United States Patent [19]

Abbema

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[54] **MULTI-FACED DISPLAY SIGN**

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[52] **U.S. Cl.** **40/32,** 40/77.7

[51] **Int. Cl.** **G09f 11/02**

[58] **Field of Search** 40/32, 77, 77.4, 77.7, 40/77.8, 77.9

[56] **References Cited**

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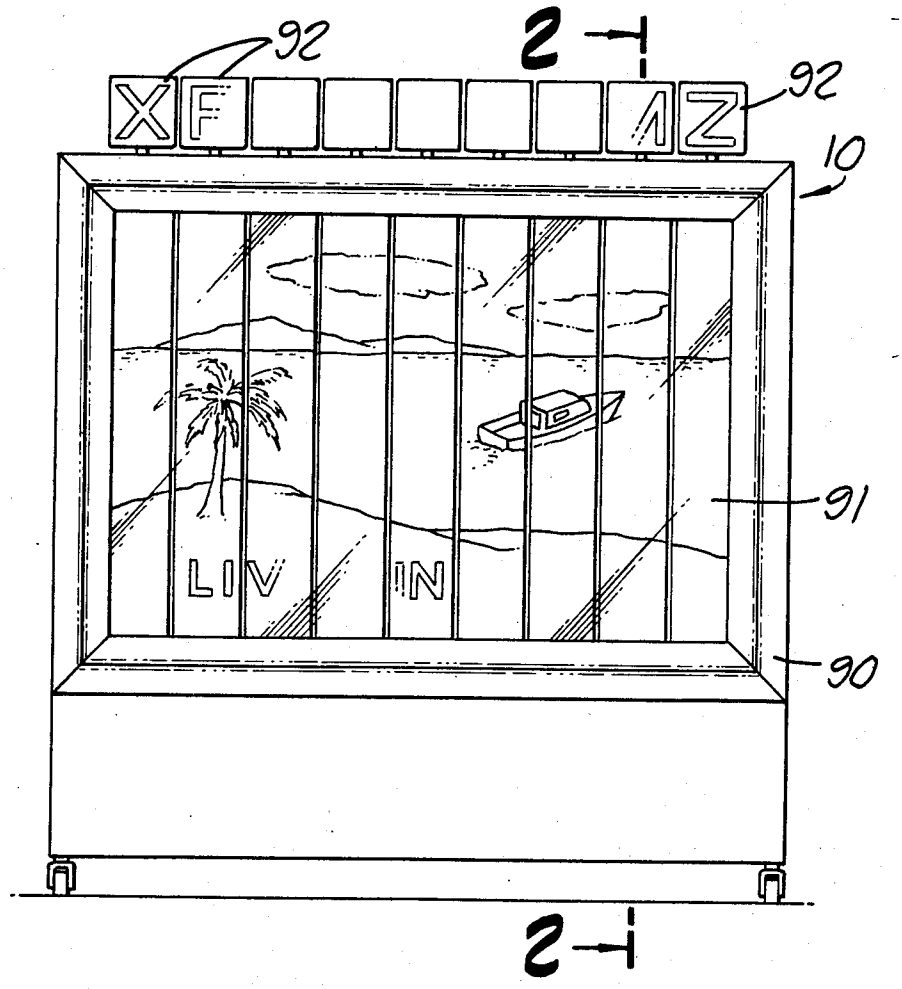
Primary Examiner—Robert W. Michell
Assistant Examiner—J. H. Wolff
Attorney, Agent, or Firm—Lyon & Lyon

[57] **ABSTRACT**

A display sign which has a plurality of endless strings of planar elements. An element of one string cooperates with corresponding elements of the strings to form an advertising or other display panel when such elements are placed side by side in a common frontal plane. The strings of elements are supported by vertically disposed shafts which are synchronously rotated to bring the elements into proper alignment.

8 Claims, 9 Drawing Figures



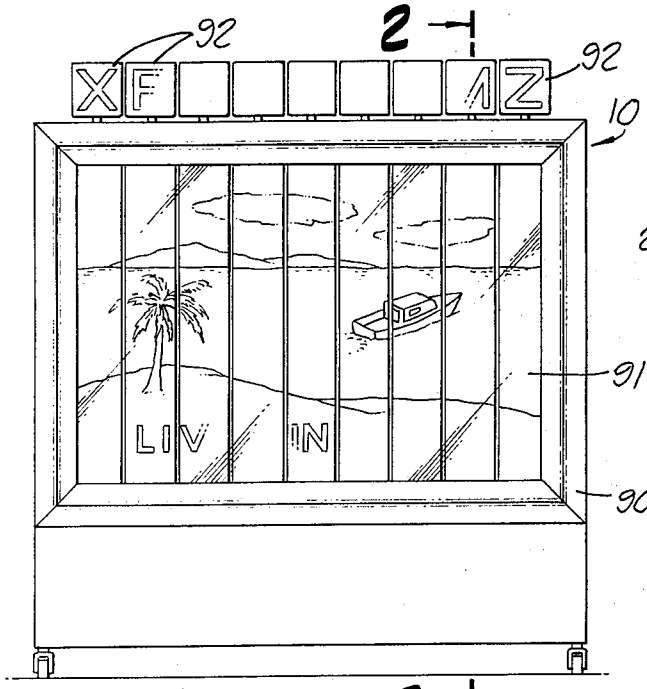


FIG. 1.

