July 28, 1931. F. L. BEDDISON 1,816,716

AUTOMATICALLY CHANGING SIGN OR ADVERTISING DEVICE

Filed June 9, 1930 2 Sheets-Sheet 1

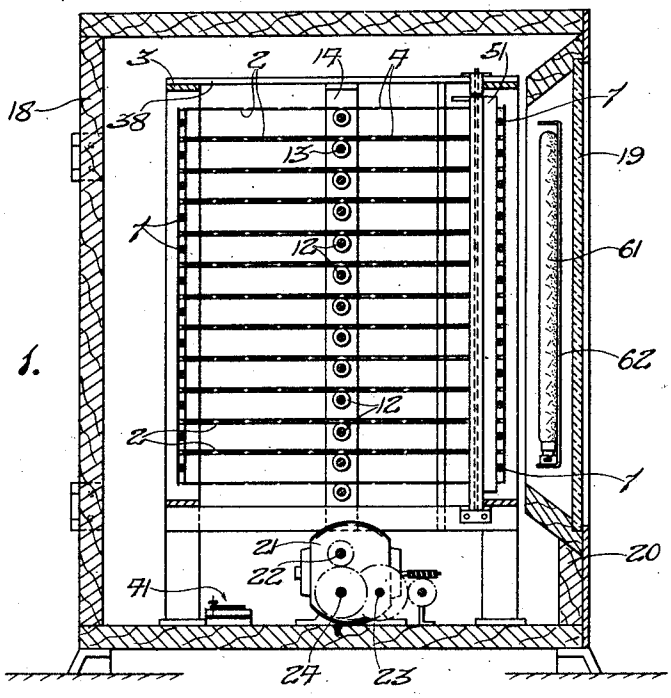


Fig. 1.

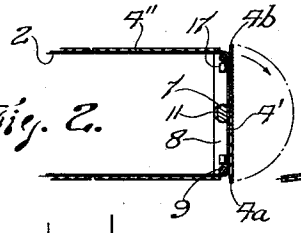


Fig. 2.

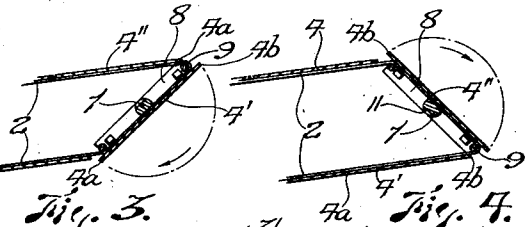


Fig. 3. Fig. 4.

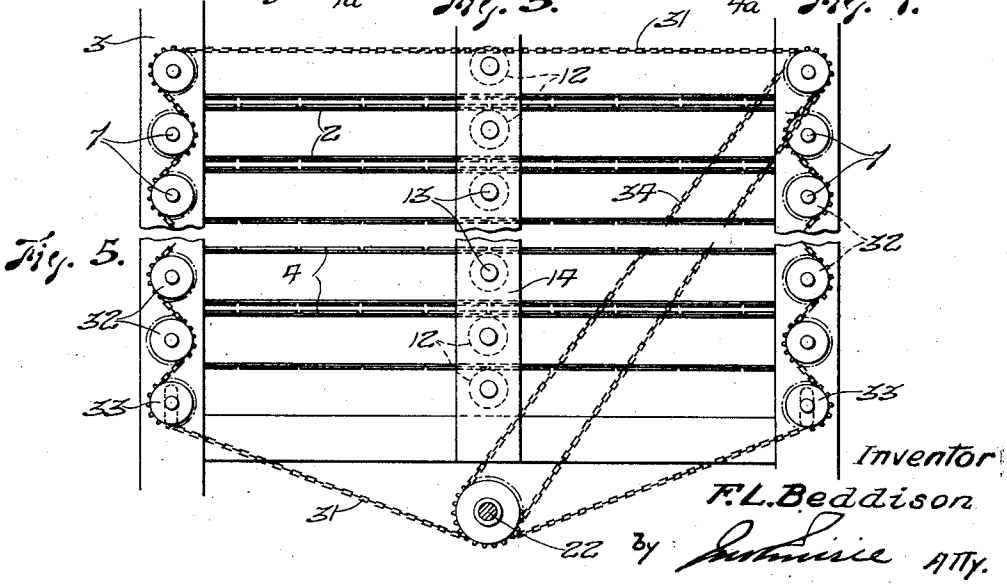


Fig. 5.

