable or desired manner, on the face surfaces of like thin, plane panels 24, of any desired material or construction, each of which is slightly greater in area than the view aperture of the sight window 16, fixedly depends from a mounting bar 25 that extends along and projects at each end beyond the panel upper margin, and may be rolled, folded or beaded along its other margins to stiffen the panel unit. Each mounting bar 25 is furnished with like rollers 26 on and freely rotatable about its projecting ends in outwardly spaced relation with the adjacent panel side margins, said rollers 26 being either peripherally grooved, as shown in Figure 3, for guided, rolling cooperation with the rounded edge of a track member 27, or rounded, as shown in Figure 5, for functionally identical cooperation with the grooved edge of the member 27. The track members 27 are duplicate straight, rigid elements of a length exceeding the spacing between reaches of the chains 22, and one of said members is fixed transversely of and to inwardly parallel each end of the cabinet 15 in inwardly-spaced, bridging relation across both reaches of the adjacent chain 22 with the upper track margin inclined slightly upwardly and rearwardly from a point upwardly and outwardly adjacent the corresponding sight window upper corner, said track members hence being parallel in a spacing corresponding with that between the rollers 26 of each mounting bar and being disposed with their upper edges in a common plane inclined downwardly from rear to front of the cabinet. At their forward ends, the track member 27 upper edges terminate in upstanding stops disposed to limit forward travel of the rollers 26 therealong and consequently position the panel 24 depending from the associated bar 25 in proper framed relation with the sight window 16, engagement of the rollers 26 with the track member edges and the non-shiftability of said rollers on their bar 25 insuring lateral registration of the associated panel 24 with the sight window.

The apparatus will accommodate that number of separate panels 24 which may be roller-engaged with and to depend between the track members 27 within the span between reaches of the chain 22, the inclination of the track member upper edges and the rotatable mounting of the rollers 26 permitting the panel weights to maintain the panels as a close, forwardly-urged bank held apart only by peripheral engagement of adjacent rollers 26 and limited as to forward travel by the track edge stops which function to register the forward panel for view through the sight window 16, in which banked interrelation undesired swinging, clattering, or oscillation of the individual panels may be inhibited by the use of non-metallic pads or buttons 28 fixed to project forwardly from lower margins or corners of the successive panels, as shown in Figure 9, by the use of a brush or row of bristles 29 fixed at an angle paralleling that of the track member 27 upper margins in the lower portion of the cabinet to expose the upwardly-directed free bristle ends to engagement with panel 24 lower margins, as shown in Figure 7, or through the provision of a studded, endless belt 30 disposed for free travel between and about mounting rollers positioned to incline the said belt upper run in conformity with the travel line of the panel 24 lower margins, a guide finger 31 serving to direct the descending, rearmost panel 24 into belt-actuating engagement between spaced studs of the belt while the forwardly-descending travel of the panel bank aids the belt movement, all as represented in Figure 8.

The continuous, uniform, upward travel of the chain 22 forward reaches deriving from power-rotation of the shaft 21 is utilized to lift the view-exposed, forward panel 24 away from its registration with the sight window 16, to elevate said panel above and rearwardly across the panel bank, and to return said panel to the bank as the rearmost element thereof, thereby successively exposing the series of panels 24 to view through the sight window 16, to which end the chains 22 are equipped with one or more pairs of lifting pins 32 axially-aligned in spaced parallelism with the shaft 21, a pin 32 of each pair being associated for travel with and to project inwardly from each of the chains 22 for upward travel along the forward chain reach past the end of the forward panel 24 mounting bar 25 between the associated chain and adjacent track member 27. Equipping the several mounting bars 25 for engagement by the lifting pins 32, a generally tubular hood 33 is fixed at one end to and projects axially from each end of each bar 25 outwardly beyond the rollers 26 thereof, said hood 33 being fixed against rotation relative to the bar 25 and associated panel 24 and terminating in closely spaced relation with the adjacent chain 22 to overhang the travel path of the uprising pin 32 carried by said chain, and the underside of each hood 33 is cut away or longitudinally slotted to freely pass the uprising pin 32 into the hood interior for lifting engagement against the inner surface of the hood crown. Thus, pins 32 at the opposite ends of the cabinet being axially aligned and moving synchronously, said pins simultaneously engage the hoods 33 at the opposite ends of the foremost panel mounting bar 25 and thereby engage said bar, with its depending panel 24, for travel with the chain 22 forward reaches and upwardly out of panel registration with the sight window 16. Should it be expedient to position the bar 25 of the foremost panel either forwardly or rearwardly out of direct alignment between the chain 22 forward reaches and hence laterally away from the path of pin 32 travel, the tubular hoods 33 terminating the bars 25 may be replaced by eccentrically-arcuate, analogous elements 34 having a web margin projected either forwardly or rearwardly of the associated bar 25 to intersect

the path of pin 32 travel, as in Figure 12, the curvature of the element 34 web being such as to bring the associated bar 25 into registration between the chains 22 when said bar has been lifted by the pins 32 past the track member 27 edge stops.