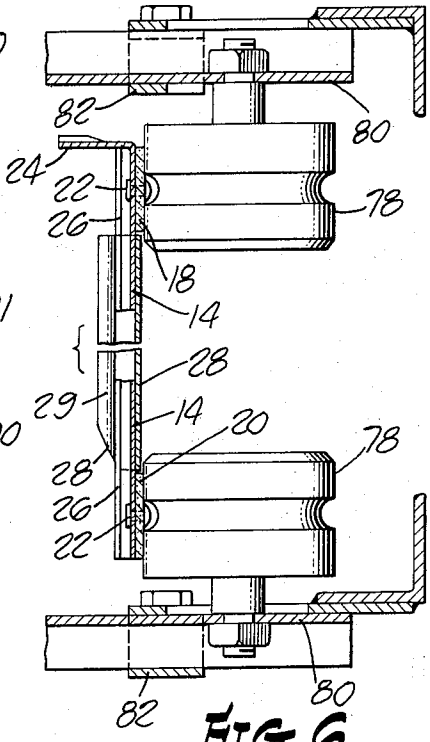


FIG. 6.

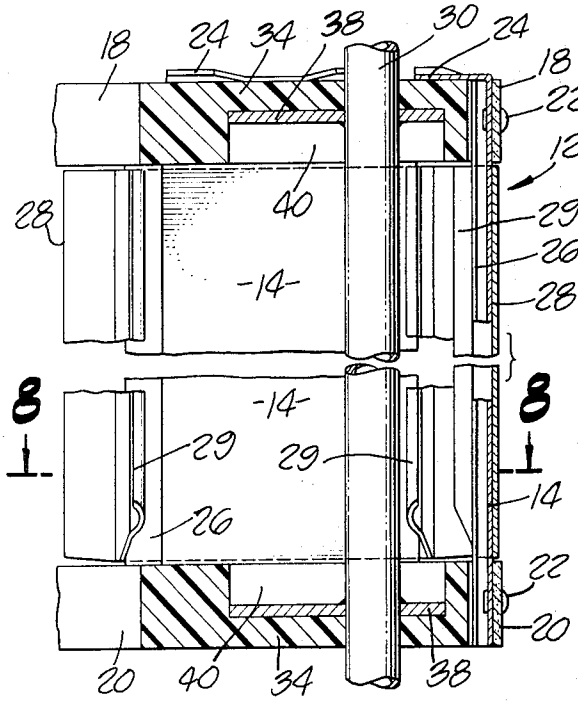


FIG. 7.

