

R. M. CRAIG.
 AUTOMATIC ELECTRIC ADVERTISING SIGN.
 APPLICATION FILED JULY 24, 1916.

1,308,698.

Patented July 1, 1919.
 5 SHEETS—SHEET 1.

Fig. 1

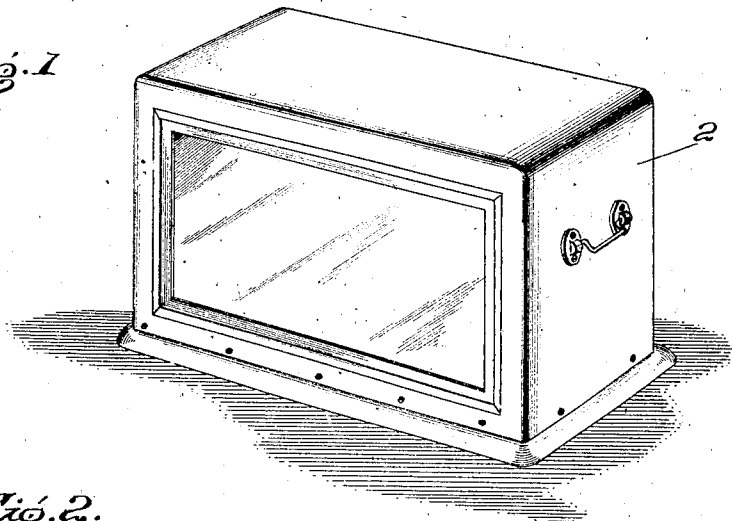
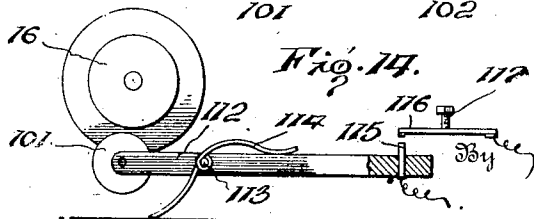
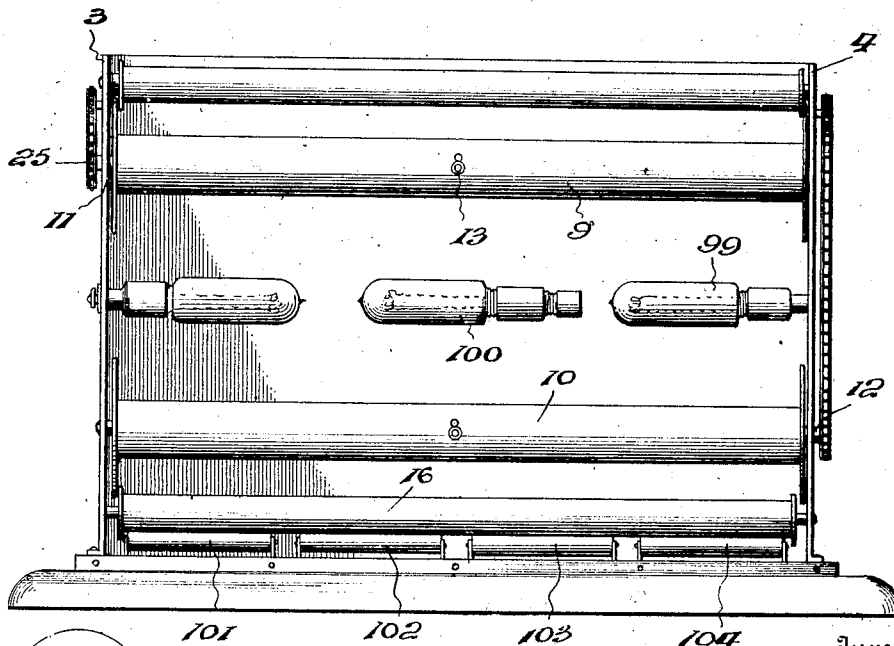


Fig. 2.



