

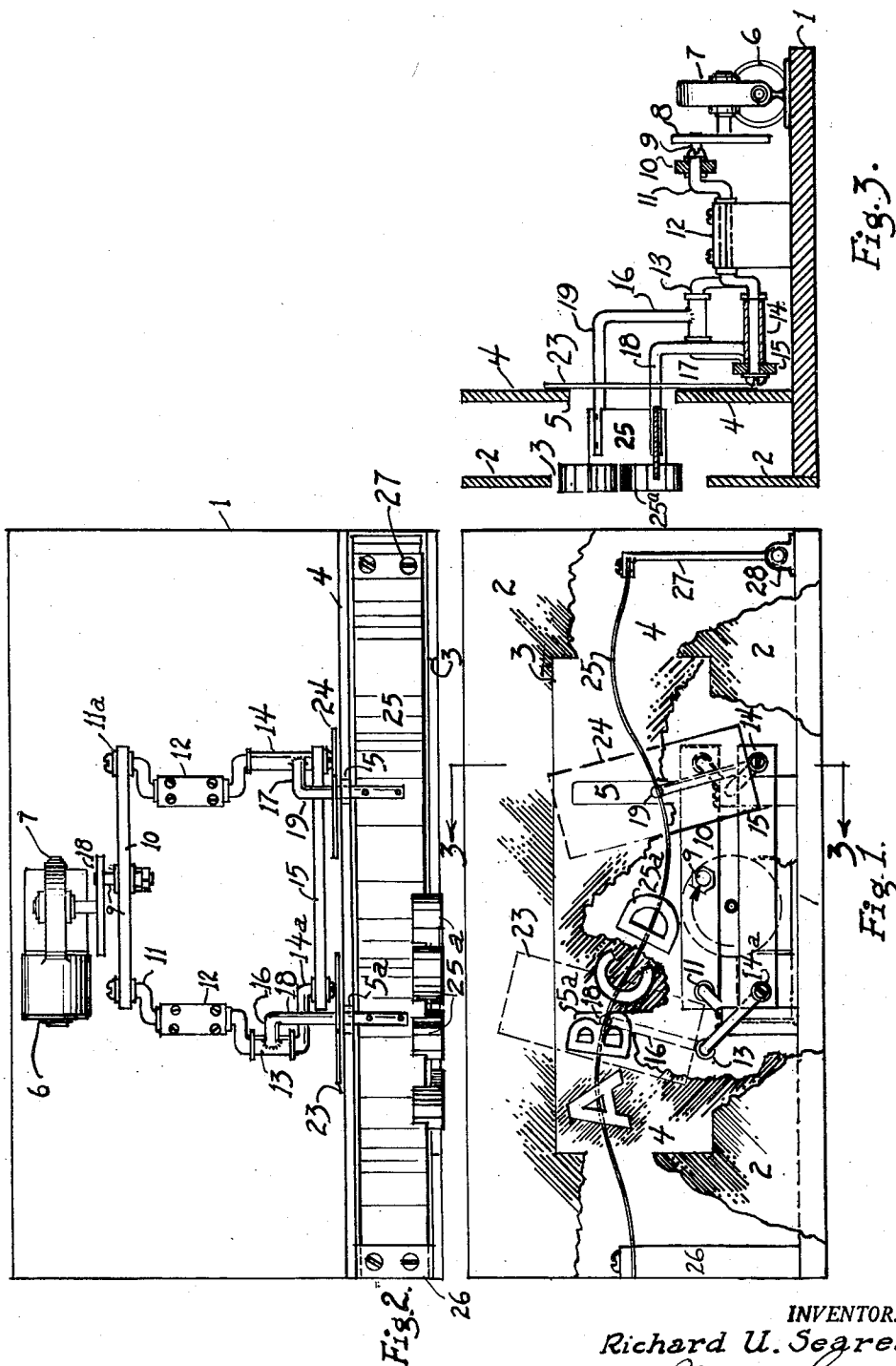
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2,530,404