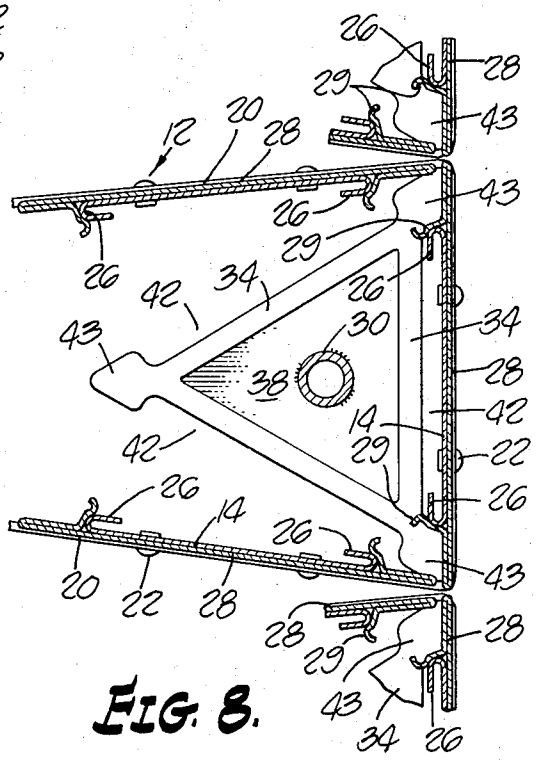
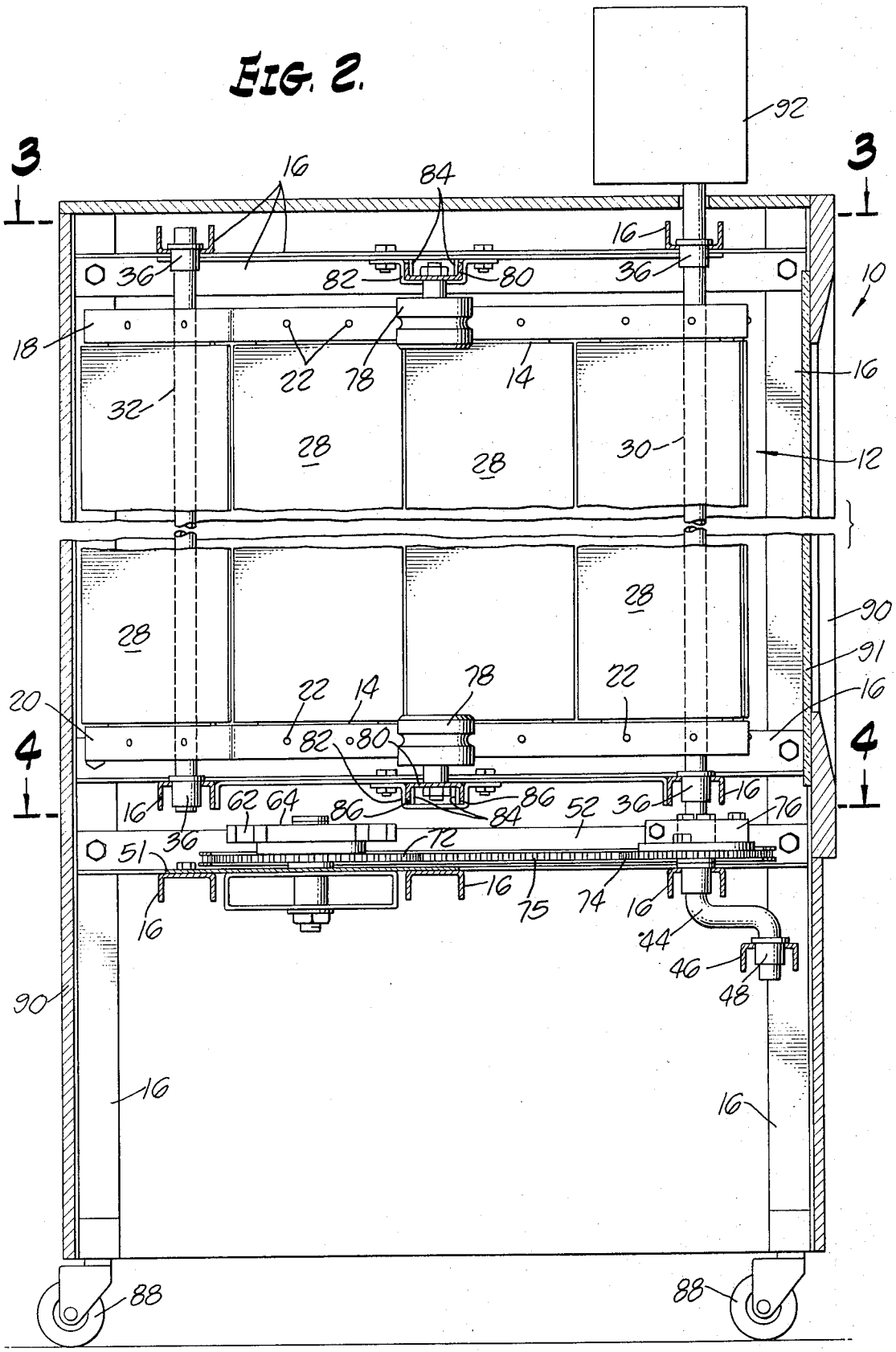


FIG. 8.

