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G. VILLANI.

SIGNALING SCREEN.

APPLICATION FILED DEC. 7, 1903.

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Fig. 1.

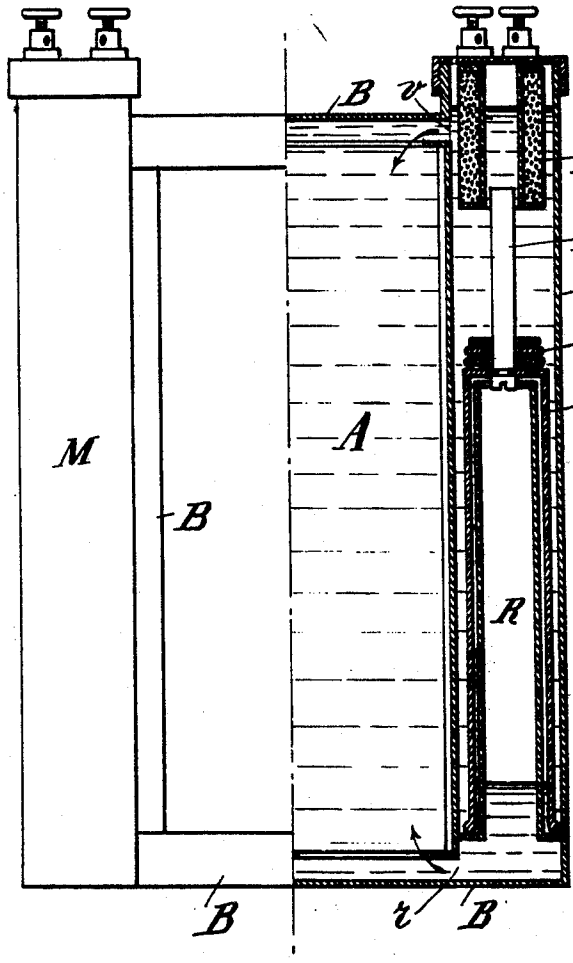
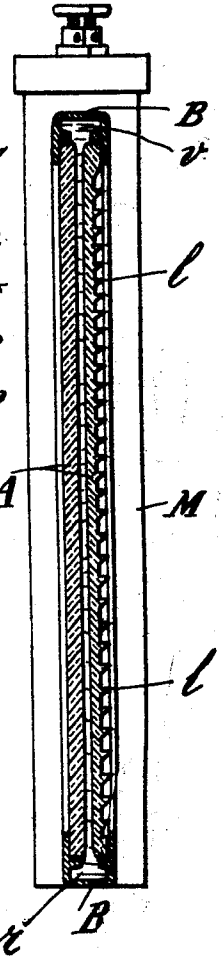


Fig. 2.



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UNITED STATES PATENT OFFICE.

GAETANO VILLANI, OF MILAN, ITALY.

SIGNALING-SCREEN.

SPECIFICATION forming part of Letters Patent No. 786,613, dated April 4, 1905.

Application filed December 7, 1903. Serial No. 184,203.

To all whom it may concern:

Be it known that I, GAETANO VILLANI, civil engineer, a subject of the King of Italy, residing at 45 Via Vittoria, Milan, Italy, have invented certain new and useful Improvements in Signaling-Screens; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention is based on the following principle: Two parallel transparent plates hermetically sealed within a frame running along their perimeter inclose a narrow space, which on being filled with a colored liquid will have the appearance of a solid screen of the same color, while the color, the transparence, and other physical qualities of this screen will change according to the quality of the liquid therein inclosed. Such a double-walled screen employed in connection with an apparatus capable of injecting and changing the liquids within the interval left between the two plates may be called a "diallochrome system" and is suitable for various industrial applications—such as, for instance, the obtention of transparent diaphragms for projecting light, which can gradually or quickly change its color and increase or reduce its brightness, (for fêtes, illuminations, scenery, &c.;) variable mediums in physical apparatus, intended to transmit heat, light, and other radiations, both for scientific or photographic apparatus; partitions, screens, windows, glass cases, frames, lamps, &c., changing their appearance at will, to be employed in building and furnishing private houses, shops, offices, for advertising purposes, &c.; screens of changeable coloration for railway signaling, optic telegraphy, working lighthouses, &c.