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July 28, 1931. F. L. BEDDISON 1,816,716

AUTOMATICALLY CHANGING SIGN OR ADVERTISING DEVICE

Filed June 9, 1930 2 Sheets-Sheet 2

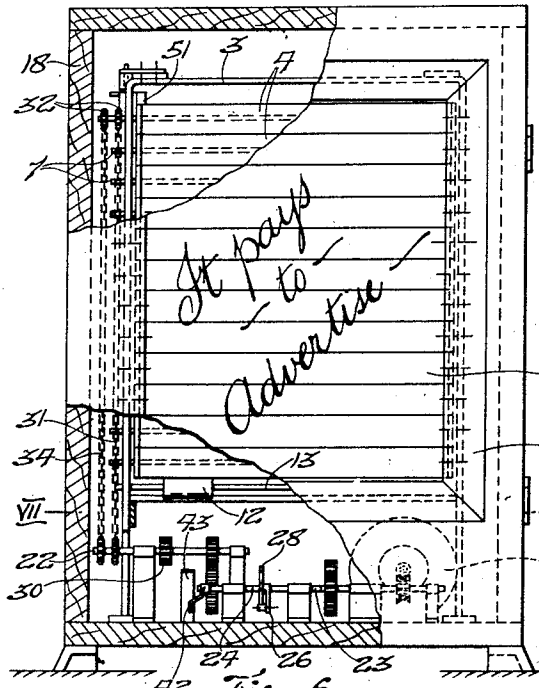


Fig. 6.

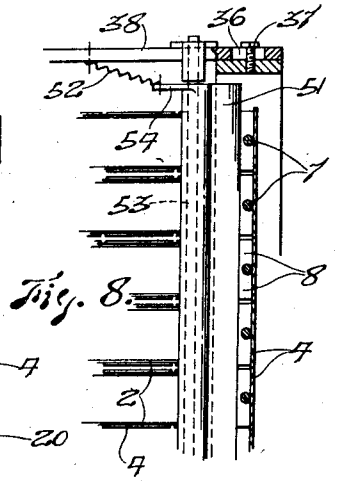


Fig. 8.

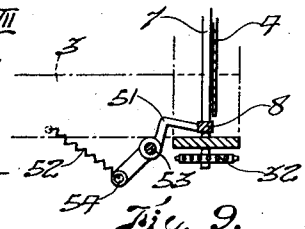


Fig. 9.

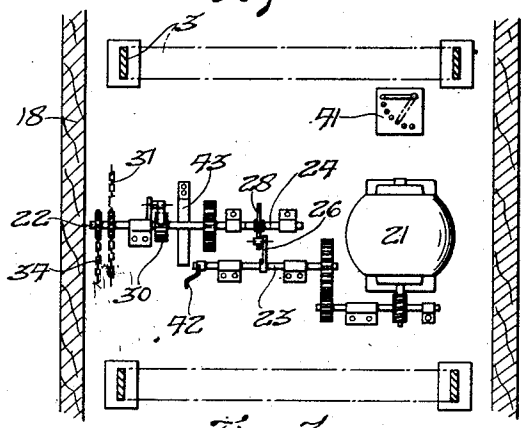


Fig. 7.

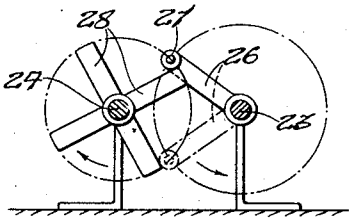


Fig. 10.

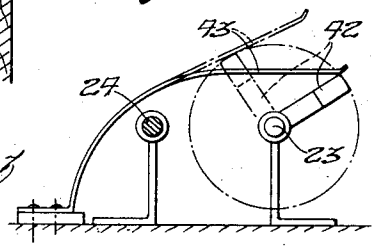


Fig. 11.