FIG. 2.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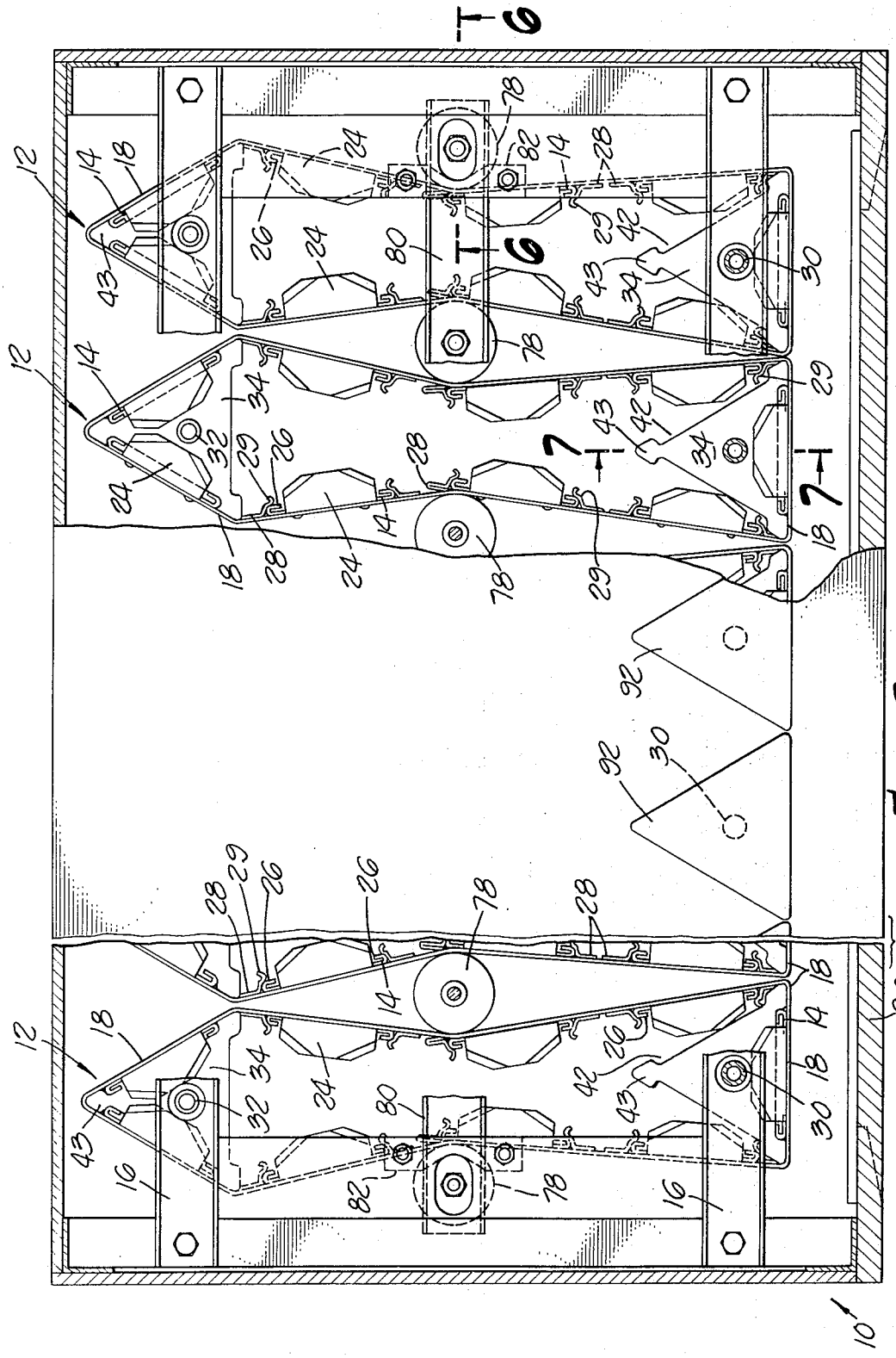

FIG. 3.

