

(No Model.)

2 Sheets—Sheet 2.

B. B. MORGAN.
INTERLOCKING SWITCH SIGNAL.

No. 572,270.

Patented Dec. 1, 1896.

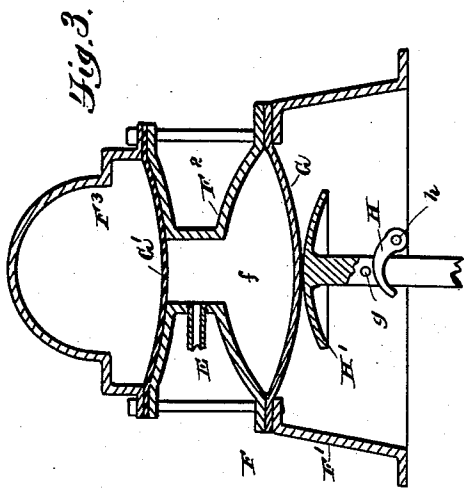
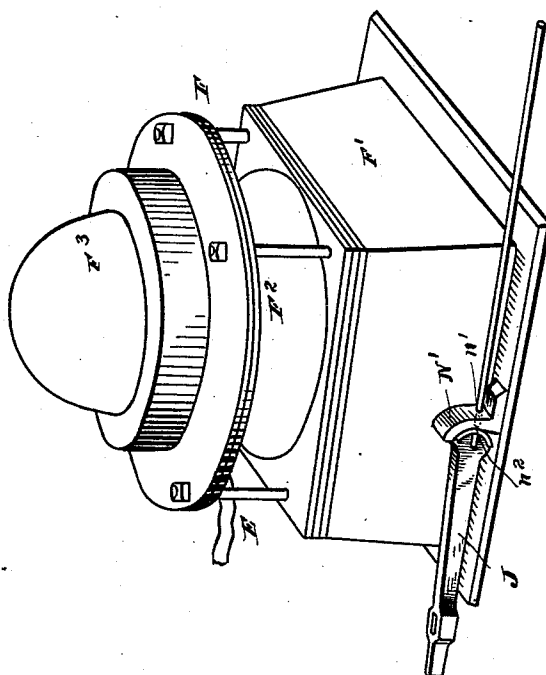


Fig. 2.



WITNESSES

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BENJAMIN B. MORGAN, OF YPSILANTI, MICHIGAN, ASSIGNOR TO THE
MORGAN SIGNAL COMPANY, OF SAME PLACE.

INTERLOCKING SWITCH-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 572,270, dated December 1, 1896.

Application filed May 23, 1896. Serial No. 592,757. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN B. MORGAN, a citizen of the United States, residing at Ypsilanti, county of Washtenaw, State of Michigan, have invented a certain new and useful Improvement in Interlocking Switch-Signals; and I 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 pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to interlocking switch-signals, and has for its object the positive interlocking of a semaphore - signal to indicate "danger," so that it cannot be reset at "safety" until the proper switch connections are made.

In the drawings, Figure 1 is an elevation of a semaphore and the mechanism or bellows intended to operate the same. Fig. 2 is an elevation of the outside casing of the bellows apparatus used as the motive power to control the semaphore-signal shown in Fig. 1, together with an interlocking switch device operated in connection therewith. Fig. 3 is a sectional elevation of the apparatus shown in Fig. 2.

In the drawings similar letters refer to similar parts.

This device is intended to operate by means of the air in inclosed air-bellows and is not intended to operate as an air-pump.

A represents the stand for a semaphore, which is preferably made hollow and intended to carry therein longitudinally operating a stem B, partially shown therein in dotted lines. Journaled to the upper portion of the standard A is an appropriate semaphore C. This semaphore has therein on its shaft *c* a wheel *c'*, fixedly attached to the shaft. Two flexible strips *c³ c⁴* are attached to said wheel at their ends. Their opposite ends are attached in opposite directions at *c⁵ c⁶* to the upper end *b'* of the stem B. The longitudinal motion of the stem in either direction would partially wind up one of the strips and unwind the other and thus rotate the semaphore. This is shown more in de-

tail in my application now pending, Serial No. 578,975.