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3 Sheets-Sheet 1



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3 Sheets-Sheet 2

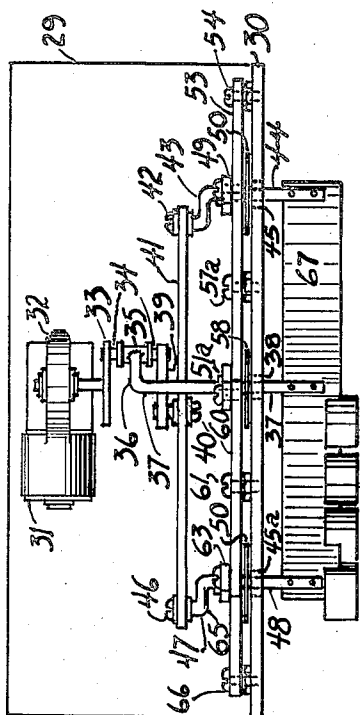


Fig. 5.

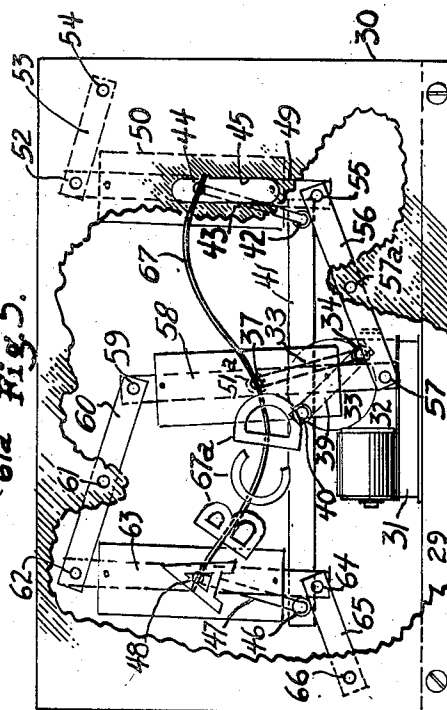


Fig. 4.

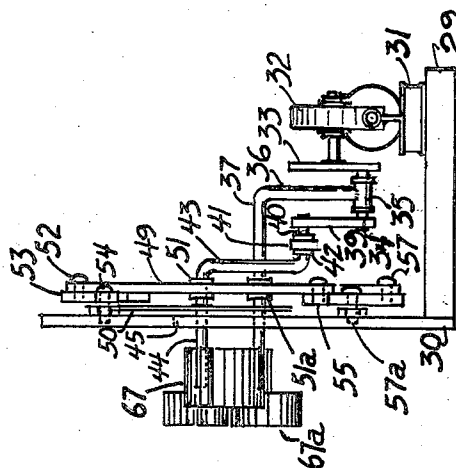


Fig. 6.