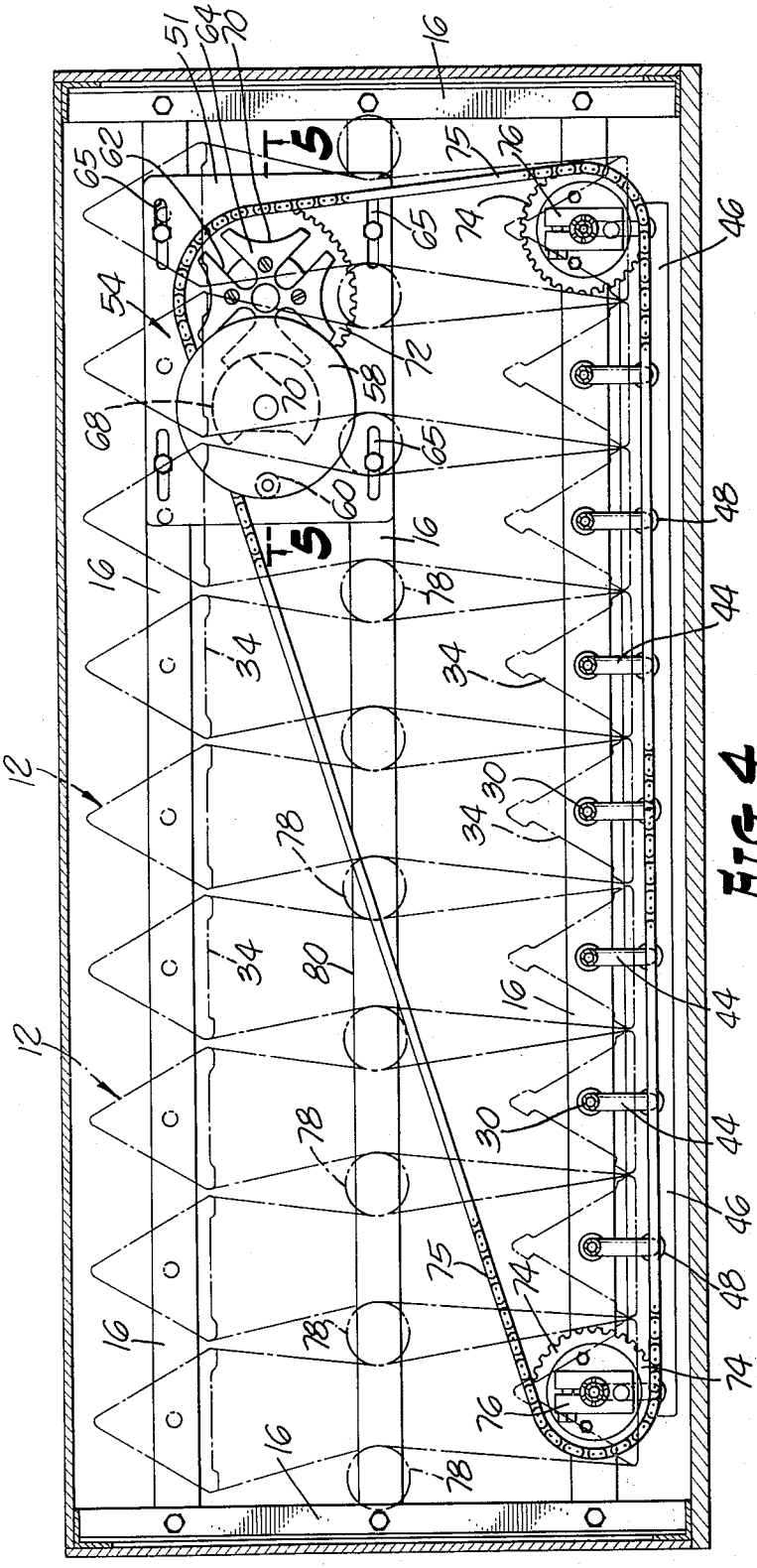

FIG. 4.

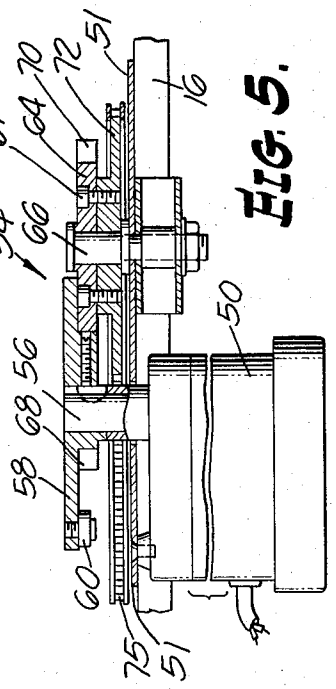

FIG. 5.

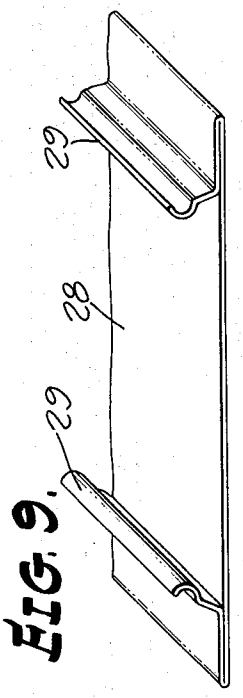

FIG. 9.

MULTI-FACED DISPLAY SIGN

BACKGROUND OF THE INVENTION

The problem of limited outdoor advertising space is presently being met by billboards which synchronously rotate a series of tri-surface elements to periodically display three different advertising panels. Such devices are expensive and their use has generally been limited to prime outdoor locations where they are constantly visible to the public. The tri-faced sign, however, has made few inroads on the indoor advertising market, as the costs involved therein are generally felt to overshadow the benefit obtained from two advertising panels. Some signs have been developed, however, which are capable of displaying several different advertising panels. An example of this type of sign is found in U.S. Pat. No. 3,229,395. The device shown therein, as is the case with other similar display signs, has failed to satisfy the need in the indoor advertising market. Such signs are expensive and while the expense may well be justified by the versatility of the signs, their appearance is a major shortcoming. In operation, these multi-faced display signs allow the customer to periodically view the interior mechanism of the sign which is distracting, detracts from the message being carried thereby and is generally unattractive. The appearance factor has been a major influence in preventing the acceptability of multi-faced signs in indoor advertising.

SUMMARY OF THE INVENTION

Briefly, the invention comprises a display sign which employs a plurality of endless strings of planer elements to successively present, with precision, numerous advertising images on the same panel for a brief period of time while restricting the view between adjacent strings during movement thereof. The panels are formed upon an element of one string being synchronously brought into view with corresponding elements of the other strings.

The principal object of this invention is to provide a display sign which successively presents numerous different advertising images in an attractive fashion.

It is another object of this invention to provide a display sign which precisely indexes the corresponding elements to present successive images.

It is a further object of this invention to provide a display sign which successively presents numerous different advertising images for a brief period of time which is attractive and likely to attract the attention of passersby.

It is yet another object of this invention to provide a display sign which successively presents numerous different advertising images which is of simple construction and relatively economically to manufacture.

These and other objects and advantages of the instant invention will be apparently on the following detailed description taken in conjunction with the accompanying drawings.

IN THE DRAWINGS

FIG. 1 is a front elevation of the sign.

FIG. 2 is a sectional view taken along line 2—2 of FIG. 1.

FIG. 3 is a partial sectional view taken along line 3—3 of FIG. 2.

FIG. 4 is a sectional view taken along 4—4 of FIG. 2.

FIG. 5 is a sectional view taken along line 5—5 of FIG. 4, showing the drive motor.

FIG. 6 is a sectional view taken along line 6—6 of FIG. 3.

FIG. 7 is a sectional view taken along line 7—7 of FIG. 3.

FIG. 8 is a sectional view taken along line 8—8 of FIG. 7.

FIG. 9 is a partial perspective view of a mounting panel.