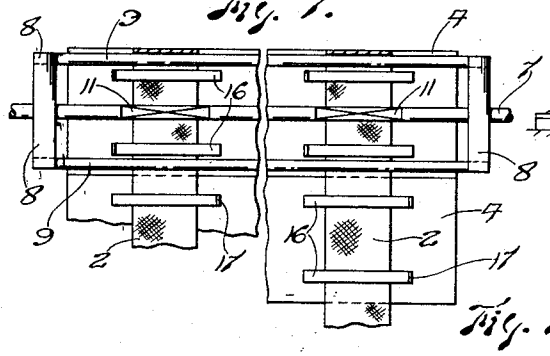


Fig. 12.

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Patented July 28, 1931 1,816,716

UNITED STATES PATENT OFFICE

FRANCIS LOVELL BEDDISON, OF EAST ST. KILDA, VICTORIA, AUSTRALIA

AUTOMATICALLY CHANGING SIGN OR ADVERTISING DEVICE

Application filed June 9, 1930, Serial No. 460,028, and in Australia October 28, 1929.

This invention relates to automatically changing signs or advertising devices, and has especial reference to devices wherein a number of carrier elements, such as endless bands or chains, each carrying strips or sections of different signs, advertisements or the like are operated so that appropriate strips or sections on each carrier element are simultaneously brought into registry at desired intervals to form a complete sign which remains stationary in a display position for a suitable period before the next sign is built up by movement of the carrier elements.

In order to ensure the effective display of such signs, pictures and the like it is highly desirable, if not essential, that the sign strips or sections should be in the form of rigid slats or like members, and that such slats be arranged on their carriers and operated in such manner that the slats of each series forming a complete sign or picture will, when in the display position, be perfectly flush with each other with the transverse edges of one slat contacting with the respective edges of neighbouring slats. To attain the best presentation of the signs it is also beneficial that the changes from one sign to another should be effected rapidly and without disclosing any of the internal parts of the apparatus.

The general object of the present invention is to provide an advertising or like device which is simple and reliable and will effectively present signs, advertising matter and the like in accordance with the above-mentioned desirable conditions.

One of the specific objects of the invention is to provide in a device of the nature indicated, means which will ensure rigid or semi-rigid slat like sign or display sections to move into and out of their display positions with ample clearance and yet ensure that there will be no gaps between the slats when they are in the display position.

Another object of the invention is to provide in a device of the general nature indicated a simple and effective aligning means which will ensure that the coacting slats when brought into display positions will be positively aligned and made flush with each other so that the pictures, signs or the like will not be marred by any gaps between the slats or by any slat being inclined to the others.

The aligning means are automatic in action and may be adapted to give an audible signal just as each change is made so as to attract attention to each completed sign that is displayed.

In accordance with this invention the plates or slats are not swung bodily in an arcuate path about a fixed centre as they approach and leave the display position but, on the contrary, are caused to move about a point or centre which is continually changing. Each slat just before moving into a display position is disposed at substantially right angles to the next slat of its series already in the display position, and the first mentioned slat is swung or moved into the display position in such a manner that what may be termed its leading edge has a semicircular motion while its trailing edge moves first inwardly or downwardly and then outwardly or upwardly so that the slat is eventually brought into display position with its trailing edge in the position occupied by the leading edge just before the change. The movement out of display position is substantially the reverse, that is to say that the trailing edge moves through an arc of 180° and the leading edge moves first inwards or upwards and then outwards or downwards.

The above and other objects and features of the invention and the advantages arising therefrom will, however, be more readily appreciated from the following description which relates to one practical embodiment of the invention. It should be understood, however, that various modifications, refinements, and/or additions may be incorporated in the construction and arrangement of parts hereinafter disclosed without departing from the spirit and scope of the invention as defined by the appended claims.

Referring to the drawings which form part of this specification—

Figure 1 is a semi-diagrammatic side sectional elevation of apparatus in accordance

with this invention indicating the general layout of the parts.

Figure 2 is an enlarged cross section of portion of one of the carrier elements seen in Figure 1 and showing one of the slats in its display position.

Figures 3 and 4 show intermediate positions assumed by the carrier element and the slats while the sign is changing.

Figure 5 is a fragmentary side view on an enlarged scale of the skeleton supporting frame, showing one suitable arrangement for driving the various carrier elements in synchronism.

Figure 6 is a front view of the apparatus parts being broken away and omitted for convenience of illustration.

Figure 7 is a part sectional plan taken on the line VII—VII of Figure 6.