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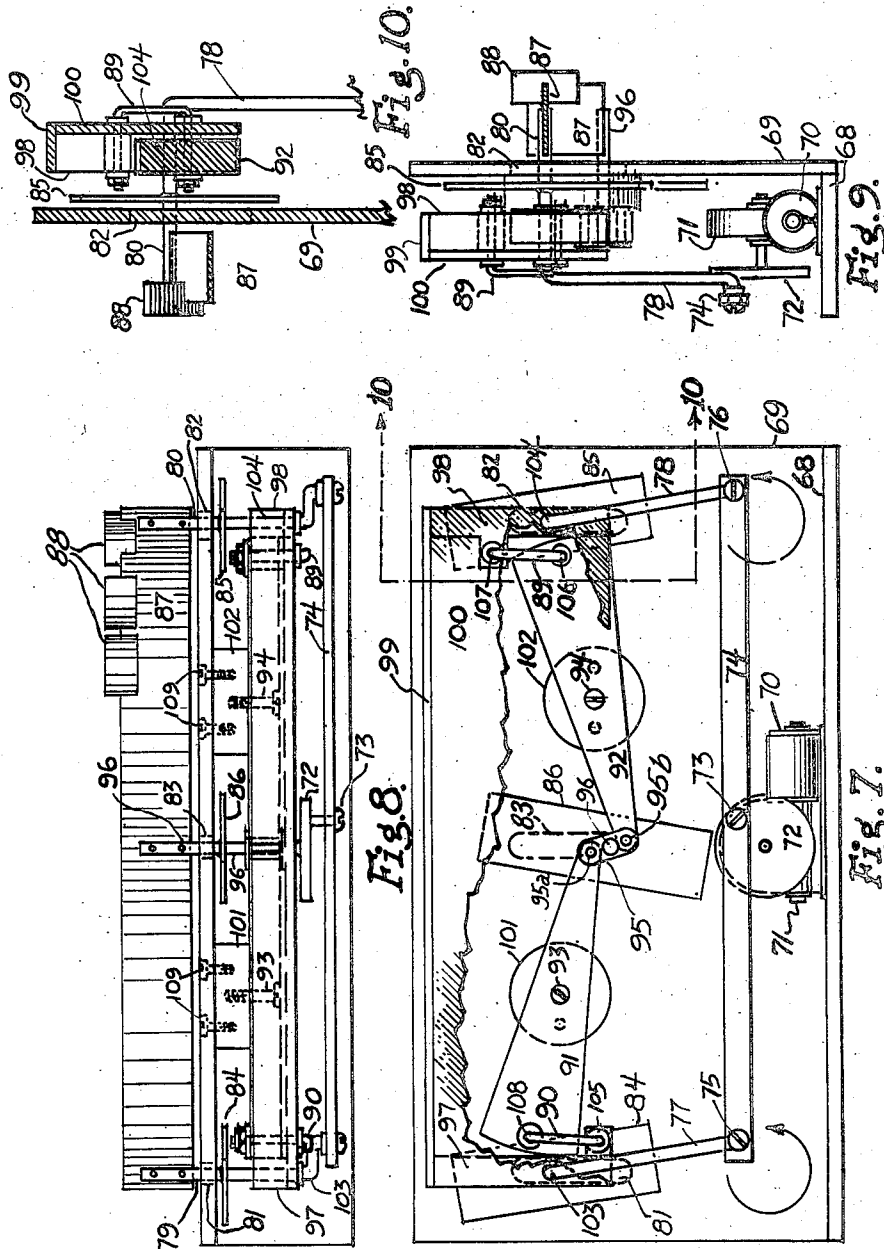
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3 Sheets-Sheet 3



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7 Claims. (Cl. 40—139)

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The present invention relates generally to displays or signs of the type used for advertising purposes, and more particularly to supporting and animating mechanisms therefor by which motion is imparted to one or more portions of the sign, signs of this type being referred to generally as "animated" because the movement of the various parts produces the appearance of animation of the sign.

One of the general objects of my invention is to provide a supporting and operating mechanism for signs which produces a pleasing and novel motion or motions of one or more portions of the sign, in order to impart to the advertising copy motion which attracts the eye and arrests the attention of members of the public.

It is another object of my invention to produce a supporting and animating mechanism for a sign which is adapted to produce a harmonious undulation of the letters or figures to the end that there is produced the appearance of rhythmic waves passing through the copy due to the successive imparting to each letter of a motion in two components; namely, vertical reciprocation and rocking in the vertical plane of the front of the sign about a vertical axis.

Another object is to provide a single flexible supporting and animating means for signs which is relatively inexpensive, rugged in construction, and simple to maintain.

Another object of my invention is to provide a means of support of minimum visibility for the resilient, letter supporting and actuating, flexible ribbon. This objective is attained by using a minimum practical number of inconspicuous supports projecting through vertical slots in a panel which screens the operating mechanism from view. The slots are also covered at the rear by floating screens secured to the ribbon supports. If each ribbon support, panel screen, and floating screen be made a uniform dark, dull color in contrast to bright colors on the moving display, brilliantly illuminated, there is created the illusion that the undulating display is apparently floating in space.

These objects of my invention have been attained by providing a stationary supporting structure upon which are mounted movable supports, or in another form, stationary as well as movable supports, said movable supports being, preferably, connecting rods, the lower ends of which are moved circularly while the upper or wrist pin ends are constrained to substantially vertical paths. A horizontal extension of a wrist pin solidly fixed to each connecting rod serves as a

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support and actuating means for a flexible ribbon or strip of resilient material on which are mounted letters or characters forming a display.