Referring now in detail to the drawings, the display sign **10** is seen in FIGS. 1 through 3 to be comprised of a plurality of juxtaposed endless strings **12** of planar elements **14** mounted on a frame **16.** Each string is formed by an upper and lower band **18** and **20** which are secured to the planar elements **14** by rivets or other suitable fastening means **22.** Each planar element has an upper flange portion **24** and curled edges **26** at the sides thereof. Elongated panels **28** having rounded holding flanges **29** integrally formed along the sides thereof [See FIG. 9] are positioned over the planar elements **14** with the holding flanges **29** pressing against the curled edges **26** of the planar elements. The images displayed by the sign **10** are carried on these panels **28.** As will be described, means are provided to drive the endless strings **12** into rotation and that a panel **28** carried by an element **14** is adapted to cooperate with a corresponding panel and element of each of the other strings to form a given display when placed side by side in a common frontal plane, as shown in FIG. **1.**

The endless strings of panel carrying planar elements are supported by pairs of vertical shafts. Each string is carried by a forward driving shaft **30** and a rearward support shaft **32** by means of triangularly shaped indexing members **34.** Each shaft is rotatably mounted upon the frame **16** by means of bushings **36,** with all the driving shafts being in a single frontal plane and the rearwardly disposed support shafts also being linearly aligned. The idexing members **34** are preferably constructed of a non-metallic material, such as nylon or plastic, and are secured to the shafts by means of triangularly shaped metallic plates **38** which are seated within correspondingly shaped hollow interiors **40** of the indexing members. The plates are then welded to the shafts as shown in FIGS. **7** and **8.** In each endless string, four indexing members are employed, an upper and lower member being secured to each shaft, corresponding with the upper and lower bands **18** and **20** which form the strings. It should be noted that all the indexing members are similarly oriented, thereby presenting a flat forward surface and pointed rear. This orientation prevents undue amounts of slack from developing in the strings upon rotating movement thereof. Each indexing member has a recessed area **42** on each of the three sides thereof and teeth-like members **43** at the three corners. The recessed area is adapted to receive holding flanges **29** of the elongated panels and the curled edges **26** of the planar elements, while the tooth portion extends between the adjacent planar elements during the movement thereof, to aid in indexig and moving the successive elements into proper frontal alignment. The upper flange portion **24** of the planar element is then disposed atop the indexing member as shown in FIG. **3.** It can be seen that rotation of the forward driving shafts **30** cause corresponding movement

of the endless strings carried thereby and rotation of the rearward support shafts **32**, with the holding flanges on the panels cooperating with the recessed areas **42** on the indexing members and the tooth portions extending between the elements **14** in gear meshing relationships whereby exacting periodic rotation of the driving shafts causes precise orientation of successive planar elements **14** and elongated panels **28.** It should also be noted that each of the rearward support shafts **32** is disposed a slight distance outwardly from the center of the display sign along the frame **16** with respect to the driving shafts. This provides a small spacing between the rearward indexing members to prevent contact between adjacent members during rotation thereof. This spacing is not necessary between those members mounted on the driving shafts due to the more precise movement thereof as contrasted with that of the indirectly driven support shafts.

The synchronizing and driving mechanisms of the display sign can be understood with particular reference to FIGS. **2, 4** and **5.** It can be seen in FIG. **2** that the rearward support shafts are rotatably mounted at both ends thereof on the frame **16,** while the lower ends of the drive shafts have cranks **44** extending therefrom. The cranks may be integrally formed with the driving shafts **30** or otherwise affixed to the lower ends thereof. The upper ends of the driving shafts are rotatably mounted in the frame by means of bushings **36,** while the lower ends of the crank are similarly rotatably mounted along a synchronizing bar **46** by means of bushings **48.** The synchronizing bar thus interconnects all of the driving shafts **30** and it can be seen that by imparting rotation to at least two of the shafts and preferably to the two end shafts, the remaining drive shafts are caused to undergo the same degree of angular rotation. The use of the two end shafts provides a higher figure of accurate rotation than would otherwise be obtained through the use of any other pair of shafts.

A gear motor **50** is mounted on a support plate **51** which is carried by lower horizontal support brackets. A geneva drive assembly **54** is secured to the drive shaft **56** of the motor. The geneva drive consists of a drive wheel **58** having a cam **60** thereon which is adapted to travel within slots **62** in the driven wheel **64,** thereby imparting periodic 90° rotation to the driven wheel rotating on a stationary shaft **66** while holding said driven wheel motionless during the interim by means of the curved cam surface **68** on the driving wheel **58** moving against one of the four curved surfaces **70** on the driven wheel **64.** A drive sprocket **72** is secured to the driven wheel **64** by fastening means **67.** A pair of driven sprockets **74** are secured to the two driving shafts **30** disposed at the opposite ends of display sign **10,** as seen in FIG. **4.** An endless sprocket chain **75** extends about the three sprockets for imparting rotary movement to the driving shafts **30** from the movement of the geneva drive assembly **54.** The support plate **51** has slots **65** therein whereby the geneva drive assembly and drive sprocket can be adjusted to attain the proper tension in the sprocket chain **75.** Clamps **76** are used to secure the two driven sprockets to the driving shafts to allow for proper adjustment of the sprockets on the driving shafts and to maintain the proper orientation of the planar elements **14** and panels **28** carried thereby subsequent to initial adjustment. To attain the desired **120°** rotation of the driving shafts **30** from the periodic rotation of the geneva drive assembly, a tooth ratio of 4:3 is used between the drive sprocket **72** and the driven sprockets **74.** It can be seen that the exacting periodic 90° rotation of the driven wheel **64** is thus translated through the sprockets to exacting periodic 120° rotation of the driving shafts **30** and panels **28** carried thereby. In this manner, and in conjunction with the meshing relationship between the triangular indexing members and endless strings of planar elements, advertising or other display panels are successively and exactingly shown for a brief period of time across the front of the display sign.