Figure 8 is an enlarged fragmentary side view of the aligning mechanism seen in Figure 1.

Figure 9 is a sectional plan of the parts seen in Figure 8.

Figure 10 is an enlarged cross section of portion of the intermittent driving mechanism seen in Figures 6 and 7.

Figure 11 is a cross section on an enlarged scale of a periodic electric switch device seen in Figures 6 and 7.

Figure 12 is a fragmentary plan view on an enlarged scale of the back of a pair of adjacent slats, showing one method of attaching same to the carrier elements.

According to the practical embodiment illustrated a series of carrier elements, each comprising a pair of endless bands 2 are arranged in superposed or contiguous formation within a skeleton framework 3, and each carrier has attached thereto a series of plates, slats or like rigid members 4 which bear on their outer faces different sections of different signs, pictures, or other display matter. The slats are preferably of thin sheet metal.

Each carrier element may comprise one or more, but preferably two endless flexible bands 2, belts or chains to which a series of the slats 4 is attached so that the slats extend transversely of the bands, with the laterally extending edges of each slat touching or close to those of the next slats of the series.

For each carrier element there is provided front and rear operating members comprising spindles 7 disposed parallel to each other at the front and rear of the frame 3 and rotatably supported to extend from side to side of the frame. Each of the spindles 7 may be provided adjacent each of its ends with diametrically opposite radial arms 8, and extending between the tips of the arms adjacent one end and tips of the arms adjacent the other end are two lateral rods 9 which move in a circular path with the spindles. The end portions or return bends of the bands pass around the rods 9 and also the spindles 7, and either or both spindles may be connected with suitable driving means hereinafter referred to, whereby the various carriers are synchronously and intermittently operated.

The rods 9 of each pair are spaced apart for a distance substantially equal to the depth of the slats i. e., the distance in a straight line extending at right angles between the opposite lateral edges of a slat. One of these lateral edges of each slat may be conveniently designated the leading edge 4*a*, and the other the trailing edge 4*b*, according to the direction of travel of the carrier and its slats.

In a display position one slat 4 at the front of each series will extend in the same plane as the radial arms 8 of the respective spindles and in front of the lateral rods 9 extending between the arms. The rods 9 will contact with the inner faces of the flexible bands 6 at points adjacent the lateral edges of the slat, or between such edges and the adjacent edges of the two slats at each side thereof as seen more clearly in Figures 2 to 4. In such position it will be evident that the front or exposed slats of each series will form the desired picture, sign or advertisement, and that the other slats of each series with the exception of the rear slats will lie in a plane at substantially right angles to the front and rear slats.

In order to enable the carrier bands 6, together with their slats to lie flat against the two rods 9 when in the display position and prevent rocking about the centre spindle 7, intermediate portions of the latter may be reduced or flattened as at 11 to accommodate adjacent portions of the bands.

Each change in the sign is effected by a half revolution of the various spindles 7 and the action thereof is best understood from Figures 2, 3 and 4 wherein the trailing edge 4*b* of the slat 4′ in the display position (see Figure 2) is caused by one of the two lateral rods 9 to move through an arc of 180° about the spindle 7, the radius of the arc conforming to the length of the radial arm 8 which is approximately half the depth of the slat. The other lateral rod turns inwardly away from the leading edge 4*a* of the slat which is thus free to swing or move first inwardly (as in Figure 3) while the trailing edge is moving through the first portion of its arc, and then outwardly until the slat assumes a substantially horizontal or right angled position with its trailing edge in the position previously occupied by its leading edge. Simultaneously with the foregoing action the next slat 4″ is brought into the display position due to said lateral rod 9 causing the leading edge 4*a* of the slat 4″ to follow

the trailing edge 4*b* of the previous slat through the arc of 180° while the trailing edge 4*b* of the second 4″ is free to move first inwards and then outwards until the slat arrives in the proper display position whereupon rotation of the spindle is automatically arrested for a suitable period. When the slats are in display positions the carrier bands are taut or comparatively taut but during the changes of the sign the bands automatically sag or develop slackness sufficient to allow the aforesaid inward and outward movements of the leading edge of the slats moving out of the display position, and the trailing edge of the slats moving into the display position.