Movements in proper phase relationship of the ribbon supports are obtained by some suitable drive means such as an electrical motor adapted to drive a speed reducer which in turn actuates suitable linkages which produce the desired operation of the ribbon supporting and actuating connecting rods.

How the above as well as other objectives and advantages of my invention are attained will be more easily understood by referring to the following description in connection with the drawings, in which:

Fig. 1 is a front view of one form of my invention with frame and screen panel partly broken away to show the actuating mechanisms;

Fig. 2 is a top view of Fig. 1;

Fig. 3 is a vertical section through the view in Fig. 1 on line 3—3;

Fig. 4 is a front view of another form of my invention with screen panel partly broken away to reveal the concealed operating mechanisms;

Fig. 5 is a top view of Fig. 4;

Fig. 6 is an end view of Fig. 4;

Fig. 7 is a rear view of another form of my invention with part of movable truss panel cut away for simplicity of illustration;

Fig. 8 is a top view of Fig. 7;

Fig. 9 is an end view of Fig. 7; and

Fig. 10 is a vertical section through the view in Fig. 7 at line 10—10.

In the form of my invention illustrated in Figs. 1, 2, and 3 there are two actuating supports, one fixed and one lever support for the resilient ribbon which carries spaced characters and when actuated by said two moving supports produces a wave-like motion of the ribbon and the characters supported by the ribbon.

This sign is composed of a base 1 on which is mounted a panel 2 containing an opening 3 through which the display is revealed. Concealing the operating mechanism is a second panel 4 containing slots 5 and 5a through which are extended connecting rods 16 and 17 which support and actuate a flexible strip 25. The spacing between the support points will determine the nature and wave length of the wave produced by the device.

A slow speed drive means is produced by motor 6 and speed reducer 7 which drives crank disc 8 carrying crank pin 9 which imparts a circular motion to shuttle bar 10 mounted on crank shafts 11 and 11a. The crank shafts are supported in

bearings 12 and produce the rotation of crank throws 13 and 14, these being 180° out of phase from each other. The crank throws carry connecting rods 16 and 17. Crank shaft 11 has an extension crank arm 14a which is connected to crank throw 14 by shuttle bar 15. The bar 15, being 90° out of phase with shuttle bar 10, permits constant operation of the whole assembly without any common dead center position of shuttle bars 10 or 15. Connecting rods 16 and 17 have affixed to them floating screens 23 and 24 which prevent any view through the slots 5 and 5a. The upper extremity of connecting rods 16 and 17 are bent at right angles at 18 and 19 and split in order to receive in the slit thus provided and firmly hold ribbon 25, the ends of which are mounted at stationary support 26 and lever support 27 pivoted at bearing 28. Rotation of crank shaft 11, for example, at approximately 20 R. P. M., imparts through the connecting rods 16 and 17 a sinuous wave-like motion to ribbon 25 and letters or figures 25a mounted on the ribbon. One end of the ribbon is fixed at 26 and the other end at the rocking support 27 which oscillates the support point at 27 about an axis perpendicular to the vertical oscillation of the supports 18 and 19. The ribbon supports 18 and 19 move in a vertical path in the same plane and perpendicular to the plane of the ribbon with their ends 18° out of phase; that is, 19 is on the upstroke when 18 is on the downstroke, and vice versa, and at the ribbon a rotation of the rods is produced which is clockwise on the upstroke and counter-clockwise on the downstroke of the rods. This causes a flexure in the ribbon 25 to establish an advancing wave from left to right when the display is viewed from the front, as in Fig. 1.