Inventor

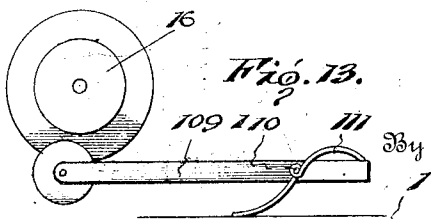
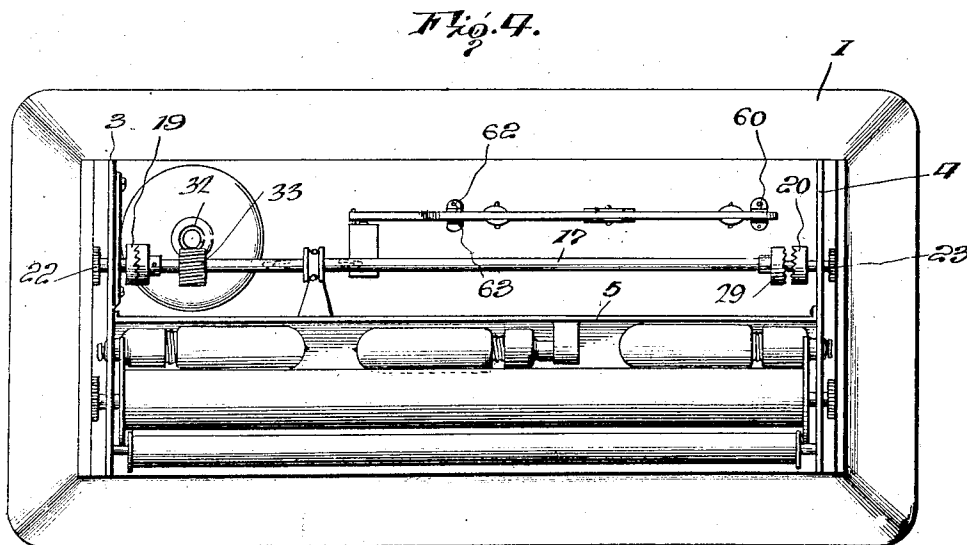
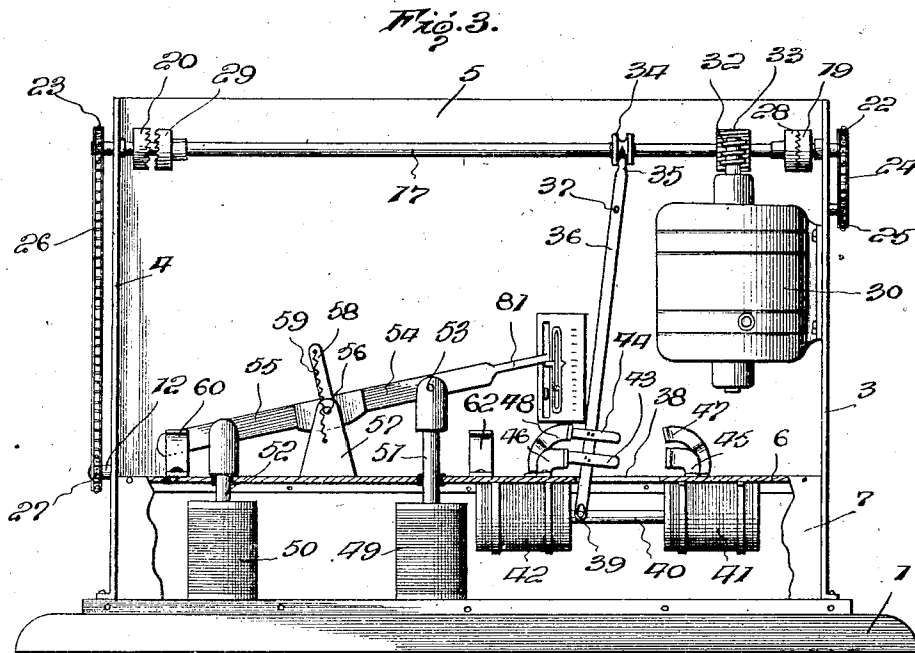
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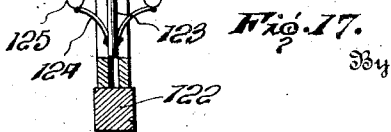
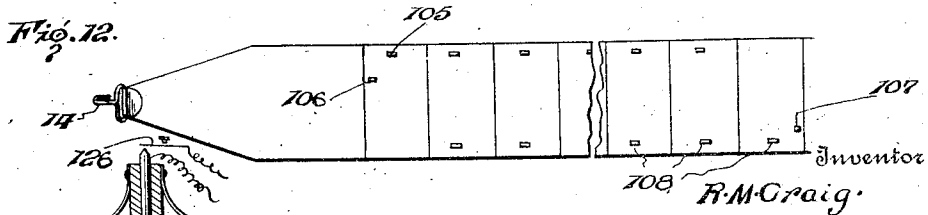
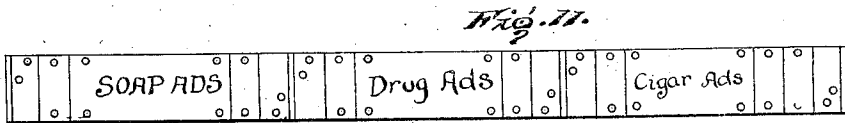
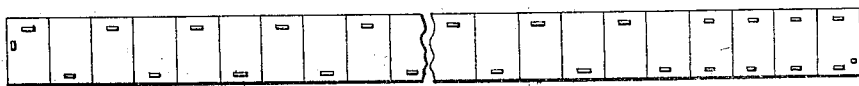
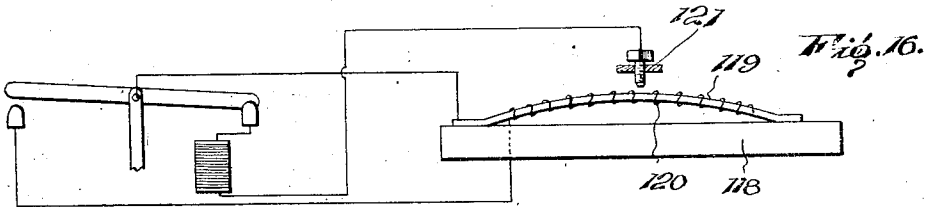
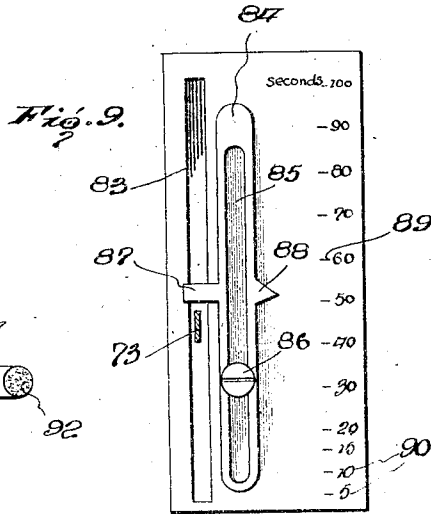
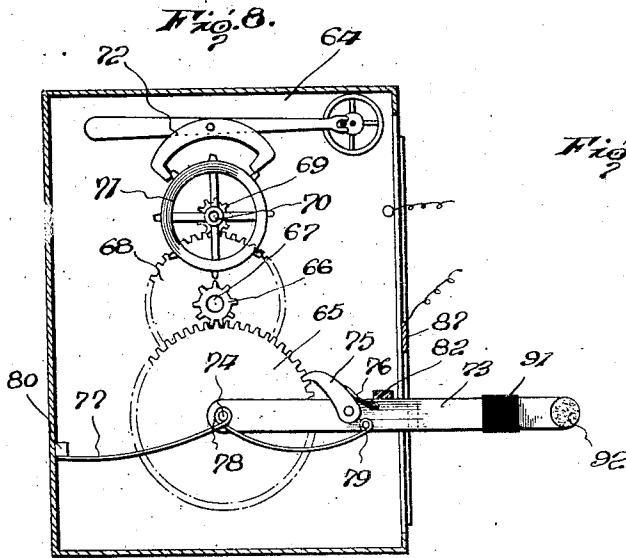
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 5 SHEETS—SHEET 4.



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Patented July 1, 1919.
 5 SHEETS—SHEET 5.