By the foregoing it is ensured that the slats turn in their own depth or breadth and thus the slats of one series cannot foul those of another. At the same time no gap is left between the front slats of each series whereby it is assured that the completely built up picture, sign or advertisement will be devoid of apparent cracks, divisions or the like. Another advantage arising from the foregoing is that the slats, during their movements into and out of the display position, effectively conceal the internal mechanism so that the changes of sign take place without allowing observers to view the internal parts nor to understand the operation of the apparatus.

The series of carriers 6, spindles 7, rods 9, and associated parts may extend horizontally or vertically within a suitable casing 18 having a window 19 carried by a door 20 through which the completed signs or the like may be viewed.

In order to minimize sagging of the carrier bands 2 during changing of the sign, a supporting roller 12 may be arranged to extend transversely between the upper and lower stretches of each band intermediately of the length thereof. These supporting rollers may be carried by spindles 13 rotatably mounted at their ends on vertical posts 14. The lowermost roller 12 is situated beneath the lower stretch of the bottom carrier band.

The slats 4 may be attached to the bands 2 by providing each slat with two or more straps 16 (see Figure 12) which pass over the respective band and may be secured to the back of the slat at each side of the band by soldering, welding or the like. One end of each of these straps 16 may be bent sidewardly to thereby form outstanding lips or projections 17 which are adapted to engage the rods 9 and thus provide a grip between the latter and the carrier band. The lips or projections 17 on adjacent slats are preferably formed on opposite ends of the straps 16 thus avoiding any possibility of fouling whilst moving around the rods 9 and spindle 7 during changing of the sign.

The power for actuating the device may be derived from any suitable source, such for instance as an electric motor 21 disposed in the casing 18 and adapted for connection to mains. The driving gear incorporates any suitable means for converting continuous motion of the driving motor or the like into intermittent motion of the spindles 7.

According to one suitable embodiment, the drive from the motor 21 is transmitted to a main driving shaft 22 through a series of intermediate shafts and suitable reduction gearing indicated in Figures 1, 6 and 7. One of these intermediate shafts 23 is rotated continuously and adapted to impart intermittent rotation to an adjacent shaft 24. For this purpose the shaft 23 may be provided with an outstanding radial arm 26 (Figure 10) carrying a roller 27 at its outer end which is adapted during each complete revolution of shaft 23 to engage an arm 28 of a series of radial arms which are fixed to the shaft 24. By this arrangement intermittent rotation of the shaft 24 and consequently the main driving shaft 22 is effected rotation being in the direction of the arrows seen in Figure 10. A pawl and ratchet device 30 (Figure 7) may be associated with shaft 22 to prevent free rotation thereof.

The drive to the spindle 7 from the intermittent rotary shaft 22 may involve toothed gearing or it may be of the chain or any other suitable type.

According to one embodiment seen in Figure 5, an endless chain 31 and sprocket wheels 32 are utilized to synchronously transmit the intermittent drive from shaft 22 to the carrier elements 2. The sprocket wheels 32 may be mounted on extensions of the spindles 7 and the chain 31 is preferably arranged to pass around adjacent sprocket wheels at opposite sides thereof or in a zigzag direction as shown. Jockey pulleys 33 may be provided to maintain the desired tension in the driving chain. If desired a second driving chain 34 may extend between the shaft 22 and one of the top sprocket wheels 32 in order to compensate any "lag" or slackness in the chain 31 and ensure that the carriers and slats will be operated in perfect synchronism.

An elongated slot 36 having a clamping bolt 37 associated therewith may be provided in each of the longitudinal bars 38 of the framework 3 in order to adjust any slackness in the various carrier elements.

If desired the spindles 7 may be rotated in the same direction but preferably they are adapted to rotate in opposite directions as previously described with reference to Figure 5. By this latter arrangement the contiguous upper and lower stretches of adjacent carrier elements will travel in the same direction as each other so that when adjacent slats come into contact as in passing

over the aforesaid intermediate supporting rollers 12 there will be no rubbing, scraping or like frictional contact between the outer faces of the slats. It follows that the sign or display matter on such outer faces, which may be printed, written, embossed or stamped, or consist of paper or fabric sheets or strips or photographs, will not be subject to rubbing and will thus retain their surface or finish indefinitely.