Figs. 4, 5, and 6 show, respectively, a front view, a top view, and an end view of a second form of a moving display, in which letters or figures mounted on a resilient, ribbon-like strip are so actuated as to produce a wave-like motion of the display. This form differs mainly from the first in that all ribbon supports are movable and in that the ribbon supports are constrained to a vertical path by means of a combination of linkages. This sign is comprised of a base 29 to which is secured a panel 30 in which are slots 38, 45, and 45a. Motor 31 and speed reducer 32 drive crank disc 33 carrying crank pin 34 which extends to crank arm 39 which carries a second crank pin 40 at equal radius but 180° out of phase from crank pin 34. Crank pin 40 imparts a circular motion to a shuttle bar 41 which is mounted on lower bearings 42 and 46 of connecting rods 43 and 47. Rods 43 and 47 at their upper ends pass through bearing sockets 51, one each mounted in vertical links 49 and 63, and extend through slots 45 and 45a. These bearing sockets are constrained to a straight-line vertical path by reason of links 49 and 63 being pivoted at their extremities to levers 53, 56, 60, and 65 by means of pins 52, 55, 62, and 64. On the vertical reciprocation of the rods 44 and 48, they are also caused to rock in the bearings 51, so as to rotate clockwise on the upstroke and counterclockwise on the downstroke. Crank pin 34 carries connecting rod 36 mounted in bearing 35, the upper end 37 of which extends horizontally through slot 38.

The pin 34 carries a crank arm 39 connected to a shuttle bar 41 at a pivot pin 40. The connecting rod 47 is connected to the shuttle bar 41 at bearing 46. A like connecting arm 43 is connected to the shuttle bar 41 at bearing 42. The

upper ends 44 and 48 of the crank arms 43 and 47, respectively, pass through slots 45 and 45a.

The wrist pin 37 passes through a bearing 51a mounted on link 58 which in turn is pivotally connected to link 60 at pins 59 and to link 56 at pin 57. The levers 53, 56, 60, and 65 are pivotally mounted on the panel 30 by means of pins 54, 57a, 61, and 66, respectively. The ends 37, 44, and 48 of the three connecting rods 36, 43, and 47 are split. The flexible ribbon 67, on which are mounted letters 67a, is inserted in said slits and fixed therein. Crank pin 34, being 180° out of phase from crank pin 40, produces a simultaneous and opposite motion to the two outer connecting rods 43 and 47 as contrasted to the motion of center connecting rod 36. The supporting arms 37, 44, and 48 impart to the ribbon at these supporting points a motion which is a combination of rocking and vertical reciprocation perpendicular to the plane of the ribbon.

As a result of this construction the ribbon and support points 44 and 48 are given a vertical in-phase motion, i. e., they move up and down together. They are also given a simultaneous rocking motion about the axes of 44 and 48 in phase, causing an in-phase up-and-down motion of the ribbon ends and an in-phase flexure of the ends of the ribbon, which, for both 44 and 48, is clockwise on the upstroke and counter-clockwise on the downstroke. The ribbon support 37, which is positioned at a point midway between support points 44 and 48, i. e., at the half wave position, has a vertical motion 180° out of phase with 44 and 48, i. e., it is upon its downstroke when 44 and 48 are on the upstroke. Likewise, the support 37 rocks on its axis clockwise on its upstroke and counter-clockwise on the downstroke, causing a flexure of the ribbon at the point of support in 37. This rocking is clockwise on the upstroke of 37 and counter-clockwise on the downstroke of 37.

The compounding of these motions causes the ribbon to flex in a manner substantially like the flexure in the form shown in Fig. 1 to produce a wave-like motion in the ribbon which advances from left to right if the display is viewed from the front, as in Fig. 4.

I may omit rod 36 and crank assembly 34 and 35 and connect the shuttle bar 41 to the crank disc 33 and support a rod such as 37 to pivot freely in 51a. Flexing of ribbon 67 by outer supports 44 and 48 causes a rocking of the rod 37 in 51a and carries the wave-like distortion across support 37 in a similar manner.

In Figs. 7 to 10, inclusive, the display is comprised of a base 68 supporting a panel 69 in which there are vertical slots 81, 82, and 83. A slow speed drive means, such as motor 70 and speed reducer 71, causes crank plate 72 to be rotated, for example, at about 20 R. P. M. in a clockwise direction if viewed from the front. Crank pin 73 supports and imparts a circular movement to shuttle bar 74. Bearings 75 and 76 are positioned at the extremities of the bar 74. In the bearings are mounted the crank end of connecting rods 77 and 78. The upper or wrist pin ends of connecting rods 77 and 78 pivot in bearings 103 and 104 in end blocks 97 and 98 which are affixed to truss panels 99 and 100. Blocks 97 and 98 and panels 99 and 100 comprise a movable truss assembly which is constrained to reciprocate in a vertical path while always remaining parallel to the supporting base 68. The movable truss assembly 97, 98, 99, and 100 is

