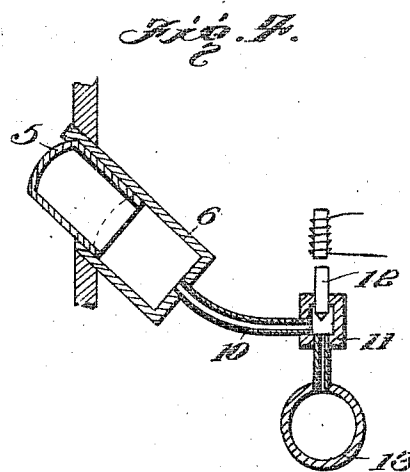
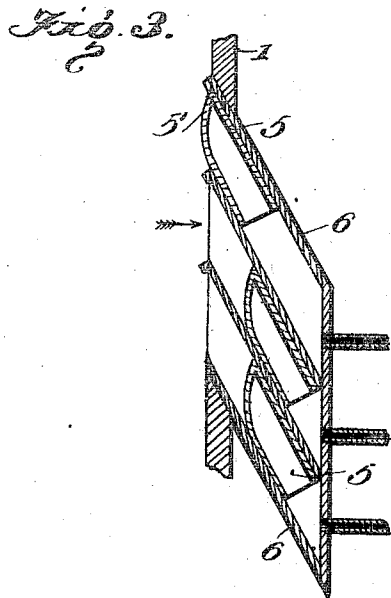
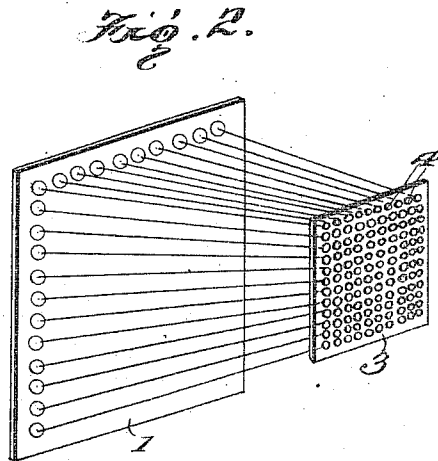
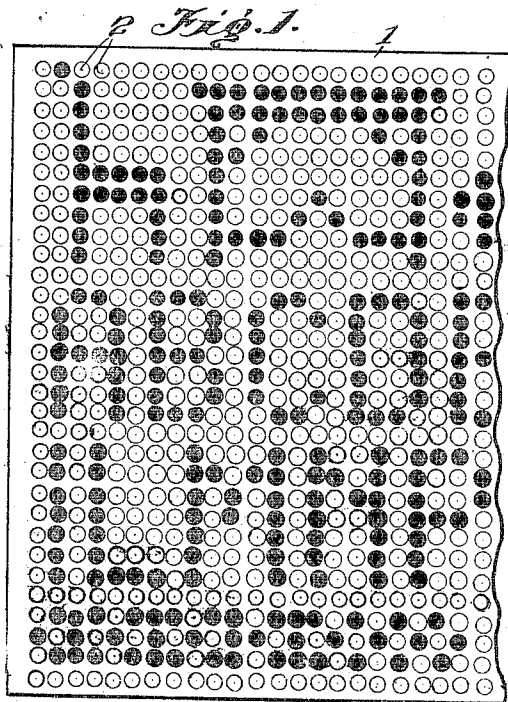


F. JANEČEK.
 DISPLAY APPARATUS.
 APPLICATION FILED JAN. 13, 1911.

1,049,240.

Patented Dec. 31, 1912.