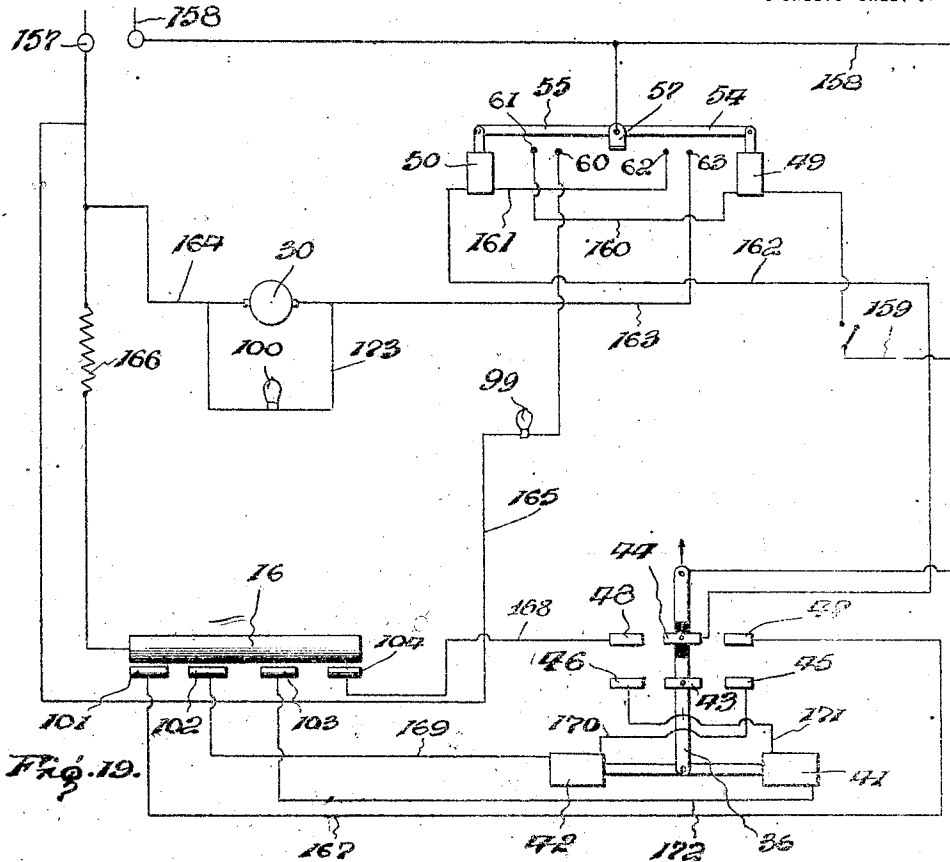


Fig. 21.

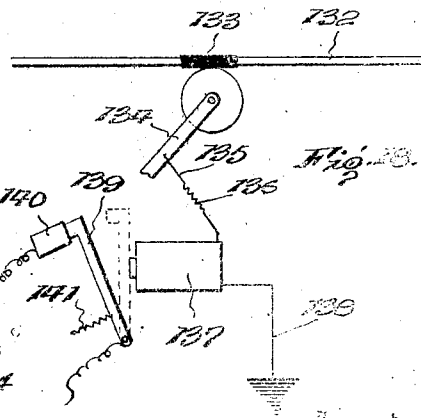
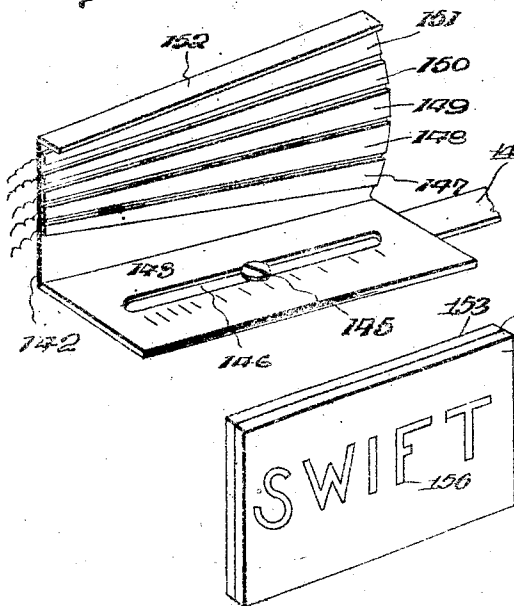


Fig. 20.

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UNITED STATES PATENT OFFICE.

RICHARD M. CRAIG, OF SAN ANTONIO, TEXAS.

AUTOMATIC ELECTRIC ADVERTISING-SIGN.

1,308,698.

Specification of Letters Patent.

Patented July 1, 1919.

Application filed July 24, 1916. Serial No. 111,014.

To all whom it may concern:

Be it known that I, RICHARD M. CRAIG, a citizen of the United States, residing at San Antonio, in the county of Bexar and State of Texas, have invented certain new and useful Improvements in Automatic Electric Advertising-Signs, of which the following is a specification.

This invention relates to electric advertising signs and has as one of its objects to provide a sign of this class which will be entirely automatic in its operation, being controlled through the medium of a traveling display band upon which advertisements may be printed or otherwise displayed, the construction of the device being such that the band will be automatically reversed in its travel after display of the entire length thereof or after display of only a portion of the length, as may be desired by the merchant.

It is also an aim of the invention to provide a sign of this class in which the operating mechanism for the traveling band is automatically controlled by the band itself in its travel, the band being automatically caused to travel a predetermined distance so as to display one advertisement and remain stationary a predetermined length of time and then automatically advance to display another advertisement which may either be the advertisement immediately following the one first displayed or one more or less advanced along the length of the band. In fact, it is the aim of the invention to place in the hands of merchants an advertising sign upon the display band of which may be printed or otherwise displayed any advertisements deemed suitable by the merchant and to so construct the actuating mechanism for the band that the same will be caused to automatically display the advertisements in any order desired by the merchant so that each successive advertising space may contain a separate and distinct advertisement or the advertisements may be so arranged upon the band that after the display of a main advertisement, so-called "follow-up" advertisements may be successively displayed.

Another aim of the invention is to provide a sign of this class in which one ad-

vertising band may be substituted for another by the merchant using the sign so that the character of the advertisements displayed may be varied from time to time as found desirable.

Another aim of the invention is to provide a sign of this class which while automatic in its operation will not be liable to cause fire through arcing of contacts and in which the motor is in operation only while the display band is being advanced from one position to another, so that a minimum amount of current is consumed in the operation of the sign and the likelihood of damage from fire is further reduced.

Another aim of the invention is to provide a sign of the class mentioned in which lights of various colors may be employed for the purpose of illumination of the sign and may be lighted in any order desired by the merchant.

A further aim of the invention is to provide means whereby the period of display or, in other words, the period of time during which the display band is stationary, may be increased or decreased, as may be desired by the merchant.