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guided in its motion by the contact of the inner vertical faces of blocks 97 and 98 against the circular ends of rocker levers 91 and 92 which are pivoted at 93 and 94 on pivot support blocks 101 and 102 which are fixed solidly to panel 69 by screws 109. Rocker levers 91 and 92 are pivotally connected by link 95 on pivot pins 95a and 95b and are constrained to move in unison. The levers 91 and 92 are connected to and support the movable truss assembly 97, 98, 99, and 100 by links 89 and 90 carried in bearings 106 and 108 in levers 92 and 91, respectively, and bearings 105 and 107 in blocks 97 and 98, respectively. This permits the truss to have only a vertical degree of freedom in a vertical plane without change of horizontal relationship to the supporting base 69.

Connecting rods 77 and 78 extend as wrist pins through panel slots 81 and 82 to provide ribbon supports 79 and 80.

Likewise mounted to rotate freely in link 95 is a center ribbon support 96 extending through panel slot 83. Ribbon 87 of resilient material, such as steel or plastic, is firmly affixed in the slots in the three supports 79, 80, and 96, and carries, affixed to its outer edge, block letters or figures 88 which may be slotted to provide their suitable fixing to the ribbon 87. Behind slots 81, 82, and 83 are thin floating screens 84, 85, and 86 which are fixed solidly in a vertical plane to ribbon supports 79, 80, and 96. These conceal a view of the actuating mechanism through slots 81, 82, or 83.

Ribbon supports 79 and 80 rising and falling in a vertical path, perpendicularly to the plane of the ribbon, in phase, i. e., together up and down, are at the same time rocked in phase due to the circular motion of 75 and 76 moving in unison, rotating each clockwise on their upstroke and counter-clockwise on their downstroke. This causes a flexure in corresponding direction and an up and down motion of the center of the ribbon, moving in a vertical path 180° out of phase from the motion of 79 and 80, i. e. moving downward as the support 96 moves upward. The support 96, which is midway between the support points 79 and 80, i. e., at the half wave position, being free to rotate in the link 96 clockwise on its upstroke and counter-clockwise on its downstroke, and the ribbon passing through a slot in the support 96, as in the case of all other ribbon supports illustrated in the drawings, causes the supports to rotate freely in the link 96 as the ribbon is flexed by the motion and flexure of the ribbon ends. The vertical motion thus imparted to the ribbon ends by the supports 79, 80, and 96 and the flexure imparted to the ribbon ends by the rotation of the supports 79 and 80 causes ribbon 87 to be distorted progressively in the form of waves running from one end to the other, most appropriately from left to right when viewed from the front of the display, i. e., from the left of Fig. 8.

Although no views in the drawings show more than three moving supports for the resilient ribbon, these may be increased to any desired number with accompanying actuating mechanisms of similar nature to those shown. In this way, where three supports, as employed in the forms illustrated in Figs. 4 to 7, inclusive, provide display of only one wave length from crest to crest of a moving wave, the full wave being established between the end supports, supports may be added with the intermediate support at the half wave points. In the case of such more than three sup-

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port points, the intermediate support need be given only a vertical motion, as in Fig. 1, together with a vertical motion of both end supports, as in Figs. 4 and 7. However, the end supports in all such cases must be given the rocking motion described above.

Where more than three movable supports are employed, the outer or end supports are desirably provided with both rotary and reciprocating means, for example, such as illustrated in Figs. 4 to 10, inclusive.

The display mounted on the flexible ribbon may be of steel, plastic, or other material having a sufficiently high modulus of elasticity and resistance to fatigue to permit it to be flexed and assume the wave-like motion for a prolonged period of time. The display may consist of a plurality of individual units, such as letters or numbers, or other units which are mounted on the ribbon in slots in which the ribbon is mounted where the length of the slot will not unduly distort the wave. The characters may, however, be mounted on a bracket which has a substantially high support point on the ribbon or a sufficiently short slot. The characters are moved up and down and rock to and fro as the ribbon is flexed in the advancing wave to follow the wave, and the row of characters assumes and appears to be in the form of an advancing wave.