3 SHEETS—SHEET 1.



Witnesses
Wm. P. Cornwall
J. H. Hughes

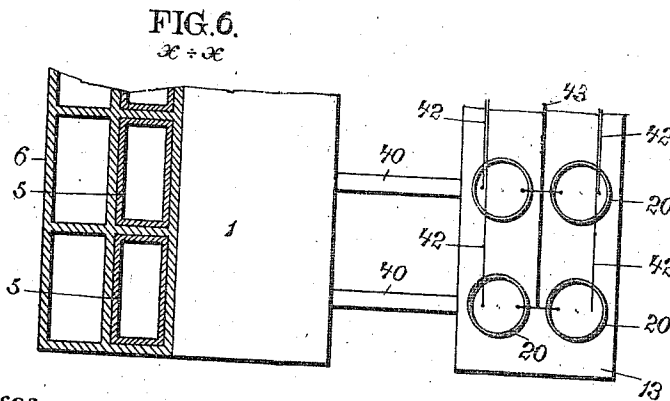
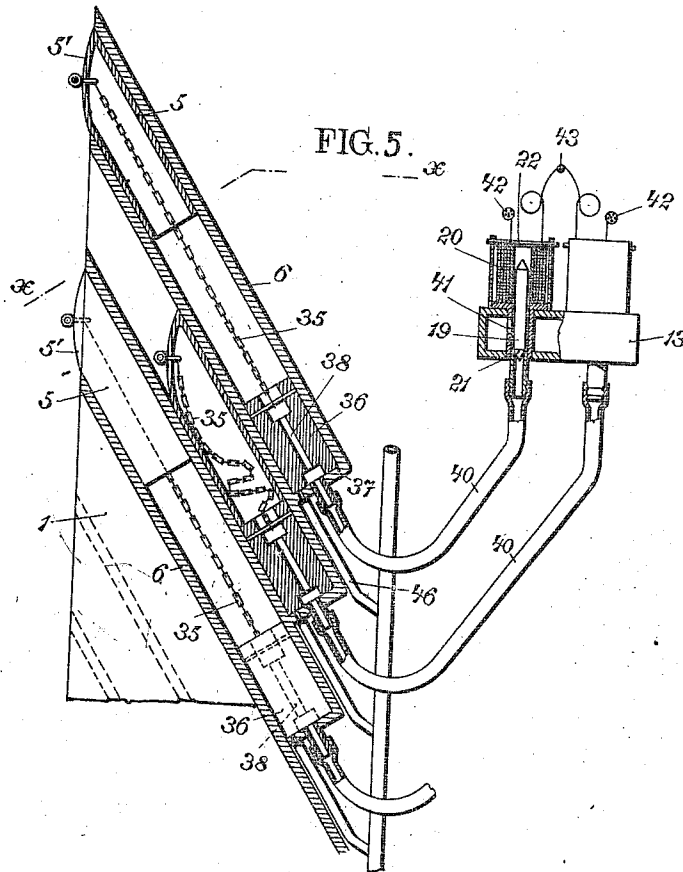
Inventor
Frazz Janeček

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Attorney

1,049,240.

Patented Dec. 31, 1912.
 3 SHEETS—SHEET 2.



Witnesses,
 Miloslav Hrubý
 František Motouš

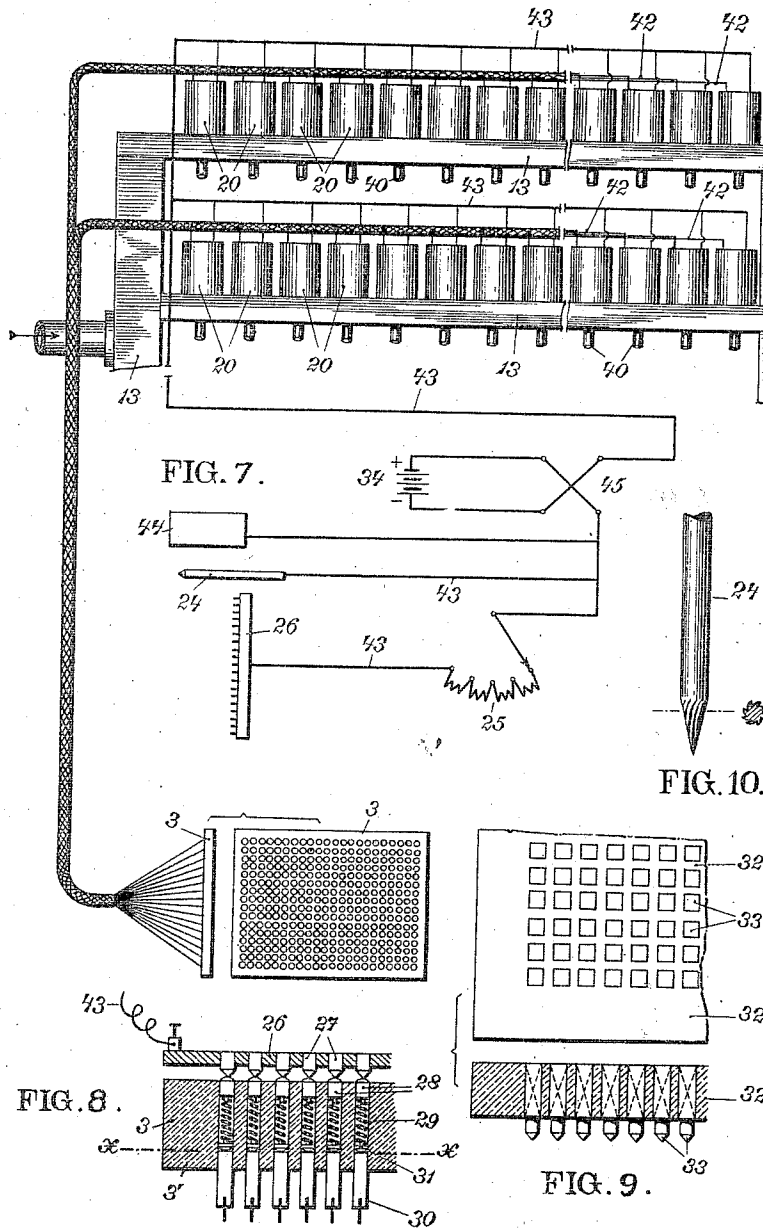
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3 SHEETS—SHEET 3.