To the lower end of the stem B and in a larger portion A' of the casing is fixedly attached a convex head B'. The center of this head is attached to a flexible diaphragm D, of similar character to that shown in the application hereinbefore mentioned. This diaphragm is attached air-tight to a casing D' in such manner as to form an air-space between the diaphragm and the casing. A pipe E leads therefrom to a mechanism hereinafter described, and shown in Figs. 2 and 3.

In Figs. 2 and 3, F is the casing, which is made of sufficient number of parts and proper shape to be convenient, or a housing (not shown) might pass over the whole. Its essential features are shown more particularly in Fig. 3. This covering consists of the base F', an intermediate portion F², and an upper portion F³. The intermediate portion F² is formed as shown in Fig. 3 and covered upon its upper and lower faces with the flexible elastic diaphragms G G', forming an intermediate air-chamber *f*. A pipe E leads to and connects with the pipe E of Fig. 1. This pipe may be of any desirable length. It is obvious, therefore, that the space between the diaphragms, including the contracted space *f'*, is connected with the interior or air space under the diaphragm D of Fig. 1.

In the lower part F' of the casing F is a convex head attached to and operating against the lower diaphragm G and by reason of its weight depressing it. A cam H is journaled to the lower part of the casing and is also connected, as shown in Fig. 2, to a switch-lever J, the shaft *h* of the cam forming the pivot of the switch-lever. The movement of the switch-lever in rotating the shaft *h* would also rotate the cam, which bears against a pin *g*, firmly attached to the stem of the head H'. This rotation and action of the cam would force the head H' upward and thus force upward also the diaphragm G, compressing the air between it and the upper diaphragm G'. This compression of air would be transmitted by means of the pipe E to the bellows shown in Fig. 1 and force upward the stem B, and thus operate the semaphore C. The upper

diaphragm is practically used for the purpose of producing a constant elastic pressure against the inclosed volume of air, thus taking up any shrinkage or allowing for any expansion of the air due to the changes of temperature. The rod actuating the switch is shown at K. M indicates the switch-lever. An extension-rod K' leads to the casing F of the bellows, by which the switch-semaphore is operated. This extension-rod locks the lever J with the semaphore-arm in position to indicate the position of the switch. The lock is reciprocal, that is, the switch cannot be thrown until the signal has been set, and after the signal has been set and the switch thrown the signal cannot be changed so long as the switch remains thrown. Thus if the switch is open and the signal indicates "danger" the signal cannot be changed until the switch is closed. The means by which this is accomplished is shown in Fig. 2, where N' indicates the spur on the frame of the casing, which curves around or partly around the outer end of the cam-shaft. Through the spur N' is a hole n , which registers with a hole n^2 through the shaft, the shaft being provided with the cam engaging with the plunger, as hereinbefore stated. The reciprocation of the lever J actuates the plunger and

operates the semaphore, but when locked by means of the switch-lever M and the extending arm passing through the holes n' and n^2 compels the semaphore to remain locked until the switch has been shut and the rod withdrawn from the registering holes n' n^2 , as hereinbefore stated.

The operation of this device will be understood from the description.

What I claim is—

In a combined switch and signal apparatus, the combination of a switch, a rod and lever operating the same, an extension-rod connecting with the rod operating said switch, means consisting of a rotating lever, an intermediate mechanism for operating a semaphore, a casing surrounding the journal of said lever, the perforation therein forming a bearing for an extension-rod, and locking means upon said lever whereby the extension-rod is adapted to lock the lever in a predetermined position when the switch is thrown, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

BENJAMIN B. MORGAN.

Witnesses:

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