In the accompanying drawings:

Figure 1 is a perspective view of the sign embodying the present invention.

Fig. 2 is a front elevation thereof with the casing removed.

Fig. 3 is a rear elevation thereof with the casing removed, parts being shown in section.

Fig. 4 is a top plan view with the casing removed.

Fig. 5 is a vertical front to rear sectional view through the sign with the casing removed.

Fig. 6 is a side elevation illustrating a modified arrangement whereby a larger advertising space is afforded.

Fig. 7 is a detail vertical longitudinal sectional view through a portion of the mechanism for transmitting rotary motion to the take-up and storage rolls for the display band of the sign.

Fig. 8 is a detail vertical sectional view illustrating the automatic timing device for controlling the operation of the sign.

Fig. 9 is a side elevation of the structure shown in Fig. 8.

Fig. 10 is a plan view of a portion of one of the display rolls.

Fig. 11 is a similar view illustrating a modified form of roll.

Fig. 12 is a similar view illustrating a further modified form of roll.

Fig. 13 is a side elevation of one of the contact members which cooperates with the display band.

Fig. 14 is a similar view illustrating a modification of the structure shown in Fig. 13.

Fig. 15 is a perspective view illustrating a further modified form of contact.

Fig. 16 is a semi-diagrammatic view illustrating a modified form of timing device.

Fig. 17 is a view illustrating a further modified form of timing device.

Fig. 18 is a view illustrating another form of timing or circuit closing device.

Fig. 19 is a semi-diagrammatic view illustrating the circuits.

Fig. 20 is a perspective view illustrating the manner of forming the transparent front of the casing of the sign.

Fig. 21 is a perspective view of the circuit device employed when a number of different colored lights are used to illuminate the sign.

The sign embodying the present invention includes a base 1 upon which the mechanism is mounted, and a casing 2 which is disposed upon the base and houses the mechanism, the casing being connected to the base in any suitable manner permitting of its convenient removal when it becomes necessary to repair the mechanism or to remove a display band and substitute another one therefor. Mounted upon the base one at the ends thereof are upstanding supporting plates 3 and 4. A partition plate 5 is also mounted upon the base and extends in a vertical plane between the side plates 3 and 4 and serves to divide the interior of the sign casing into front and rear compartments respectively housing the display band and its rolls and the lights for illuminating the same, and the mechanism for driving the band. The plate 5 also constitutes a reflector for the electric lights within the forward compartment, as will be presently understood. The rear compartment has mounted within it at its bottom a two-wall casing which extends between the sides 3 and 4 and which includes a top wall 6 and a rear wall 7, these walls being complementary to the base 1 and plate 5 respectively. The display band which carries the advertising matter is indicated in general by the numeral 8 and this band is adapted to be wound upon and unwound from upper and lower take-up rolls indicated respectively by the numerals 9 and 10, these rolls being provided at their ends with trunnions

11 and 12 respectively mounted within suitable bearings in the side plates 3 and 4 of the structure. Each of the rolls 9 and 10 is provided with an eye or other suitable connecting element 13 for the engagement therewith of a hook 14 which is carried at each end of the band 8. From the upper roll 9 the display band 8 passes over an idle guide roll 15 and thence downwardly vertically of the front of the casing 2 and behind a pane of glass which is mounted within the said front and which will presently be more specifically described. The band is then passed beneath an idle roll 16 and thence wound upon the roll 10. It will be observed that the roll 15 is located above and forwardly of the roll 9 and that the roll 16 is located below and forwardly of the roll 10 and in a manner which will be presently explained, the roll 16 serves also as a contact member common to all of a number of contacts between which and the said roll the band 8 is caused to travel. Both rolls 9 and 10 are driven from a drive shaft common to the two rolls and this shaft is indicated by the numeral 17 and is rotatably and slidably mounted at its ends in sleeve extensions 18 of clutch members 19 and 20 which are in turn rotatably mounted in bearings 21 fitted through the side plates 3 and 4 and provided at their outer ends with sprocket gears 22 and 23 respectively. A sprocket chain 24 is trained over the gear 22 and over a similar gear 25 fixed upon the trunnion 11 of the upper roll 9. A sprocket chain 26 is trained over the sprocket gear 23 and over a similar gear 27 upon the trunnion 12 of the lower roll. It will now be understood that when the gear 22 is clutched with the shaft 17 and the said shaft is rotated, the display band will be wound upon the upper roll and unwound from the lower roll and that, on the other hand, when the gear 23 is clutched for rotation with the shaft 17, the display band will be wound upon the lower roll and thus by selectively throwing one or the other of the gears into clutch with the shaft the direction of travel of the display band may be reversed. In order that the gears 22 and 23 may be clutched with the shaft 17, clutch members 28 and 29 are fixed upon the shaft 17 near the ends thereof and are arranged, upon sliding movement of the shaft 17 in one direction or the other, to coact with the respective clutch members 19 and 20 whereby to clutch the gears 22 or 23, as the case may be, for rotation with the said shaft 17. The numeral 30 indicates an electric motor which is mounted upon the side plate 3 of the structure and the shaft of this motor is indicated by the numeral 31 and is provided with a worm 32 meshing with a worm gear 33 which is fixed upon the shaft 17 and is shiftable

therewith. In order that the shaft 17 may be shifted so as to throw one or the other of the gears 22 and 23 into clutch with the shaft 17, a grooved collar 34 is fixed upon the said shaft and engaging this collar is a yoke 35 at the upper end of a lever arm 36 which is pivotally mounted as at 37 upon the partition plate 5. The lower end of the lever arm 36 extends through a slot 38 in the wall 6 and is pivotally connected as at 39 to a core 40 which is common to two solenoids 41 and 42 mounted beneath the said wall 6. It will now be understood that when the solenoid 41 is energized, the core will be shifted to the right in Fig. 3 of the drawings, thereby so rocking the lever arm 36 as to shift the clutch member 29 into clutch with the member 20 when upon rotation of the shaft 17 through the motor 30 the lower roll will be rotated to take up the display band, the said band at such time traveling downwardly. On the other hand, when the solenoid 42 is energized the lever arm will be so rocked as to shift the clutch member 28 into clutch with the member 19 and upon rotation of the shaft 17 the upper roll will be rotated whereby to cause the display band to travel in an upward direction. For a purpose to be presently explained, the lever arm 36 carries a double ended contact blade 43 and a similar blade 44. The ends of the blade 43 are, in the swinging movement of the lower end of the lever arm 36, designed to be brought into contact with fixed contacts 45 and 46 mounted upon the wall 6 and located at opposite sides of the said arm. In like manner the ends of the blade 44 are designed to coact with fixed contacts 47 and 48 also mounted upon the wall 6 at opposite sides of the arm 36. The purpose of the contacts above referred to will be presently fully set forth in connection with the description of operation of the sign.