Witnesses,
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UNITED STATES PATENT OFFICE.

FRANZ JANEČEK, OF PRAGUE, AUSTRIA-HUNGARY.

DISPLAY APPARATUS.

1,049,240.

Specification of Letters Patent.

Patented Dec. 31, 1912.

Application filed January 13, 1911. Serial No. 602,460.

To all whom it may concern:

Be it known that I, FRANZ JANEČEK, a subject of the Emperor of Austria-Hungary, and resident of Prague, Austria-Hungary, have invented certain new and useful Improvements in Display Apparatus, of which the following is a specification.

This invention relates to improvements in a display apparatus.

According to my invention I provide a board with a plurality of openings in which pistons operated by air are thrust toward the surface of the board, whereby to expose the ends to form various letters or symbols, the pistons being automatically withdrawn when the air pressure is removed.

The invention comprehends improvements in the details of construction and arrangement of parts which will be hereinafter described and particularly pointed out in the claims.

Figure 1 is a front elevation of my improved display apparatus. Fig. 2 is a diagram of a switch board employed in connection with my invention. Fig. 3 is a detail view of several of the pistons and the means for supporting them. Fig. 4 is a detail section of a means for pneumatically operating the inclined pistons. Fig. 5 is a detail vertical section of a modified form of the invention. Fig. 6 is a section on the line $x-x$, of Fig. 5. Fig. 7 is a diagram illustrating the electrical connections. Fig. 8 is a detail section of a switch board. Fig. 9 is a detail section of a writing board. Fig. 10 is a detail view of a metallic stylus.

1 indicates a board having openings 2, to receive sleeves 6, in which are mounted pistons 5. The actuation of these pistons in the board 1 is effected from a switch board 3, shown diagrammatically in Fig. 2. This switch board is generally provided with as many electric contacts 4 for electro-magnets or valves for a pneumatic installation or the like, as the board 1 has holes or pistons. Such a contact 4 causes the corresponding piston in the board 1 to move.

Fig. 3 illustrates the sleeves 6 obliquely arranged in the board 1 so that the pistons fall by gravity to their normal or retracted position. By thus obliquely disposing of the pistons, the latter are invisible.

Fig. 4 shows one form of the invention for pneumatically actuating the pistons. In this case each sleeve 6 is connected by means

of a pipe 10 with a valve box 11 in which a valve 12 is located and which is controlled by electro-magnetic means, so that air coming from a common compressed air duct 13 may enter the sleeve and force the piston outward. When the valve is closed, the air contained in the sleeve escapes through a space formed between the piston wall and the inner wall of the sleeve and the piston assumes its normal position by gravity.

