

June 15, 1926.

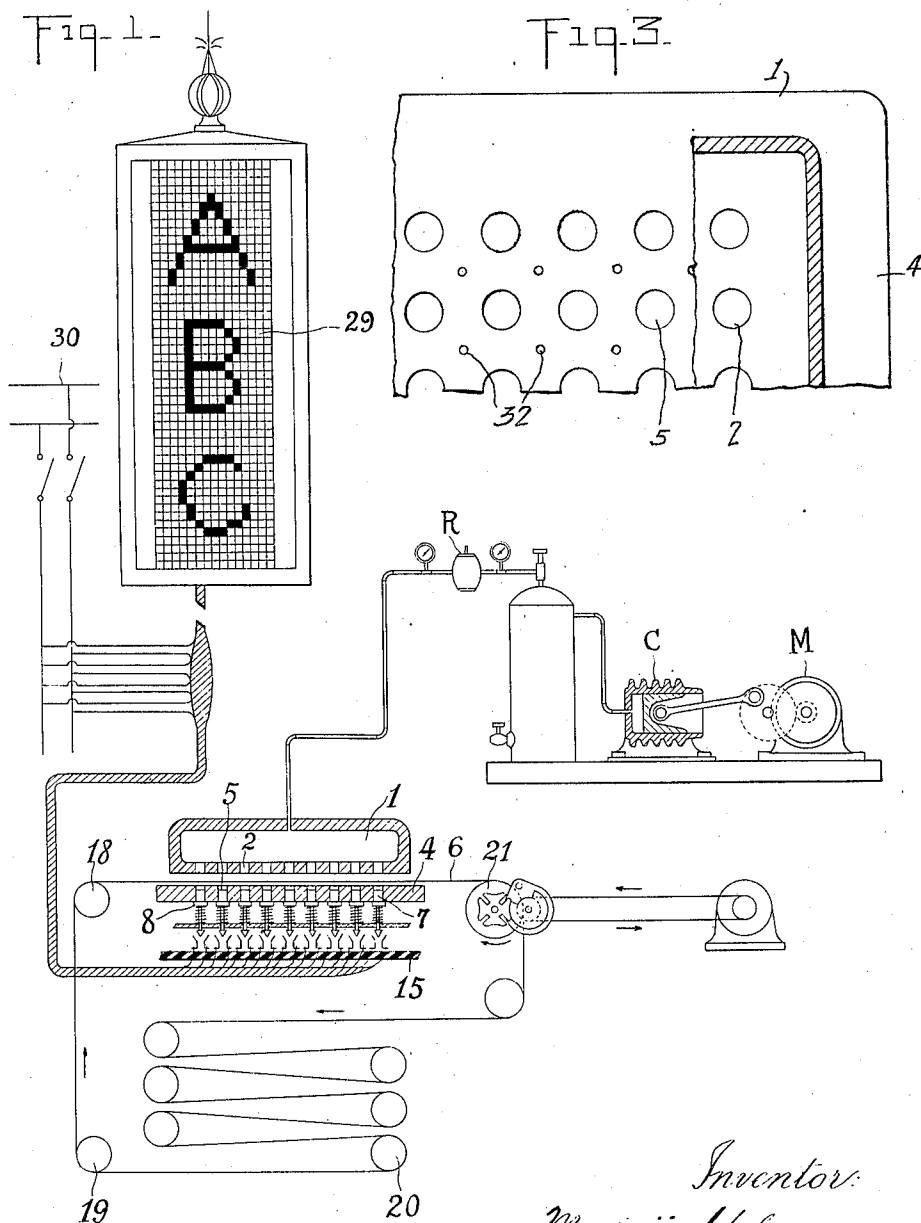
1,588,831

M. YOKOYAMA

SIGN CONTROLLER

Filed May 29, 1924

2 Sheets-Sheet 1



Inventor:
Masaji Yokoyama
 By Attys
 Draser, Myers & Manley

June 15, 1926.