The stopping and starting mechanism includes two solenoids, one indicated by the numeral 49 and the other by the numeral 50, these solenoids having cores 51 and 52 respectively and the said solenoids being mounted within the casing comprised by the walls 6 and 7 and having their cores extending up through the wall 6 in the manner clearly shown in Fig. 3 of the drawings. The cores 51 and 52 at their upper ends are pivotally connected as at 53 to the arms 54 and 55 respectively of a contact member which is mounted for rocking movement as at 56 on a bracket 57 in turn mounted upon the wall 6. An arm 58 extends upwardly from the intermediate portion of the contact member above the pivot 56 and a spring 59 is connected at its upper end to the upper end of the arm 58 and at its lower end to the bracket 57 below the said pivot 56. At one side of the bracket

57 and upon the said wall 6 there are mounted spaced contacts 60 and 61 and at the other side of the said bracket there are mounted spaced contacts 62 and 63 and by reference to Fig. 3 of the drawings it will be understood that when the solenoid 49 is energized the contact member will be so rocked that its arm 54 will swing downwardly and bridge the contacts 62 and 63 and the contact member will be held in this position, inasmuch as the spring 59 is then past center, until the solenoid 50 is energized, whereupon the contact member will be so rocked that its arm 55 will swing downwardly thereby bridging the contact members 60 and 61, and, of course, the said contact member will be held in this latter position by the spring 59 in the manner above stated. The purpose of the contacts 60 and 61 and the contacts 62 and 63 will presently be fully explained.

The circuit opening and closing mechanism above described coacts with an automatic timing mechanism shown clearly in Figs. 8 and 9 of the drawings. The timing mechanism is mounted within a casing 64 and includes a main gear wheel 65 which meshes with a pinion 66 fixed upon a shaft 67. Also fixed upon this shaft is a gear 68 which meshes with a pinion 69 fixed upon a shaft 70, this shaft carrying an escapement wheel 71 which forms one element of an ordinary escapement indicated in general by the numeral 72. A lever arm 73 is pivotally mounted at one end as at 74 upon the same shaft or spindle as the gear 65 and this arm carries a pawl 75 which is yieldably held by means of a spring 76, in coactive engagement with the teeth of the gear 65 in the manner clearly shown in Fig. 8 of the drawings. A spring 77 is coiled one or more times as at 78 about the spindle 74 and at one end is connected as at 79 to the lever arm 73 and at its other end is connected to a fixed portion of the casing 64 as indicated at 80. It will now be apparent that when the lever arm 73 is swung downwardly, the spring 77 will be placed under tension and when the arm is released the spring will tend to swing the same upwardly but this movement will be gradual due to the escapement provided in conjunction with the gearing. Downward movement of the lever arm 73 is caused by downward swinging of the contact arm 54 through the energization of the solenoid 49, the said arm being provided with a terminal extension 81 which projects through a slot in one wall of the casing 64 and is designed to engage against a block of insulation 82 upon the upper edge of the lever arm 73. In order that the upward movement of the arm 73 may be retarded and in order, therefore, that the period of time re-

quired for the arm to return from lowered to raised position may be varied, means is provided which will now be described. One wall of the casing 64 is formed with a slot 83 through which the arm 73 extends in the manner clearly shown in Figs. 8 and 9 of the drawings and disposed against the outer face of the said wall of the casing is a strip 84 provided with a slot 85 which extends longitudinally thereof and which receives a set screw 86 which may be loosened to permit of vertical adjustment of the said strip 84. The strip is provided at one lateral edge with a finger 87 which extends across the slot 83 and in the path of upward swinging movement of the lever arm 73 and at its other lateral edge the strip 84 is provided with a pointer 88. A series of scale marks 89 is provided upon the said outer face of the said wall of the casing 64 and these scale marks have suitable designating numerals 90 which preferably indicate in seconds the length of time it will require the arm 73 to return from its lowermost position to position in contact with the finger 87, the proper scale mark to indicate the length of this period of time being indicated by the pointer 88 in the adjustment of the strip 84. The arm 73 is designed to make electrical contact with the finger 87 in a manner and for a purpose to be presently described and in order that the timing device may be rendered inactive whenever desired, a sleeve 91 is slidably mounted upon the lever arm 73 and while it normally occupies substantially the position shown in Fig. 8 of the drawings, it may be slid inwardly so that when the arm 73 swings upwardly through the action of the spring 77, the sleeve 91 will contact the finger 87 and the circuit in which the said finger and arm are located will not be closed. Also, for a purpose to be presently explained, the arm 73 is provided at its outer end with a carbon contact button 92.

In that form of the invention shown in Figs. 1 to 5 inclusive the display band 8 is passed directly over the rolls 15 and 16, which rolls are housed within the casing. However, in the event that it becomes desirable to increase the area of the portion of the band to be displayed at any one time, uprights 93 are secured to the side plates 3 and 4 at the front thereof and extend a greater or less distance above the upper edges of the said plates and mounted between the upper ends of the uprights 93 is a guide roll 94 over which the band is passed instead of over the guide roll 15, the band being further passed over a roll 95 mounted between the ends of arms 96 which extend rearwardly from the uprights 93. Shorter arms 97 extend rearwardly from the uprights 93 and carry electric light

bulbs 98 whereby the display band may be illuminated.

In the preferred form of the invention an electric light bulb 99 is mounted upon the side plate 3 and a similar bulb is mounted upon the side plate 4 and these bulbs are either of clear glass or frosted, and when the display band is stationary and an advertisement is being displayed it is intended that these bulbs shall be lighted so as to illuminate the sign. While the display band, however, is moving from one position to another so as to display another portion thereof, it is intended that the bulbs 99 shall be cut out of circuit and that a bulb 100 shall be lighted, which bulb is mounted upon the partition plate 5 and is preferably of colored glass. The manner in which the bulbs are arranged in the electric circuit and the means provided for automatically cutting the bulbs into and out of circuit will be fully set forth in the description of operation of the sign to be presently given.