In the device shown by Figs. 5 to 10 the cores 19 of the solenoids 20 (Fig. 5) which act at their lower end as cone valves 21, are made of steel, so that when the solenoids are electrically excited, the said cores adhere to the metallic cover 22 of the magnet casing, owing to their residual magnetism and this even in case the current does not circulate in the winding of the solenoid. Under these conditions the air may continuously flow under the piston 5 in the sleeve 6 and hold the piston in its outward position without any consumption of electric current. When the piston 5 is to be brought back to its normal position a current having a corresponding intensity and an opposite direction is passed through the winding; the steel core 19 owing to its own weight falls back on the valve seat, thus shutting the air off so that the piston 5 may return to its position of rest. Owing to this arrangement it becomes practically possible that the signs written or drawn on the switch board 3 (see the diagram shown by Fig. 7) immediately appear on the show board 1, and may remain visible thereon as long as desired. In order to cause all pistons 5 forced outward to disappear at the same time (for instance when the advertisement has to be changed), it will be advantageous, because all the cores 19 cannot have the same magnetic remanence, to cause the intensity of the demagnetizing current to increase gradually between suitable limits by inserting a resistance whereby the required effect is obtained. The same result is also accomplished when the cores 19 are caused to fall by means of alternating current, in which case the strength of the current is preferably reduced gradually by inserting an ohmic resistance. In both these cases, that is to say in case of employment of direct current as well as when alternating current is made use of, a metallic contact board 26 is placed on the switch board 3 (Fig. 8)

which metallic contact board 26 contains as many contact pins 27 as there are contacts 28 on the switch board, so that the oppositely directed current or the alternating current circulates through all solenoids which ever may be those which have been energized. In order to obtain a sure contact between the contacts 28 of the switch board 3 and the contact pins 27 of the metallic contact board 26, the contacts of the switch board are yieldingly mounted, the small contact piston 28 being electrically connected by means of the spiral spring 29 with the conducting wire 30. As the contact pins 27 are pointed and press the contact pistons 28 down, the electric contact must be obtained with certainty. The spiral spring 29 is soldered at its top to the contact piston 28 and at its bottom to the contact piece 30 so that this entire contact device may be easily taken into pieces. Such yielding contact pistons 28 must also necessarily be employed in the case when it is desired to cause free hand writing or drawings or inscriptions or drawings made by means of printing types or the like to become visible on the show or display board 1. In the first instance a special writing board 32 (Fig. 9) is employed which is made from insulating material and contains metallic contact pins 33 which pass through the board 32. These pins form at their top a plane surface with the surface of the board while they project at their lower end from the board and correspond exactly to the contact pistons 28 of the switch board 3. This writing board 32 is placed on the switch board 3 and it is then possible to write or draw on the board 32 by means of a metallic stylus 24 which is connected with one of the poles of the source of electric current 34. All motions which are performed by the writing stylus on the writing board are reproduced in exactly the same manner on the large show or display board, because the stylus while sliding over the surface of the writing board energizes the solenoids corresponding to the shape of the writing or the drawing. In order to cause the writing or the drawing to remain visible in a lasting manner also on the writing board; for eventual corrections and so on, one employs such a writing style which leaves behind it visible traces which however may be effaced; for this purpose a metal style may be suitably employed which for instance has at its point a star shaped section (Fig. 10) which may be dipped into a color; the style may also be made hollow and the point provided with a small hole through which the color flows on the writing board during the writing.

For advertisements which have to be repeated several times type may be provided which are similar to the contact board 26, the contact pins 27 being removable and

adapted to be inserted in such a manner in the board that they represent the required advertisement on a small scale.

In order to be able to remove the pistons 5 (Fig. 5) easily from the sleeve 6 of the show board and to obtain at the same time the limitation of their stroke, each piston is secured by means of a chain 35 or the like with a correspondingly heavy body 36 which is introduced first into the sleeve so that it falls down in the latter until it reaches the bottom 37 whereafter the piston 5 is in turn inserted into the sleeve. The length of the chain 35 is such that when it is tensioned, it allows the front side 5' of the piston to project from the sleeve. The body 37 is provided with an air passage 38 and is heavy enough to allow the compressed air to push the piston upward only to the distance allowed by the chain 35. As soon as the compressed air supply is cut off, the piston owing to its own weight, slides downward until it comes into contact with the body 36.