As the foremost panel 24 is moved by the pins 32 and chains 22 upwardly out of registration with the sight window 16, the remaining units of the panel bank move forward along the inclined track member 27 edges to registration of the new-uncovered panel with said sight window, the mounting bar 25 of said letter panel serving to inhibit rearward oscillations of the panel being elevated and an aperture brace strut 35, or equivalent element, which may take the form of an elongate illuminating unit longitudinally and interiorly of the cabinet above the sight window 16 serving to inhibit forward oscillations of said panel, thereby guiding the latter during its uprise and facilitating smooth interchange of the exposed panels. The panel being withdrawn is elevated as the pins 32 pass over the sprockets 19 into clearing relation with the panel bank and into lower margin engagement against C-shaped guide springs 36 fixedly spaced from the vertical legs of the frame 18 to open rearwardly and downwardly of the cabinet with their more flexible, free ends uppermost, so that said panel lower margin is caused to slide upwardly against and rearwardly over the yieldable, upwardly-directed, spring 36 free ends as the panel upper margin follows the upper arcs of the sprockets 19 to the end that the panel lower margin is positioned by said spring free ends for entrance between the track members 27 behind the panel bank as the lifting pins carrying the panel mounting bar descend along the chain 22 rearward reaches and is held by said spring free ends against any tendency to swing forwardly into possible entanglement with the panels of said bank. The mounting bar 25 being permitted some degree of axial shift on the pins 32 engaged therewith, it is expedient to properly register the panel 24 as it descends between the track members 27 to insure engagement of the rollers 26 with the track member edges, and for this purpose inwardly and downwardly inclined webs 37, of considerable length fore and aft of the cabinet, are fixed in opposition to inner faces of said track members to engage side margins of the descending panel and re-establish the latter in position for engagement of its mounting bar rollers 26 with the track member edges, the roller and track edge engagement thus established insuring proper registration of the panel in its ultimate relation with the sight window 16.

As will be obvious, downward travel of the pins 32 along the chain 22 rearward reaches and past the rearward extensions of the track members 27 seats the rollers of the panel carried thereby on the track member edges and frees the said pins from their engagement with the mounting bar hoods 33, thus releasing the panel unit to move by gravity forwardly into the panel bank, where it becomes the rearmost element, and conditioning the lifting pins to pass about the sprockets 20 and shaft 21 for repition of their operative cycle. Save for the uncertainties of gravity panel feed along an inclined track and the feed problems incident to use of a horizontal, instead of an inclined, panel-supporting track, a sometimes desirable variation typified by Figure 10, the device is operatively complete as hereinabove described, but regardless of the presence or degree of track inclination, a positive, automatic feed of the panels toward the sight window 16 contributes to the trouble-free, efficient operation of the apparatus, and such a feed is an important feature of the instant invention.

Operatively meshed with the rearward reach of each chain 22, a sprocket 38 is mounted for rotation about a fixed axis supported from the adjacent cabinet end wall or frame 18 leg to project inwardly parallel to the shaft 21 between the reaches of each said chain and above, but not overhanging, the receiving end of each track member 27, each sprocket 38 being thus mounted to rotate as an incident of chain 22 travel in the same direction as the sprockets 19 and 20. An idler sprocket 39 revoluable about a fixed axis paralleling the axis of the sprocket 38 is disposed to engage each chain 22 rearward reach in opposition to and closely-spaced relation with each sprocket 38, thereby insuring positive drive of the latter without danger of slippage due to chain slack. The hub of each sprocket 38 is extended inwardly to spacedly overhang the positions of the hoods 33 or 34 of the rearmost panel units in the panel bank, as determined by unit roller engagement with the track member edges, and a pin 40 eccentrically fixed in said hub to project inwardly of the cabinet therefrom in parallel with the sprocket axis pivotally mounts one end of a detent 41 projecting at its free end well beyond the associated sprocket periphery and disposed to sweep as said sprocket rotates through the space between the chain 22 rearward reach and the adjacent track member rearward extension. A retractile coil spring 42 connects between the inner end of the detent 41 and a point on the sprocket hub leading the pin 40 in the direction of sprocket rotation and tends to hold said detent at the limit of its extension radially of the sprocket and against a stop pin 43 which limits detent oscillation in the direction of sprocket rotation to a position wherein its free end slightly trails the axis of the pin 40, the yieldability of the spring 42 permitting detent oscillation in the opposite direction. As the chains 22 travel, their rearward reaches rotate the sprockets 38 to swing the detents 41 downwardly and forwardly through the space between each chain and the adjacent track member 27 rearward extension and hence against the hoods 33 and 34 of the rearward units in the panel bank which necessarily project across the detent orbit. As the sprockets 38 rotate, their detent 41 projections urge the hoods engaged thereby, and the associated panel units, forwardly along the track members 27, thus consolidating the bank, regardless of gravity feed, and insuring proper view presentation of the foremost panel. With the bank properly consolidated, resistance to further forward travel of the panel units is accommodated by the yieldability of the spring 42 which extends when the detent 41 encounters resistance to permit said detent to ratchet over the non-movable elements in its path. Where, as in Figure 10, upper edges of the track members 27 supporting the panel bank are substantially horizontal, the rearward, receiving extensions of said track edges should preferably be forwardly and downwardly curved or inclined from an elevated point to feed the descending panel units into the path of the advancing means comprised by the sprockets 38 and their related elements.