A variable resistance 41 may be interposed between the electric supply mains and the motor 21 for the purpose of varying the speed of the said motor and thus regulating the interval between each change of advertisement.

Provision may also be made for automatically varying the supply of electrical energy to the motor so that it may operate comparatively slowly during the showing of an advertisement and be automatically speeded up to effect quick changes of the advertisements. For this purpose the shaft 23 (see Figure 11) may be provided with a radial arm or striker 42 adapted to travel just in advance of the aforesaid arm 26 and to periodically contact with a spring plate 43. The plate 43 is electrically connected with the input end of the resistance 41 whilst the striker 42 is also electrically connected with the motor by any suitable means. By this arrangement the resistance 41 normally reduces the supply of energy to the motor to a minimum until the co-aligned members 42—43 are brought into contact, whereupon the resistance is automatically cut out and the motor receives the full supply of energy available in the mains.

When the slats 4 arrive in a display position they will be supported substantially flush with each other by the front operating members. It is possible, however, that they may be not perfectly flush with each other, and to correct any such error an aligning device may be provided to come into action automatically as the slats come into display positions to thereby positively align the plates and ensure that they are all perfectly flush with each other.

The aligning device may comprise a straight bar, rod or other rigid member 51 mounted in the framework 3 as in Figures 1, 8 and 9, so as to extend adjacent one side of the sign and contact with all of the radial arms 8 associated with the front slats of the series when in a display position.

The aligning bar 51 may be yieldingly held in its operative position by a spring 52 but is automatically swung out of such position during every changing of the sign and swung into position at the completion of every change. The means for actuating the aligning bar may obviously vary but according to one arrangement it is mounted to turn with a spindle 53 supported on the framework. The spindle or the bar may have an outstanding arm 54 between which and a suitable stationary part extends the spring 52. If desired this arm may also have a rod or projection provided with a roller which contacts with a cam member upon a shaft which receives intermittent motion by medium of the aforesaid driving means, the construction and arrangement being such that during the changing of the sign the aligning bar 51 is forced by the action of the cam and against the influence of the spring away from the aforesaid radial arm 8 but at the end of each change is forced back by the spring into contact with the slats to effect the aligning action.

The cam member and associated roller are however preferably omitted and movement of the aligning bar effected by the rotary movement of the various arms 8, the spring 52 tending to maintain the bar in constant engagement with said arms and to thus ensure that they and the slats are in perfect alignment when in a display position.

The aligning means may be silent in operation or it may be allowed to give rise to an audible signal indicating that a change has been effected. If desired a gong, bell or the like may be arranged to be struck automatically each time the aligning bar 51 moves into an operative position. The aligning bar may act upon the front of the real surfaces of the aforesaid arms 8.

In Figure 6 horizontal lines are shown in order to indicate the transverse edges of the various slats but no such lines will in practice be apparent to a person viewing a complete sign owing to the perfect joints between the slats.

Provision may be made for illuminating the device either externally or internally. For example a series of electric lamps 61 and reflectors 62 may be suitably mounted on the door 20 so that the light is directed onto the sign. The casing 18 may be of any suitable form and the various parts may be disposed and mounted therein in any suitable position and in any suitable manner.

Having now described my invention what I claim as new and desire to secure by Letters Patent is—

1. An automatically changing sign or advertising device comprising a series of endless carriers arranged in superposed or side by side formation, rotary operating members extending transversely between the opposite stretches of each carrier at the front of the device, a series of rigid or semi-rigid slats attached to and extending transversely of each carrier and bearing sections of different signs or advertisements, and means for intermittently and simultaneously reversing said rotary operating members whereby the slats of each series will be successively moved into and out of display positions to

form complete signs or advertisements the slats being maintained substantially flush and with their transverse edges in contact with each other in their display positions by said operating members.

2. An automatically changing sign or advertising device as claimed in claim 1 characterized in that said operating members are so constructed and arranged that in moving each slat into and out of the display position, one transverse edge of the slat has a semi-circular motion and the other transverse edge moves first inwardly and then outwardly in relation to the remote or opposite stretch of the carrier.

3. An automatically changing sign or advertising device comprising a series of carriers such as endless bands or chains arranged in superposed or side by side formation, a series of rigid slats attached to and extending transversely of each carrier and bearing sections of different signs or advertisements on their outer faces, the depth of each slat being substantially the same as the distance between the opposed stretches of its carrier, operating members for said carriers and slats at the front and rear of the device, and means for reversing the operating members, whereby the slats of each series are successively moved into display positions to form different signs.