M. YOKOYAMA

SIGN CONTROLLER

Filed May 29, 1924

1,588,831

2 Sheets-Sheet 2

Fig. 2

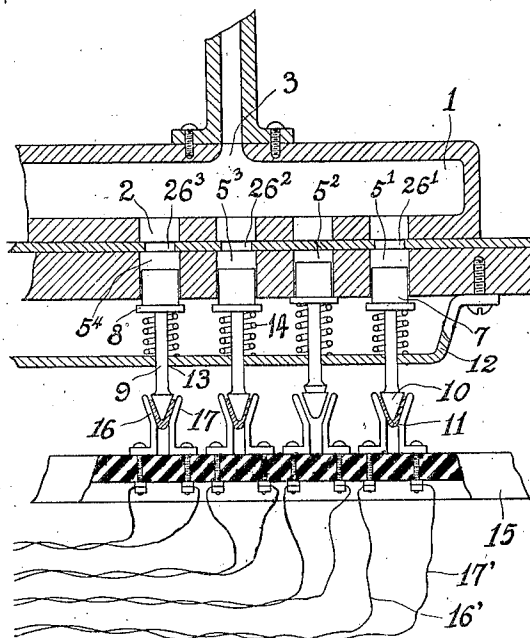


Fig. 5

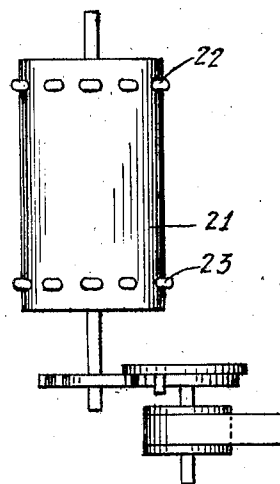
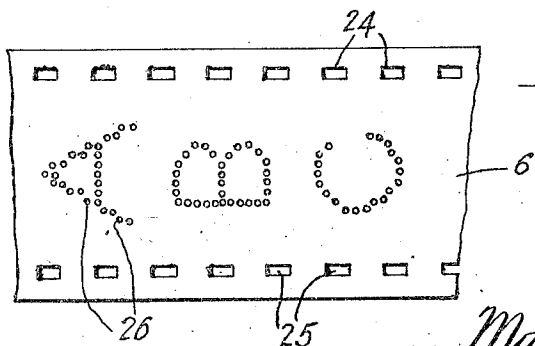


Fig. 4



Inventor:
Masaji Yokoyama
By *Atty.*
Dracer, Myers & Manley

UNITED STATES PATENT OFFICE.

MASAJI YOKOYAMA, OF TOKYO, JAPAN.

SIGN CONTROLLER.

Application filed May 29, 1924, Serial No. 716,726, and in Japan March 15, 1924.

This invention relates to a sign controller or advertising apparatus and more particularly, the invention has to do with such apparatus in which a display board or tower is provided with a multitude of incandescent electric lamps which are automatically controlled by a suitable controlling mechanism in such a manner that advertising matters will be made to appear or to appear and disappear on the display board or tower.

According to this invention all the electric lamps on the display board or tower are connected with the respective switches arranged in the controlling mechanism and certain lamps on the display board or tower, the aggroupment of which represents the advertising matter to be exhibited, are caused to glow by closing the corresponding switches in the controlling mechanism by means of a switch-operating means inserted therein or by moving the same through the said controlling mechanism. The switch-operating means consists essentially of a belt or the like having singular portions. By placing the switch-operating means in the controlling mechanism or by moving the same intermittently or continuously through the said controlling mechanism, the switches are acted upon by the singular portions of the belt or the like, causing the corresponding electric lamps on the display board or tower to glow.

In one type of this invention a belt or the like made of a flexible material is perforated so as to represent letters or designs, and by placing the said belt or the like between the compressed-air chamber and the foundation board, the pistons provided in the holes formed in the said board, when these holes register with the perforations of the belt or the like, are displaced so as to short circuit the fixed contacts on the switch board, whereby the electric lamps on the display board or tower connected to the said fixed contacts are caused to glow, making advertising letters or designs upon the display board or tower to appear.

One object of this invention is to display moving pictures or designs or a long sentence which will appear continuously on the display board or tower. Another object is to make the replacement of the advertising matter on the display board or tower practicable in very simple and easy manner at

a distant point remote from the said display board or tower.

This invention may be best explained by means of illustrations and for this purpose references are made to the accompanying drawings, wherein:

Figure 1 shows a diagrammatic view of the general arrangement of the apparatus according to this invention.

Figure 2 shows a longitudinal section of the controlling mechanism, a part thereof being broken.

Figures 3 to 5 show the details of the controlling mechanism.