In that form of the invention shown in Figs. 1 to 5 inclusive a plurality of contact members are arranged in juxtaposition to the roll 16 and in this said form of the invention these contact members are in the nature of idle rolls indicated by the numerals 101, 102, 103 and 104. The display band in this form of the invention is provided at suitable intervals with contacts which may be in the nature of metallic eyelets or rivets fastened through the band at proper points as indicated at 105 in Fig. 12 of the drawings and these contacts are so arranged as to pass between the roll 16 and the roll 101 and adjacent one end of the band a contact 106 is secured thereto and is so positioned as to pass between the roll 16 and roll 102. In a like manner the band is provided near its other end with a contact 107 positioned to pass between the roll 16 and the contact roll 103 and with another contact 108 designed to pass between the roll 16 and the contact roll 104. It will be understood, of course, that when one or another of the contacts carried by the band passes between the roll 16 and the respective one of the contact rolls, a circuit is closed controlling the further movement of the band. For example, when one of the contacts 105 passes between the rolls 16 and 101, a circuit will be closed stopping the travel of the band and lighting the bulbs 98. After the band has traveled its full length or such portion of its length that a contact 106 will pass between the rolls 16 and 102, a circuit will be closed shifting the shaft 17 so as to provide for reverse movement of the band and in like manner when the band has traveled such distance that the other contact 107 passes between the rolls 16 and 103, a circuit will be closed again shifting

the shaft 17 so as to provide for travel of the band in a reverse direction. Also, when the contacts 108 pass between the rolls 16 and 104, a circuit will be closed stopping the travel of the band and illuminating the sign through the medium of the bulbs 99. The rolls 101, 102, 103, and 104 may be supported in any desired manner and in that form of the invention shown in Fig. 13 of the drawings, the rolls are each supported between the ends of arms 109 which are pivotally mounted as at 110 upon the base 1. A spring 111 is assembled with each pivot 110 and bears at one end against the base 1 in the manner shown in Fig. 13 and at its other end bears downwardly upon the rear end of one or both of the arms 109, whereby to yieldably hold the roll supported between these arms in contact with the roll 16. In this form of the invention the metallic contacts carried by the display band, pass between the metallic rolls, completing the several circuits but if it should be found desirable not to have these metallic contacts serve this purpose a circuit closing device such as shown in Fig. 14 of the drawings may be employed. In this form of the invention the rolls 101, 102, 103, and 104 are mounted between the forward ends of arms 112 which arms are pivotally mounted as at 113 upon the base 1 and are held by means of a spring 114 so that each respective roll will bear yieldably against the roll 16 or more specifically against the band as it passes between these rolls. At their rear ends the arms 112 are provided with contacts 115 designed to cooperate with a fixed contact 116 which may be adjusted with relation to the contact 115 through the medium of a set screw 117. Now, when the metallic eyelets or rivets upon the band pass between the roll 16 and one or another of the rolls which are supported by the arms 112, the respective arms will be swung downwardly at their forward ends and upwardly at their rear ends, thereby bringing the contact 115 into engagement with the contact 116 and closing the respective circuit.

While it is preferable that a timing device such as heretofore described and shown in Figs. 8 and 9, be employed, if desired, a timing device of the character shown in Fig. 16 may be employed in lieu thereof. In this figure the numeral 118 indicates a base of insulating material upon which is mounted an arched wire or rod 119 of some metal having a high coefficient of expansion and contraction and suitably wound about this member is a conductor wire 120, which, when current is passed therethrough, serves to heat the arched wire 119 and cause the same to expand. A contact 121 is adjustably mounted above the arched wire 119 and when the said wire 119 expands it will engage the said

contact 121 and a circuit will be closed breaking the circuit in which the wire 120 is located.

If desired, a timing device such as shown in Fig. 17 of the drawings may be employed and in this figure the numeral 122 indicates a rotary shaft and 123 indicates a sliding contact member carried by the shaft and having connected to it the arms 124 of a centrifugal governor, the balls of which are indicated by the numeral 125. The numeral 126 indicates a fixed contact which is in the same circuit with the contact 123 and when the shaft 122, which shaft is either the motor shaft itself or a shaft driven therefrom, has gained such speed that the centrifugal governor device will slide the contact pin 123 upwardly and into contact with the contact 126, the circuit in which these contacts are located will be closed, thereby stopping the travel of the display band and closing the circuit through the light bulbs 99.

If desired, instead of employing rolls 101, 102, 103 and 104, circuit closing means such as shown in Fig. 15 of the drawings may be employed. In this figure the numeral 127 indicates a roll which is the equivalent of the roll 16 heretofore described and the numeral 128 indicates the display band which, at suitable intervals, is provided with slots or openings 129 which travel in the path of contact rolls 130 which are four in number and correspond to the rolls 101, 102, 103 and 104, these contact rolls 130 being mounted at the outer ends of arms 131 which are suitably connected in the respective circuits which control the movement of the band.

In Fig. 18 of the drawings there is illustrated a still further modified form of circuit closing device. The structure shown in this figure is especially designed for use when the sign is to be placed within a street railway car and in the figure the numeral 132 indicates the trolley wire and 133 a button of insulation, a number of these buttons being employed and placed at suitable intervals along the wire 132. The trolley pole is indicated by the numeral 134 and leading from this pole is a conductor wire 135 in which suitable resistance is interposed as at 136, the wire leading to an electromagnet 137 and the other wire for this magnet, indicated at 138 being led to ground. The armature for the magnet is indicated by the numeral 139 and this armature serves also as a contact member and cooperates with a fixed contact indicated by the numeral 140, the armature and contact 140 being in the same circuit as in all the previously described forms of circuit closing devices. It will now be understood that normally the magnet 137 is energized and the armature 139 is attracted thereto and held out of engagement with the contact 140. However,

when the trolley wheel passes one of the buttons 133, the circuit is momentarily broken and inasmuch as the magnet 137 is deenergized the armature 139 is pulled sharply into engagement with the contact 140 by means of a spring 141 connected to the said armature.