Instead of individual characters, I may employ any display which will follow the wave, as, for example, any display mounted on the ribbon which will flex in unison with the ribbon to appear to follow an advancing wave.

While I have described a particular embodiment of my invention for the purpose of illustration, it should be understood that various modifications and adaptations thereof may be made within the spirit of the invention as set forth in the appended claims.

I claim:

1. A device for producing a progressive wave in a flexible ribbon, comprising a flexible ribbon, spaced supports for said ribbon said ribbon being firmly attached at said supports, an intermediate support between said spaced supports, means for moving said supports relative to each other, and means for flexing said ribbon to produce an advancing wave in said ribbon.

2. A device for producing a progressive wave in a flexible ribbon, comprising a flexible ribbon member, spaced supports for said ribbon said ribbon being firmly attached at said supports, an intermediate support between said spaced supports, means for moving said supports relative to each other, means for flexing said ribbon to produce an advancing wave in said ribbon, means for vertically reciprocating said spaced supports in unison, and means for reciprocating said intermediate support 180° out of phase relationship to the reciprocation of said spaced supports and for simultaneously rocking said supports, whereby said ribbon is repeatedly flexed to produce an advancing wave in said ribbon.

3. A device for producing a progressive wave-like motion in a flexible strip, which comprises a flexible strip, means for holding one end of said strip in a fixed position, means for holding the other end of said strip to impart a rocking motion therein and a repeated flexure at the end of said ribbon intermediate supports for said ribbon, means for reciprocating said intermediate supports in a direction perpendicular to the plane of said ribbon in out of phase relation to each other, and means for rocking said interme-

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diate supports to repeatedly flex said ribbon to produce an advancing wave-like motion in said ribbon.

4. A device for producing a progressive wave in a flexible ribbon, comprising a flexible ribbon, a rod positioned at each end of said ribbon, said ribbon being attached to each of said rods, a rod attached to the ribbon at an intermediate point between said first-mentioned end supports, bearings for said rods, means for reciprocating said bearings in a vertical path perpendicular to the plane of said ribbon with said bearings for said intermediate point moving 180° out of phase with the other bearings, and means for rotating said rods in said bearings to flex said ribbon to produce an advancing wave in said bearings.

5. A device for producing a progressive wave in a flexible ribbon, comprising a flexible ribbon, a rod positioned at each end of said ribbon, said ribbon being attached to each of said rods, a rod attached to the ribbon at an intermediate point between said first-mentioned end supports, bearings for said rods, means for reciprocating said bearings in a vertical path perpendicular to the plane of said ribbon with said bearings for said intermediate point moving 180° out of phase with the other bearings, and means for rotating said rods in said bearings clockwise on their upstroke and counter-clockwise on their downstroke to flex said ribbon to produce an advancing wave in said bearings.

6. A device for producing an advancing wave in a flexible ribbon, which comprises a flexible ribbon, a fixed end support for said ribbon, a plurality of rods spaced at intermediate points of said ribbon and attached thereto, a bearing for

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each rod, means for moving said bearings in a path perpendicular to the plane of the ribbon 180° out of phase to each other, means for rotating said rods in said bearings clockwise on the upstroke of said bearings and counterclockwise on the downstroke of said bearings, and a rocking support for the other end of said ribbon rotatable about an axis perpendicular to said reciprocation of one of said bearings to produce an advancing wave to said ribbon.

7. A device for producing an advancing wave in a flexible ribbon, which comprises a flexible ribbon, a fixed end support for said ribbon, a plurality of rods spaced at intermediate points of said ribbon and attached thereto, a bearing for each rod, means for moving said bearings in a path perpendicular to the plane of the ribbon 180° out of phase to each other, means for rocking said rods in said bearings, and a rocking support for the other end of said ribbon rotatable about an axis perpendicular to said reciprocation of one of said bearings to produce an advancing wave in said ribbon.

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