The shape and size of the screen, the liquid-injecting apparatus, the nature of the liquids, and of the motive power will vary according to the purpose to be pursued.

The annexed diagrammatical drawings show, by way of example only, the application of a diallochrome-screen to distant railway signaling.

Figure 1 is a front view, partly in section, and Fig. 2 a cross-section, of an apparatus intended therefor.

The signal consists of a diallochrome-screen A, suspended in a vertical position, whose empty space is connected both at the top and bottom with the surrounding frame by means of conducts through which liquids can flow inside.

The aftmost face of the screen A is preferably fitted with right-angled prisms *l*, with the view of reflecting the sun-rays by daytime, thus rendering the surface of the screen brighter, with great advantage for its visibility at a distance.

The operative device is composed as follows: Two concentrical cylindrical reservoirs V and R are mounted along one of the vertical sides of the frame B and connected, the first with the conduct at the top of the screen and the second with the lower one by means of the orifices *v* and *r*. A bell-shaped piston P, as shown by the figures, is fitted without friction on the external wall of reservoir R. A tubular electromagnet E, when operated by a continuous current of proper strength and direction, is capable of sucking up an iron core *n*, fixed on the top of the piston.

The screen is filled with a transparent red liquid, (alcohol mixed with some glycerin, in order to increase its density.) A green transparent liquid (mineral oil) is poured into the reservoir V. The green liquid escaping through the orifice *v* and filling the upper conduct of the screen floats above the red one. The two liquids cannot mix within the apparatus, since the air confined within the hollow piston acts as a water-tight seal. A proper ballast *c* counteracts the tendency of the piston P to move upwardly out of its buoyancy and keeps it to the bottom of the apparatus, pressing the red liquid within the screen. As soon as the electric current is turned on the coil of magnet E sucks up the core *n*, the piston P rises, displacing both liquids at the same time. A thin sheet of green petroleum going down the interval between the screen-plates drives out the red liquid, which rises within the hollow cavity of cylinder R, compressing the air contained therein. Provided

the travel of the piston be sufficient, the color of the screen will totally turn from red ("danger") to green ("all right.")

The operation may be intrusted to two identical and symmetrically-arranged devices, as shown in the drawings, wherein M represents a reservoir mounted on the left side of the screen, whose arrangement is internally the same as that of the reservoir V on the right side. Both devices having been worked, the screen will appear fully green. Only one of said devices having been worked, the upper half only of the screen will turn to green, the color of the lower one remaining unchanged. This composite appearance will perform the same office as a special signal with the meaning of "caution."

My invention is not limited to the apparatus hereinbefore described, but may be constructed in any form and size, and may be operated by any available motive power—by hand, by gravity, by a spring, by air or water pressure, as well as by electricity, &c.—according to the various requirements of railway signaling. In any case, owing to the smallness and constancy of the internal resistance, the working of the system will require a small expense of power and a very simple actuating mechanism. Electricity, as in the example shown, affords, of course, very convenient means to actuate the apparatus, as every transmission of motion by wire or rod is wholly dispensed with and the signal can be operated by simply handling a switch and throwing a continuous current into a circuit. Contact-breakers connected with levers, rails, points, crossing-gates, or with any other mechanism or signal can be inserted into the same circuit as the signal. The flow of the continuous current which is to operate the signal may thus be made dependent upon the various conditions of safety, every requirement of an interlocking system being therefore directly and fully fulfilled.