In Fig. 21 of the drawings there is illustrated a circuit closing device or switch which is employed when a number of different colored lights are used to illuminate the sign and this said device comprises a plate 142 of insulation which upstands from an attaching base portion 143 designed to be adjustably disposed upon a supporting arm or ledge 144 secured to the casing 64 and extending outwardly therefrom, the base portion being held in adjustment by means of a set screw 145 fitted through a slot 146 in the said portion and into the arm or ledge 144. Mounted upon the plate 142 and insulated from each other, are contact strips 147, 148, 149, 150 and 151, which are in circuit respectively with red, blue, green, amber and white light bulbs. The strips are, as stated, suitably insulated from each other and yet are arranged relatively close together and in an arcuate series, the strips being gradually decreased in width from their outer to their inner ends so that when the plate 142 is moved outwardly upon the supporting arm or ledge 144, the carbon contact button 92 upon the lever arm 73 will pass across the faces of the strips nearer to their smaller ends than to their larger ends and less time will be consumed in the return of the lever to its normal position. Upon return of the lever to its normal position it is designed to engage a contact strip 152 at the upper edge of the plate 142, this strip corresponding to the contact finger 87 heretofore described. It will now be understood that when the lever has been swung downwardly to its limit of movement in this direction, the carbon contact button 92 will be in contact with the strip 147, and the sign will be illuminated by a red light. As the lever arm 73 swings upwardly in its return movement, the button will pass from the strip 147 to the strip 148 and, therefore, the blue light will be momentarily blended with the red light and next the blue light alone will be lighted, this blending and display of colors being continued until the button has passed over all of the said strips.

The transparent front of the casing may be in the nature of a pane of clear glass or if there is to be a total lack of illumination within the casing while the display band is being moved, a front of the kind shown in Fig. 20 of the drawings may be employed. In this figure the numerals 153 and 154 indicate two panes of glass secured together in any suitable manner face to face and applied

to the face of one pane is an extremely thin coat 155 of silver which covers the entire face of the pane except portions purposely not covered whereby to form letters in the nature of advertising matter as indicated at 156. The transparent front thus produced is to all appearances transparent and when the interior of the casing is illuminated, the display band may be readily viewed through the said front. However, when the band is traveling and the electric bulbs within the casing are not lighted, the dark interior of the casing will serve to convert the front into a mirror except where the letters or other characters 156 occur.

By reference now to Fig. 19 of the drawings, the numeral 157 indicates one of the line wires and the numeral 158, the other of these wires, supplying current from any suitable source of electricity to the several mechanisms of the sign. The wire 158 is connected electrically to the bracket 57 which supports the rocking contact member embodying the contact arms 54 and 55. This wire is also connected electrically with the arm 36. A branch wire 159 leads from the wire 158 and is connected to one terminal of the solenoid 49 and a wire 160 leads from the other terminal of the solenoid to the contact 61. A wire 161 leads from the contact 62 to one terminal of the solenoid 50 and a wire 162 leads from the other terminal of the said solenoid to the contact 44 carried by the lever arm 36. A wire 163 leads from the contact 63 to the motor 30, and another wire 164 leads from this motor to the line wire 157. As shown in Fig. 19, a switch is interposed in the wire 159 and this switch corresponds to any one of the several timing devices heretofore described. A wire 165 is connected to the contact 60 and to the line wire 157 and it is in this wire that the white lights 99 are interposed. The wire 157 leads to and connects electrically with the roll 16 and any suitable resistance 166 is interposed in the said wire. A wire 167 is connected to the contact 101 and to the contact 47, and a wire 168 is connected to the contact 104 and to the contact 48. A wire 169 is connected to the contact 102 and to one terminal of the solenoid 42, and a wire 170 is connected to the other terminal of this solenoid and to the contact 45. A wire 171 is connected to one terminal of the solenoid 41 and to the contact 46, and a wire 172 is connected to the other terminal of the said solenoid and to the contact 103. The red light or other colored light 100 which is to be lighted while the band is moving, is interposed in a shunt circuit 173 with the motor 30.

It will now be assumed that the band is traveling in an upward direction. As soon as one of the contacts 105 passes between the roll 16 and the roll 101, the circuit will be

closed through the wire 157, wire 167, contacts 47 and 44, solenoid 50, contact arm 54, and line wire 158. Thus the solenoid will be energized and the contact arm 55 will bridge the contacts 60 and 61. Also upon energization of the solenoid 50 the contact arm 54 will be moved out of position bridging the contacts 62 and 63, and, therefore, current will be cut off from the motor. Current will now flow from the wire 158 through contacts 55 and 60, white light bulb 99 and wire 165 to line wire 157 and the band will be illuminated by white light rays, while it remains stationary. In the meantime the lever 73 is returned to normal position and when this lever arm comes in contact with the finger 87, a circuit is closed equivalent to closing of the switch which is interposed in the wire 159. Current then flows to wire 158, wire 159, solenoid 49 and out to line, through contacts 61 and 60 and wire 165 to line 157. The solenoid 49 being momentarily energized, the contact arm 55 is swung upwardly out of position bridging the contacts 60 and 61 and the arm 54 in swinging downwardly will bridge contacts 62 and 63. Current will then flow from wire 158 through contact arm 54 and contact 63 to wire 163 and to motor 30 and thence out through line 164 to line 157. The lamp 100 being in shunt with the motor 30, the lamp will be lighted while the motor is running or, in other words, while the band is traveling. When the band has traveled such distance as to bring the contact 106 between the roll 16 and roll 102, the circuit will be closed through line 157, contact rolls 16 and 102, wire 169, solenoid 42, wire 170, contacts 45 and 43, and thence out through wire 158. This will, of course, result in energization of the solenoid 42 and as a consequence the lever arm 36 will be swung over so as to provide for reverse travel of the band and the said band will then travel downwardly until the first one of the contacts 108 passes between the roll 16 and contact roll 104, whereupon the circuit will be closed from wire 157 through contact rolls 16 and 104 to wire 168, thence through contacts 48 and 44 and through solenoid 50 and contact arm 54 to line 158. The solenoid 50 being in this manner energized, the circuit will again be closed through the white light 99 and current will be cut off from the motor, thereby resulting in stopping of the band. After the band has traveled such distance as to bring the contact 107 between the roll 16 and contact roll 103, the circuit will be closed so as to energize the solenoid 41 and the direction of travel of the band will again be reversed.