Since many changes, variations, and modifications in the specific form, construction, and arrangement of the elements shown and described may be had without departing from the spirit

of my invention, I wish to be understood as being limited solely by the scope of the appended claims, rather than by any details of the illustrative showing and foregoing description.

I claim as my invention:

1. Cyclicly interchangeable display means of the character described, comprising a housing formed with a sight window in its lower face portion, spaced, parallel tracks fixedly interiorly and transversely of said housing to terminate at their forward ends outwardly and upwardly adjacent upper corners of said sight window, visually-distinguished, structurally-identical display panels, each equipped with spacedly-parallel rollers outwardly adjacent its upper corners and perpendicular to its plane, roller supported on said tracks in juxtaposed succession to form a bank whereof the foremost panel is registered for view through said window, like, endless chains sprocket-mounted for travel in vertical planes perpendicular to the sight window between each track and the adjacent housing end wall with their forward reaches aligned with the ends of the foremost panel of the bank, power means and connections for simultaneously, synchronously, and continuously driving said chains for uprising travel of their forward reaches, operatively-aligned, opposed means on said chains simultaneously engageable with upper corner extensions of and to elevate the foremost panel of the bank as an incident of chain travel and to subsequently release said panel to track support as the rearmost element of the bank, means for guiding the chain-engaged panel during its travel, means for minimizing oscillation of the individual panels in the bank, and means reactive to chain travel effective to positively advance the panel bank toward the sight window.

2. The organization according to claim 1, wherein each of the display panels consists of a thin, plane, relatively stiff sheet of an area slightly greater than that of the sight window bearing matter to be displayed on its forwardly-directed face, a supporting bar fixedly coincident with and projecting at each end beyond the panel sheet upper margin, track-engageable rollers journaled on the end projections of said bar adjacent the panel sheet side margins, hood extensions coaxially and fixedly terminating the bar end projections beyond said rollers, and longitudinal slots intersecting the walls of said hood extensions directed toward the panel sheet lower margin.

3. The organization according to claim 1, wherein the means for guiding the chain-engaged panel during its travel includes housing-fixed stops for limiting forward oscillations of the panel during its uprise away from the sight window, housing-mounted, rearwardly and downwardly opening C-springs yieldable to slidably pass the moving panel lower margin as the panel upper margin is carried over the uppermost arc of the chain travel and to inhibit forward oscillations of the panel lower margin during descending panel travel, and inwardly and downwardly inclined webs fixed in opposition to the track rear end inner faces for engagement with the panel lower corners and consequent determination of the panel lateral disposition for registration of the panel rollers with the supporting tracks.

4. The organization according to claim 1, wherein the means for minimizing oscillation of the individual panels in the bank consists of a brush-like member fixed in the housing lower portion with its bristles directed upwardly below and in a length to span the depth of the panel bank, the plane of the member bristle free ends paralleling and being spaced slightly above the plane determined by the lower margins of the panels constituting the bank.

5. The organization according to claim 1, wherein the means for minimizing oscillation of the individual panels in the bank consists of an endless, flexible member roller-mounted in the housing lower portion for free travel of its upper run closely adjacent the lower margins of the panels constituting the bank across the full depth of said bank, and studs spacedly outstanding from said member for engagement between lower margins of adjacent such panels.

6. The organization according to claim 1, wherein the means reactive to chain travel effective to positively advance the panel bank toward the sight window consists of extensions fixedly projecting from the upper corners of each panel laterally beyond the panel rollers, sprockets housing-mounted for rotation in meshed engagement with the chain rearward reaches inwardly of the latter and upwardly and outwardly adjacent the track rear ends, a detent eccentrically pivoted on the inner face of and to rotate with each said sprocket, said detent being disposed to sweep past and parallel to the outer face of the adjacent track rear end and hence bear against and forwardly move the upper corner extensions of panels carried by said track portion, a stop on the sprocket for limiting radial projection of the detent, and a spring yieldably urging said detent against said stop, whereby the operating end of said detent may retract against the pressure of said spring toward the sprocket axis and ratchet past the extensions of the panels in a consolidated bank.

7. The organization according to claim 1, wherein the means for minimizing oscillation of the individual panels in the bank consists of a member fixed in the housing lower portion in a length to span the depth of the panel bank and pressure-yieldable elements upstanding from said member across and to terminate slightly above the plane determined by the lower margins of the panels constituting the bank.

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