While the corresponding alignment of the front and rear trinagular indexing members **34** greatly reduces the amount of slack in the endless string **12** during movement thereof, some slack, nevertheless, occurs. This slack is taken up by a plurality of spacing wheels **78** which are rotatably mounted on upper and lower slide bars **80.** These bars are slidably mounted on frame **16** by bracket **82.** The brackets are constructed of non-metallic material, such as nylon, and have a pair of vertical flange portions **84** which, in the upstanding position [e.g., lower slide bar mounting], relieve the pressure from the lower ends of the flange portions **86** of the bar [See FIG. **2**]. As the endless strings rotate, the slide bars are caused to undergo reciprocal movement with respect to the frame **16** by the force of the endless strings pressing against the spacer wheels **78.** In addition to maintaining the strings of planar elements in a taut disposition, the rollers and slide bar prevent corners of the panels **28** from interfering with each other during the movement of the strings and further, prevent rubbing between panel surfaces and scratching the portion of the display painted or otherwise secured thereon. The wheels are rotatably mounted on the slide bars to reduce any drag which otherwise might be caused by the bands **18** and **20** pressing against the wheels. This forced reciprocal movement of the slide bars, continually takes up any slack and maintains each of the endless strings of planer elements in a taut disposition.

Finally, rollers **88** are secured to the bottom of frame **16.** A wooden or other suitable outer covering **90** is placed about the frame and a glass pane **91** is placed across the front of the sign to present a more attractive appearance. In addition, the driving shafts **30** can be extended upwardly through the outer covering as seen in FIGS. **1** and **2.** Triangularly shaped display members **92** are secured to the upper extensions of the driving shafts. One face of each display member cooperates with a face of the other display members to present a given word or message. As the driving shafts are periodically rotated, three different messages successively appear atop the display sign.

Various changes and modifications may be made in carrying out the present invention without departing from the spirit and scope thereof. Insofar as these changes and modifications are within the purview of the appended claims they are to be considered as part of the invention.

I claim:

1. A display sign of the type have a plurality of juxtaposed endless strings of planar elements wherein an element of one string cooperates with a corresponding element of each of the other strings to form a visual display, said sign comprising:

a frame;

a plurality of driving shafts rotatably mounted on said frame;

a corresponding number of support shafts rotatably mounted on said frame rearwardly of said driving shafts, each of said endless strings of planar elements being supported by one of said driving shafts and the support shaft disposed therebehind;

a plurality of triangularly shaped indexing members, at least one of said members being secured to each of said shafts and each of said members having extended tooth portions at the corners thereof and recessed areas in the side walls thereof extending between said tooth members, each of said areas being adapted to receive a planar element therein and all of said indexing members having the same angular orientation on said shafts with respect to a plane extending through said driving shafts;

a plurality of rollers rotatably and slidably mounted on said frame between and on either side of said endless strings of planar elements such that said rollers bias said elements inwardly of said strings and undergo reciprocal motion with respect to said frame upon rotation of said shafts whereby each of said juxtaposed endless strings of planar elements is spaced from the strings adjacent thereto and said strings are maintained in a taut and unstrianed disposition and;

means for synchronously inducing periodic rotation to said shafts causing said planar elements to mesh with said indexing members whereby successive corresponding elements are brought into side by side relation in a common frontal plane.

2. The combination of claim **1** including a plurality of elongated display panels, each of said panels having a pair of holding flanges thereon, said flanges being disposed inwardly from the vertical ends of said panels and adapted to press against the side walls of said planar elements whereby said panels are carried by said planar elements with the adjacent vertical ends thereof being in close proximity to avoid a noticeable gap therebetween, said flanges on said panels abutting the tooth portions of the indexing member with which the planar element carrying said panel is meshed.

3. The combination of claim **1** including a first bar slidably mounted on the upper portion of said frame and a second bar slidably mounted on the lower portion of said frame, a first plurality of said rollers being rotatably mounted on said first bar and a corresponding plurality of said rollers being rotatably mounted on said second bar below said first plurality thereby defining pairs of rollers rotatably in slidably mounted on either side of said endless strings of planar elements.