The solenoids 20 with their cores 19 are arranged in one or more rows on a common compressed air duct 13 and each valve 21 is connected by means of a flexible pipe 40 with the corresponding sleeve 6. The air contained in the compressed air duct 13 enters through the hole 41 at the cone of the valve. One pole of each solenoid 20 is connected with a contact of the switch board 3 by means of an insulated wire 42, while the other pole is connected with a common wire which is connected with one of the poles of the source of electric current 34. The other pole of the source of current is connected according to whether it is desired to write or draw hand free by means of the writing stylus 24 or to produce by means of type 44 repeated advertisements or still to cause by means of the contact board 26 the advertisement to disappear for a moment from the show or display board 1, either with the writing stylus 24 or with the type 44 or finally with the contact board 26. The poles of the source of current are connected with the circuit changing switch 45 so as to enable the operator to send through the solenoids 20 currents having the desired polarity. The diagram of connections just described is also employed when the device is operated by electromagnetic means alone.

In order to allow the rain water which possibly might have penetrated into the obliquely arranged sleeves (Fig. 5) to again escape therefrom each sleeve is provided at its lowermost place with a draining opening through which the water flows off and is conducted by means of a small pipe into a common pipe 46 which is provided with a closing device.

In order to economize a special writing

board 32 and to be able to easily clean the spring contacts of the switch board 3 (Fig. 8) this switch board may be made in two pieces by sectioning it on line $x-x$. When the upper part is taken or slid off, the lower part 31 may be employed as a writing board.

Having now fully described my said invention, what I claim and desire to secure by Letters Patent, is:—

1. A display apparatus comprising a board formed with a plurality of inclined openings, pistons slidably arranged in the inclined openings, pneumatic means for individually sliding the pistons toward the free outer end of the openings, said means including sliding valves, means for holding the valves in open position, and means in the inclined openings for limiting the outward movement of the sliding pistons.

2. A display apparatus comprising a show board formed with a plurality of oblique openings, pistons slidably arranged in said oblique openings and adapted to slide backward therein by gravity so as to be invisible when in their withdrawn position, and pneumatic means for causing the said pistons to move individually outward, substantially as and for the purpose set forth.

3. In a device of the kind described the combination with a show board, of a plurality of guide sleeves provided in said show board, a piston slidably engaged in each of said guide sleeves, a heavy body loosely engaged in said piston sleeve, a flexible member adapted to connect the said body with said piston, and means for admitting compressed air under the said piston to force the latter outward for the distance allowed by the said flexible member, substantially as and for the purpose set forth.

4. In a device of the kind described the combination with a show board provided with a plurality of guide sleeves, a piston slidably engaged in each of said guide sleeves, a compressed air device adapted to actuate the said pistons, and means for controlling the said compressed air device,

these means comprising for each piston a cone valve, a solenoid, a core for said solenoid which core forms at the same time the valve rod for said cone valve, an iron cover for said solenoid, the said cores being made of steel so as to be adapted when the solenoid is energized even momentarily, to adhere in a lasting manner to the iron cover of said solenoid, substantially as and for the purpose set forth.

5. A display apparatus comprising a board provided with a plurality of inclined openings, weighted pistons arranged in the openings, means for sliding the pistons toward the outer ends of the openings to expose the ends of the pistons, and holding the pistons at the outer ends of the openings, the pistons assuming their normal withdrawn position by gravity when the holding means is released.

6. A display apparatus comprising a board provided with a plurality of inclined openings, pistons arranged in the openings, weights formed with passages and mounted in the openings, means connecting the weights to the pistons, pipes communicating with the openings and the passages in the weights, means for supplying the pipes with compressed air, a sliding valve for each pipe to control the air, means for operating the sliding valves, and means for holding the valves in open position.

7. A display apparatus comprising a board provided with a plurality of inclined open end sleeves, pistons arranged in the sleeves, means for forcing the pistons to the open ends of the sleeves, the pistons returning to normal position by gravity, and means for limiting the outward movement of the pistons to expose their ends at the open ends of the sleeves.

In testimony whereof I have hereunto set my hand in presence of two witnesses.

FRANZ JANEČEK.

Witnesses:

MILOSLAV HRUBÝ,

CHARLES J. ZAKOSTELECKY.