Referring to Figures 1 and 2, 1 is the compressed air chamber. It has at its top-side an opening 3 for the drawing in of compressed air and has holes 2 on the bottom side. 4 is a foundation board having holes 5 each registering with one of the holes 2. The foundation board 4 is arranged in such a manner that the distance between the same and the chamber 1 can be adjusted to suit the thickness of the belt 6 which is inserted between them. In each of the holes 5 a piston 7 is provided slidably, the upward motion of which is limited by means of the flange 8. The flange 8 has extending downwardly therefrom a piston rod 9 which passes through a hole 13 perforated on the cover 12 attached to the bottom side of the board 4. To the lower end of the piston rod 9 is attached a contact piece 11 through the intermediary of an insulator 10. 14 is a resilient spring which normally keeps the piston 7 in its raised position. Fixed contacts 16 and 17 provided on the switch board 15 are connected with the wires 16' and 17' respectively. The wires 16' are connected with the respective electric lamps on the display board or tower and the wires 17' with the source of power 30.

Belt 6 is perforated with a group of holes 26 (Figure 4). This group of holes represents letters or designs to be exhibited on the display board or tower, although the configuration of the group can represent an entirely different figure according to the mode of electrical connections. These holes 26 are situated so as to register at one hand with the perforations 2 on the bottom of the air chamber 1 and at the other hand with the perforations 5 on the foundation board 4. In this manner the holes 5 are

caused to communicate with the compressed air chamber 1, at the same time those holes 5 which do not come to register with the holes 26 are cut off from the supply of compressed air.

The belt 6 is preferably made endless and is carried over the series of idle rollers 18, 19, 20 and a feed roller 21. The feeding of the belt 6, either continuous or intermittent as desired, is carried on by means of two series of teeth 22 and 23 provided on the feed roller 21 (Figure 5) and engaging with the corresponding perforations 24 and 25 provided on the belt. The intermittent motion may be performed by means of a mechanism well known in the moving picture machines.

The chamber 1 may be supplied with compressed air produced by the compressor C driven by the motor M, after the pressure has been suitably reduced through the reducing valve R. Of course, any other suitable source of compressed air, such as a reservoir of compressed air may be used (not shown).

There are arranged on the display board or tower 29 the same number of lamps as there are the sets of the fixed contacts 16, 17. One of the terminals of the said lamp is connected through the wire 16' to the fixed contact 16 and the other to the source of electricity 30. The display board should preferably be formed of cell-like compartments, in each one of which an electric lamp is to be placed.

The operation of this apparatus is as follows:—

When the belt 6 is placed in the narrow space formed between the air chamber 1 and the foundation board 4 at a suitable position in relation to the latter in such a manner that the holes 26 register with some of the holes 5, these holes 5 will be put in communication with the air chamber 1. On the other hand, the rest of them will be covered by the solid portion of the belt 6 and the communication with the air chamber will be cut off. At the position of the belt shown in Figure 2, holes 5¹, 5³ and 5⁴, communicate with the chamber 1, but the hole 5² is cut off from such communication. In this case the pistons 7 in the holes 5¹, 5³ and 5⁴ will be pressed down by the compressed air, causing thereby the movable contacts 11 to bridge over the pairs of the fixed contacts 16, 17 and lighting the lamps on the display board connected to them. Small vent holes 32 (Figure 3) are provided on the foundation board at the portions lying between the perforations 5 to help free any air under pressure leaking from the holes 5¹, 5³ and 5⁴ into the clearance space between the under side of the belt 6 and board 4, which would if unprovided for tend to establish a certain pressure in the hole 5² which is otherwise cut

off from the pressure region. When the belt 6 is moved longitudinally by one pitch of the holes 5 in the direction indicated by the arrows by means of the intermittent driving mechanism, the holes 26² and 26³ will register with holes 5² and 5³, while the holes 5¹ and 5⁴ will be covered by the solid portions of the belt. Consequently, the pistons in the holes 5² and 5³ will be pushed down and exactly as in the previous occasion the circuits corresponding to these positions will be closed. Meanwhile, the compressed air remaining in the holes 5¹ and 5⁴ will be allowed to leak through the clearances existing around the piston or across the small space between the board 4 and the belt 6 and through the vent holes 32. In this wise the pistons in the hole 5¹ and 5⁴ will be restored to their normal upper positions by means of the springs 14 and the lamp circuits corresponding to these pistons will be broken. At the same time, the pistons in the hole 5² and 5³ will be moved downward and the corresponding lamp-circuits will be closed.

By moving a long belt intermittently as described above, the advertising matter can be exhibited so as to advance continuously onward along the display board 29.

If we divide the belt 6 into many sections equal to the length of the controlling mechanism and place the advertising matter on each section so as it differs slightly and in a continuous manner from the preceeding one, and if we displace such belt through the controlling mechanism in such a manner that the one section of the belt is replaced by the next section at one stroke by a suitable intermittent feeding mechanism, the advertising matter could be made to move on the display board in exactly similar manner as in a moving picture machine. During the intermittent feeding just described the circuits of the electric lamps are preferably broken to make the advertising matter on the display board or tower appear clearly, which could be done by any suitable means easily devised by those skilled in the art.