4. A display sign of the type having a plurality of juxtaposed endless strings of planar elements wherein the element of one string cooperates with a corresponding element of each of the other strings to form a visual display, said sign comprises:

a frame;

a plurality of driving shafts rotatably mounted on said frames;

a corresponding number of support shafts rotatably mounted on said frame rearwardly of said driving shafts, each of said endless strings of planar elements being supported by one of said driving shafts and the support shaft disposed therebehind;

a plurality of triangularly shaped indexing members, a pair of said members being mounted on each of said shafts, one toward the upper end thereof and one toward the lower end thereof, each of said indexing members having extended tapered tooth portions at the corners thereof and recessed areas in the side walls thereof extending between said tooth members, each of said areas being adapted to receive a planar element therein and said tooth members extending between adjacent planar elements, all of said indexing members having the same angular orientation of said shafts with respect to a plane extending through said driving shafts;

means for spacing each of said juxtaposed endless strings of planar elements from the strings adjacent thereto;

a plurality of elongated display panels, each of said panels having a pair of holding flanges thereon, said holding flanges being disposed inwardly from the vertical ends of said panels and adapted to press against the side walls of said planar elements whereby said panels are carried by said planar elements with the adjacent vertical ends thereof being in close proximity to avoid a noticeable gap therebetween and abut the sides of a tooth portion of an indexing member when the planar element carrying said panel is disposed within the area in said indexing member and;

means for synchronously inducing periodic rotation to said shafts causing said planar elements and panels to mesh with said indexing members whereby successive corresponding display panels are brought into side by side relation in a common frontal plane.

5. The combination of claim **4** wherein said spacing means comprises a plurality of rollers rotatably and slidably mounted on said frame between and on either side of said endless strings of planar elements such that said rollers bias said elements inwardly of said strings and undergo reciprocal motion with respect to said frame upon rotation of said shafts whereby each of said juxtaposed endless strings of planar elements is spaced from the strings adjacent thereto and said strings are maintained in a taut and unstrained disposition.

6. The combination of claim **5** wherein said inducing means comprises a synchronizing bar, a plurality of cranks, one of said cranks extending from the lower end of each of said driving shafts and being rigidly secured thereto, said cranks being rotatably mounted on said synchronizing bar such that rotation of one of said shafts causes the other shafts to rotate in synchronism therewith, a geneva drive assembly, a drive sprocket secured to said geneva drive assembly, a pair of driven sprockets secured to a pair of set driving shafts, said drive sprockets having a four to three tooth ratio with respect to said driven sprockets and an endless sprocket chain disposed about said sprockets.

7. A display sign of the type having a plurality of juxtaposed endless strings of planar elements wherein an element of one string cooperates with the corresponding element of each of the other strings to form a visual display, said sign comprising:

a frame;

a plurality of driving shafts rotatably mounted on said frame;

a corresponding number of support shafts rotatably mounted on said frame rearwardly of said driving shafts, each of said endless strings of planar ele-

ments being supported by one of said driving shafts and the support shaft disposed therebehind;

a plurality of support bands for joining adjacent planar elements to define said endless strings thereof;

a plurality of triangularly shaped indexing members, a pair of said members being secured to each of said shafts, one toward the upper ends thereof and one towards the lower ends thereof, each of said indexing members having extended tapered tooth portions at the corners thereof and recessed areas in the side walls thereof extending between said tooth portions, the extended surfaces of said tooth portions defining flat surfaces for supporting said bands and said recessed areas being adapted to receive a planar element therein, said tooth portions extending between adjacent planar elements and all of said indexing members having the same angular orientation on said shafts with respect to a plane extending through said driving shafts;

a plurality of elongated display panels, each of said panels having a pair of holding flanges thereon, said holding flanges being disposed inwardly from the vertical ends of said panels and being adapted to press against the side walls of said planar elements whereby said panels are carried by said planar elements with the adjacent vertical ends thereof being in close proximity to avoid a noticeable gap therebetween and abut the sides of a tooth portion of an indexing member when the planar element carrying said panel is disposed within the area in said indexing member;

a plurality of rollers rotatably and slidably mounted on said frame between and on either side of said endless strings of planar elements such that said rollers bias said elements inwardly of said strings and undergo reciprocal motion with respect to said frame upon rotation of said shafts whereby each of said juxtaposed endless strings of planar elements is spaced from the strings adjacent thereto and said strings are maintained in a taut and unrestrained disposition and;

means for synchronously inducing periodic rotation to said shafts causing said planar elements and panels to mesh with said indexing members whereby successive corresponding elements are brought into side by side relation in a common frontal plane.

8. The combination of claim **7** wherein said inducing means comprises a synchronizing bar, a plurality of cranks, one of said cranks extending from the lower end of each of said driving shafts and being rigidly secured thereto, said cranks being rotatably mounted on said synchronizing bar such that rotation of one of said shafts causes the other shafts to rotate in synchronism therewith, a geneva drive assembly, a drive sprocket secured to said geneva drive assembly, a pair of driven sprockets secured to a pair of set driving shafts, said drive sprockets having a four to three tooth ratio with respect to said driven sprockets and an endless sprocket chain disposed about said sprockets.

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