The peculiar advantages of the diallochrome railway signaling system are as follows: The signal, when left to itself or cut off by accident, will always indicate "danger," as required for safety. The unalterableness of coloration of the signal is preserved by the glass plates, the liquid employed not being practically subject to freeze and being hermetically secluded from external contacts and dispersion. The glass plates being conveniently protected against breakage, the signal will be in the best condition for good and long preservation. The visibility may be increased by employing white enameled or prismatic glass plates for the purpose of reflecting or refracting light through the colored liquid sheet. The signaling being invariably given by color not only at night, as commonly practiced, but also during day-time, a greater simplicity and clearness is given to the code and rules of railway signaling, and therefore probabilities of mistakes and risks of accidents are diminished. The signal being, unlike common types of disks or semaphores, wholly immovable, it can be from the first and permanently set up in the best conditions for perfect visibility, good preservation, and durable working.

Having now described my invention and how the same is to be performed, what I claim is—

1. In a signaling-screen, the combination of a framework, a pair of parallel glass plates hermetically secured therein and forming a cavity between said plates, conducts leading to said cavity and means for forcing either of two differently-colored and non-blending liquids through said conducts into said cavity; the whole apparatus forming a closed system of intercommunicating vessels.

2. A screen consisting of two parallel glass plates in combination with a frame surrounding them, conducts leading to the interval between said glass plates, means for forcing into said interval either of two differently-colored liquids, means for forcing into the upper part of said interval one of said liquids and forcing the other liquid into the lower half; the whole apparatus forming a closed system of intercommunicating chambers containing a quantity of liquid therein.

3. A screen consisting of two parallel glass plates in combination with a frame surrounding them, conducts within said frame leading from the interval between said glass plates respectively to the top and bottom compartments of a vertical cylinder situated on one side of the same, a movable piston within one compartment of said cylinder, which on being displaced, forces the colored liquid contained within the screen into one of the compartments of the vertical cylinder replacing the same by the differently-colored liquid contained within the other compartment; means for displacing the said pistons; the whole apparatus forming a closed system of intercommunicating chambers containing a quantity of liquid therein.

4. A screen consisting of two parallel glass plates in combination with a frame surrounding them, conducts within said frame leading from the interval between said glass plates respectively to the top and bottom compartments of two vertical cylinders, each on one side of the screen, movable pistons within one compartment of each of said cylinders, either of which on being displaced forces the half of the colored liquid contained within the screen into one of the compartments of either cylinder, replacing the same by a differently-colored liquid contained within the other compartment; means for displacing either of said

pistons, the whole apparatus forming a closed system of intercommunicating chambers containing a quantity of liquid therein.

5. In a signaling-screen, the combination of a frame, a pair of parallel glass plates mounted therein, one of said plates formed with a corrugated surface, conducts within said frame leading to the interval between said plates, vertical cylinders arranged one on each side of said screen, bell-shaped pistons operating in said cylinders, means for operating said pistons and two differently-colored and non-blending liquids in said cylinders adapted to be forced into the interval between said plates, the whole apparatus forming a closed system of intercommunicating chambers containing a quantity of liquid therein.

6. In a signaling-screen the combination of a framework, a pair of transparent plates hermetically secured therein and forming a cavity therebetween, said cavity adapted to contain liquid therein, conducts leading to said cavity and means for forcing either of two differently-colored and non-blending liquids through said conducts into said cavity; the whole apparatus forming a closed system of intercommunicating chambers.

7. In a signaling-screen the combination of a framework, transparent walls secured therein and forming a hermetically-sealed chamber and means for forcing either of two differently-colored and non-blending liquids into said chamber.

8. In a signaling-screen the combination of a framework, transparent walls secured therein and forming a cavity between said walls, conducts leading to said cavity and means for forcing either of two differently-colored and non-blending liquids through said conducts into said cavity, the whole apparatus forming a closed system of intercommunicating chambers.

In testimony whereof I affix my signature in presence of two witnesses.

GAETANO VILLANI.

Witnesses:
H. P. SMITH,
MICHELE DE DRAGO.