The controlling mechanism is not limited to those described above, but can be modified in many suitable ways. For example, in the controlling mechanism of Figure 6 which shows one of such modifications, all the devices working on compressed air are dispensed with and the closing of the lamp circuits carried out by means of a lever mechanism. In this figure, 33 is a lever pivoted at its middle portion to a fixed part 33' of the controlling mechanism. The lever 33 has at one end a roller 34 and at the other a projection 35 provided with a contact 11. When the roller 34 rolls on the surface of the belt 6, the movable contact 11 is separated from the fixed contacts 16 and 17 and the lamp circuit is broken. But when the said roller enters into the hole 26 formed on the

belt 6, the lever, being acted upon by the spring 36, rotates slightly around the pivotal point, bringing the contact 11 to bridge over the fixed contacts 16, 17 to close the lamp circuit. In this way the same result as in the controlling mechanism described above is obtained.

In the controlling mechanism shown in Figure 7, which is another modification, the belt 6 is constituted of an insulating material and the spots of conductive material 37 are embedded in the holes 26. 38 and 39 are a pair of brushes connected to the wires 16', 17' and held opposite to each other so as to be in contact with each side of the belt 6. By this arrangement, the electric lamp connected to the brushes 38 and 39 is lighted when these brushes come in electrical contact with a metallic spot 37.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A controlling and operating mechanism for electric signs comprising a compressed air chamber having one of its walls provided with perforations, a foundation board spaced from said chamber provided with perforations registering with the said perforations of the chamber, a switchboard provided with sets of pairs of fixed contacts each connected to lamps on a display board, a piston in each of said perforations of the foundation board, movable contacts carried by said pistons adapted to short circuit the said pairs of the fixed contacts when a belt having perforations therein is moved in the space between the said air chamber and the said foundation board, so that the perforations in the air chamber, belt, and foundation board come into coincidence.

2. In a switch controlling device for electric signs, a compressed air chamber having one of its walls provided with perforations, a foundation board provided with perforations registering with the said perforations of the air chamber, a switch board provided with sets of pairs of fixed contacts consisting of resilient metallic pieces each connected to lamps on a display board, a piston positioned in each of said perforations of the foundation board so as to leave a sufficient clearance space to allow leakage of compressed air along the wall of said perforations, each piston having a piston rod, the free end of which is provided with contacts adapted to engage the fixed contacts on the switch board to short circuit them, spring means normally holding the said piston rod contacts in detached spaced relation to the said fixed contacts, and each of said pistons being adapted to be displaced

to short circuit the said fixed contacts by the compressed air supplied from the said compressed air chamber when the perforation containing the said piston is caused to communicate with the perforation of the wall of the air chamber by means of a perforation formed on a movable belt inserted between the said air chamber and the said foundation board, the said piston returning to its normal position by the action of the said spring means, the compressed air remaining in the perforation in the space above the piston after communication with the compressed air chamber is broken being adapted to escape through the clearance formed around said piston.

3. In a switch controlling device for electric signs, a compressed air chamber having one of its walls provided with perforations, a foundation board provided with perforations registering with the said perforations of the air chamber, a switch board provided with sets of pairs of fixed contacts consisting of resilient metallic pieces each connected to lamps on a display board, a piston positioned in each of said perforations of the foundation board so as to leave a sufficient clearance space to allow leakage of compressed air along the wall of said perforations, each piston having a piston rod, the free end of which is provided with contacts adapted to engage the fixed contacts on the switch board to short circuit them, spring means normally holding the said piston rod contacts in detached spaced relation to the said fixed contacts, and each of said pistons being adapted to be displaced to short circuit the said fixed contacts by the compressed air supplied by the said compressed air chamber when the perforation containing the said piston is caused to communicate with the perforation of the wall of the air chamber by means of a perforation formed on a movable belt inserted between the said air chamber and the said foundation board, the said piston returning to its normal position by the action of the said spring means, the compressed air remaining in the perforation in the space above the piston after communication with the compressed air chamber is broken, being adapted to escape through the clearance formed around said piston, and the foundation board having vent holes in the portions lying between the said perforations so as to help free any air under pressure leaking into the spaces between the said foundation board and the said movable belt.

In testimony whereof I affix my signature.

MASAJI YOKOYAMA.