4. An automatically changing sign or advertising device as claimed in claim 3 characterized in that said operating members are so constructed and arranged that in moving each slat into and out of the display position, one transverse edge of the slat has a semi-circular motion and the other transverse edge moves first inwardly and then outwardly in relation to the remote or opposite stretch of the carrier.

5. An automatically changing sign or advertising device, comprising a series of endless carriers arranged in superposed or side by side formation, rotary operating members extending transversely between opposite stretches of each carrier at the front of the device, a series of rigid slats attached to and extending transversely of each carrier and bearing sections of different signs or advertisements, each of said operating members comprising a transversely elongated rectangular structure, the transverse edges of which coincide with the transverse edges of a slat in the display position, the rectangular structure being adapted to be turned about a transverse axis aligned with the centre of its side edges, and means for intermittently and simultaneously turning said operating members whereby the slats of each series will be successively moved into and out of display positions.

6. An automatically changing sign or advertising device as claimed in claim 5, characterized in that each rectangular operating member has or encloses an area substantially the same as the surface area of a slat.

7. An automatically changing sign or advertising device comprising a series of endless carriers arranged in superposed or side by side formation, rotary operating members extending between the opposite stretches of each carrier at the front of the device, a series of rigid slats attached to and extending transversely of each carrier and bearing sections of different signs or advertisements, each of said operating members comprising a pair of interconnected parallel rods extending immediately behind the transverse edge portions of a slat in a display position, said pair of rods being mounted to turn about an axis extending parallel to the rods and disposed centrally thereof when viewed from the side, and means for intermittently and simultaneously turning said operating members whereby the slats of each series will be successively moved into and out of display positions.

8. An automatically changing sign or advertisement as claimed in claim 7; characterized by arms spanning the ends of the rods of each operating member so as to interconnect the rods, and a spindle extending parallel to said rods, said arms being mounted centrally of their length on said spindle.

9. An automatically changing sign or advertising device comprising a series of endless flexible bands arranged in superposed or side by side formation, a series of slats bearing sections of different signs or advertisements for each carrier, each slat being attached to a band by a pair of retainers secured to the inner or non-display surface of the slat adjacent the opposite transverse edges thereof, said retainers having projections, rotary operating members extending between the opposite stretches of each carrier at the front of the device, each operating member comprising a pair of interconnected parallel rods extending behind the transverse edge portions of a slat in the display position and contacting with said slat retainer projections, said pair of rods being adapted to turn about an axis parallel to the rods and disposed centrally thereof when viewed from the side, and means for intermittently and simultaneously actuating said rotary members whereby the slats of each series will be successively moved into and out of display positions.

10. In an automatically changing sign or advertising device having a series of endless carriers, series of display slats on said carriers, and means for intermittently and simultaneously bringing successive slats of each series into display positions wherein they are appropriately aligned to form a plane surface, the provision of slat align-

ing means adapted to come into operation automatically at each change of sign in order to positively align the slats in the display position and maintain them perfectly flush with each other during the display period.

11. In an automatically changing sign or advertising device set forth in claim 10 characterized in that said slat aligning means comprises a straight edged member movably mounted adjacent said slats when in the display position, and spring means adapted to automatically force said member against the slats, or members connected therewith, at the completion of each change of sign.

12. An automatically changing sign or advertising device set forth in claim 1 in combination with means automatically operated by said slat aligning means to give rise to an audible signal at each change of sign.

13. An automatically changing sign or advertising device of the character specified, including endless slat carriers, means for intermittently and simultaneously actuating the endless slat carriers, said means comprising a shaft, means for continuously rotating said shaft and automatic control means whereby said shaft is driven at relatively high speed during each change of sign and at relatively low speed while each sign is being displayed.

14. An automatically changing sign or advertising device as claimed in claim 13 wherein said continuously rotated shaft is driven by an electric motor, said motor being connected in circuit with a resistance having associated means whereby it is automatically shunted or cut out of the circuit during such periods as the drive is being transmitted to the slat carriers.

In testimony whereof I affix my signature.

F. L. BEDDISON.