By referring now to Fig. 10 of the drawings, it will be observed that at the first part of the band or, in other words, at one end of the band, the band is provided with

in each of the sign spaces with one of the contacts 105 and one of the contacts 108 and that farther along and, in fact, throughout the remainder of the length of the band, the contacts 105 occur only in every other sign space as also the contacts 108, so that the first several sign spaces will be successively or consecutively displayed, whereupon in the further travel of the band every other sign space will be skipped in the upward travel of the band and the sign spaces displayed in the up travel of the band will be skipped in the down travel of the band. If desired, a single band may be made to contain a number of different advertisements relating to the same line of goods or a single band may contain a number of groups of advertisements, the advertisements of each group relating to a certain class of merchandise. Thus a single band may contain cigar advertisements, drug advertisements, soap advertisements, etc., as shown in Fig. 11 of the drawings, and by providing the contacts 106 and 107 at the ends of each group of advertisements, that one particular group only will be automatically displayed, the direction of travel of the band being automatically reversed.

Having thus described the invention, what is claimed as new is:

1. In a sign of the class described, an electric motor, a drive shaft driven by the said motor, take-up rolls each having operative gear connection with the said shaft, a display band wound at its ends upon the rolls, timing mechanism arranged to close the circuit through the motor at predetermined intervals of time, means controlled through the travel of the band for breaking the motor circuit, gears carried by the said shaft and arranged to be selectively clutched with the shaft and having operative gear connection with the rolls, and means actuated also through the travel of the band to actuate the clutch devices whereby to provide for automatic reversal of the direction of travel of the band.
2. In a sign of the class described, take-up rolls, a display band wound at its ends upon the said rolls, means for selectively rotating the rolls, means controlled through the travel of the band for rendering the rotating means inactive, and a timing device for rendering the said rotating means active at predetermined intervals of time.
3. In a sign of the class described, take-up rolls, a display band wound at its ends upon the said rolls, means for selectively rotating the rolls, means controlled through the travel of the band for rendering the rotating means inactive, a timing device for rendering the said rotating means active at predetermined intervals of time, and an electric lighting circuit and means for closing the

said circuit when the roll rotating means is inactive.

4. In a sign of the class described, take-up rolls, a display band wound at its ends upon the said rolls, means for selectively rotating the rolls, means controlled through travel of the band for rendering the rotating means inactive, a timing device for rendering the said rotating means active at predetermined intervals of time, electric light bulbs of different colors for illuminating said display band, an electric circuit in which said bulbs are arranged, means for closing the circuit through one bulb during the period of time the roll rotating means is inactive, and means for closing the circuit through another bulb during the period of time the roll rotating means is active.

5. In a sign of the class described, take-up rolls, a display band wound thereon, a light circuit, an electric motor for driving the said rolls, an electric circuit having solenoids interposed therein, the said motor being also in said circuit, spaced sets of contacts, an oscillatory contact arm in said circuit and operatively connected with the cores of the said solenoids and arranged upon energization of one of the solenoids to be moved to position bridging the contacts of one set and upon energization of the other solenoid to be moved to position bridging the contacts of the other set, a circuit closing device in circuit with the first mentioned solenoid and arranged to close the circuit through the said solenoid at predetermined intervals, the contact member when bridging the contacts of the first mentioned set being arranged to close the circuit through the motor, and means controlled by the travel of the band for closing the circuit through the other solenoid at predetermined intervals whereby to energize the same and move the contact member to position breaking the circuit through the motor and closing the light circuit.

6. In a sign of the class described, take-up rolls, a display band wound thereon, a light circuit, an electric motor for driving the said rolls, an electric circuit having solenoids interposed therein, the said motor being also in said circuit, spaced sets of contacts, an oscillatory contact arm in said circuit and operatively connected with the cores of the said solenoids and arranged upon energization of one of the solenoids to be moved to position bridging the contacts of one set and upon energization of the other solenoid to be moved to position bridging the contacts of the other set, a circuit closing device in circuit with the first mentioned solenoid and arranged to close the circuit through the said solenoid at predetermined intervals, the contact member when bridging the contacts of the first mentioned set being

arranged to close the circuit through the motor, means controlled by the travel of the band for closing the circuit through the other solenoid at predetermined intervals whereby to energize the same and move the contact member to position breaking the circuit through the motor and closing the light circuit, electrically operated means for reversing the direction of travel of the said band, and means controlled by the travel of the band for closing the circuits through the said reversing means.

7. A timing device for an electric sign including a contact arm in an electric circuit, an adjustable contact member in the path of movement of the arm, means for moving the arm out of contact with the said member, means for returning the contact arm to position in contact with the said member within a predetermined period of time, and a circuit to be closed by the said arm and member.

8. In an automatically controlled electric sign of the class described, a display band, selectively arranged protuberances thereon, an electric circuit having means arranged therein upon closing of said circuit to control the movement of the band, a pivoted arm, a roller about which the band is arranged to travel, means carried by the arm resting against the band in the path of said protuberances, and normally spaced contacts in said circuit and one relatively fixed and the other carried by the said arm whereby upon passage of one of the protuberances between the roller and the said member upon the arm the contacts will be brought into mutual engagement for closing said circuit.

9. In an electric sign of the class described, take-up rolls, a display band wound thereon, a motor for driving said rolls, timing mechanism for closing the circuit through the motor at predetermined intervals, electrically operated means for breaking the circuit through the motor when the band is traveling in one direction, electrically operated means for breaking the circuit through the motor when the band is traveling in another direction, electrically operated means for reversing the direction of travel of the band when the band has completed its travel in either direction, series of electric contacts in electric circuit with said means and normally spaced, and means carried by the band selectively arranged to permit of coaction of the contacts of the series.

10. In an electric sign of the class described, take-up rolls, a display band wound thereon, a motor for driving said rolls, timing mechanism for closing the circuit through the motor at predetermined intervals, electrically operated means for breaking the circuit through the motor when the

band is traveling in one direction, electrically operated means for breaking the circuit through the motor when the band is traveling in another direction, electrically
5 operated means for reversing the direction of travel of the band when the band has completed its travel in either direction, series of electric contacts in electric circuit with said means and normally spaced, means

carried by the band selectively arranged to 10 permit of coaction of the contacts of the series, an electric lighting circuit including an electric lamp for illuminating the said band, and means for closing the lighting 15 circuit when either of the two first-mentioned means is active.

In testimony whereof I affix my signature.
RICHARD M. CRAIG. [L.S.]