

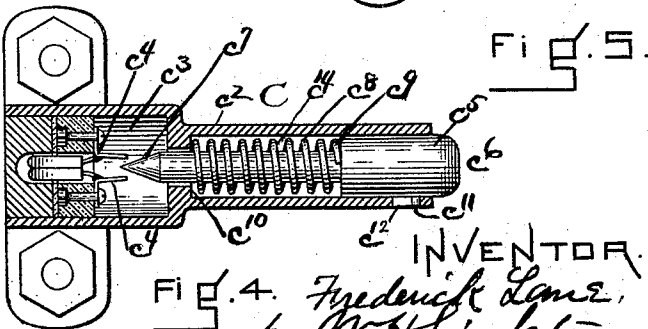
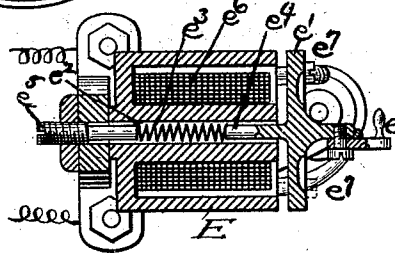
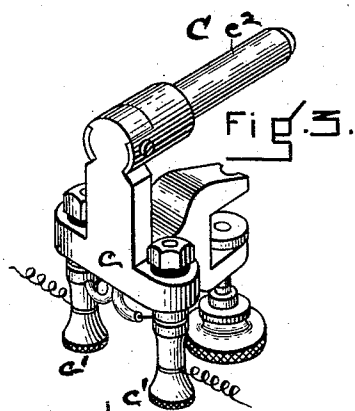
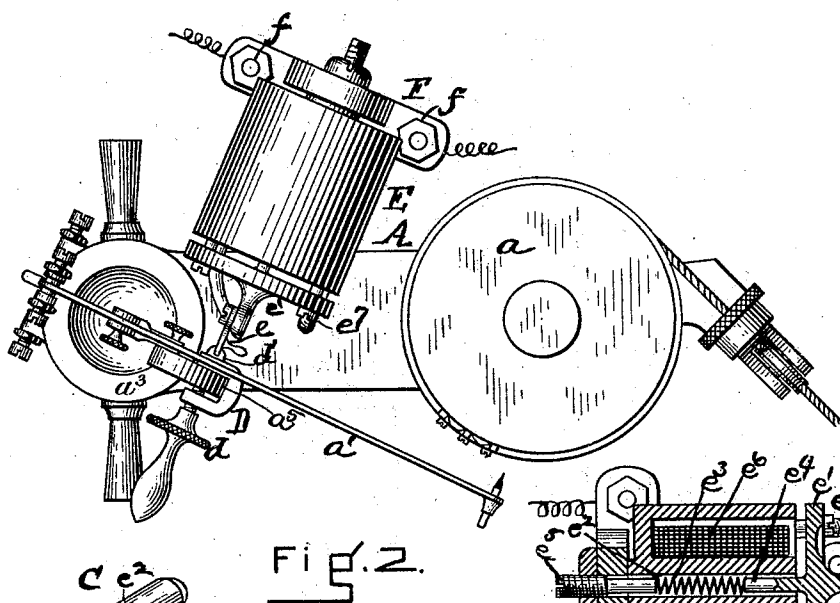
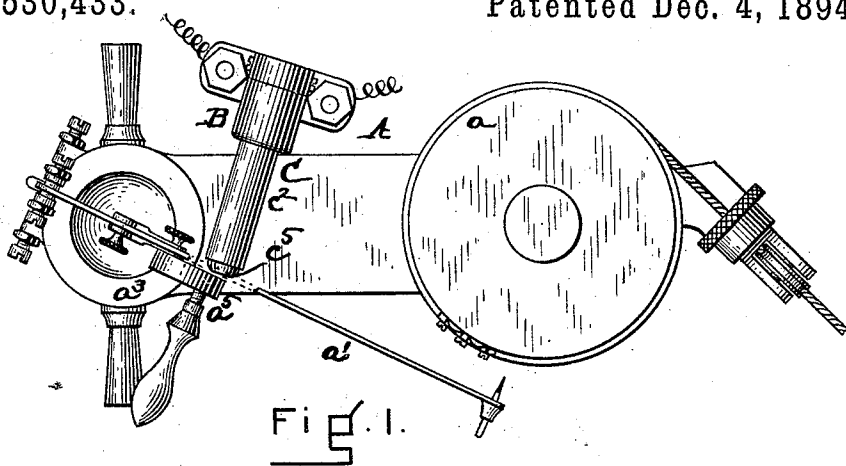
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F. LANE.
INDICATOR FOR STEAM ENGINES.

No. 530,433.

Patented Dec. 4, 1894.



WITNESSES
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(No Model.)

4 Sheets—Sheet 2.

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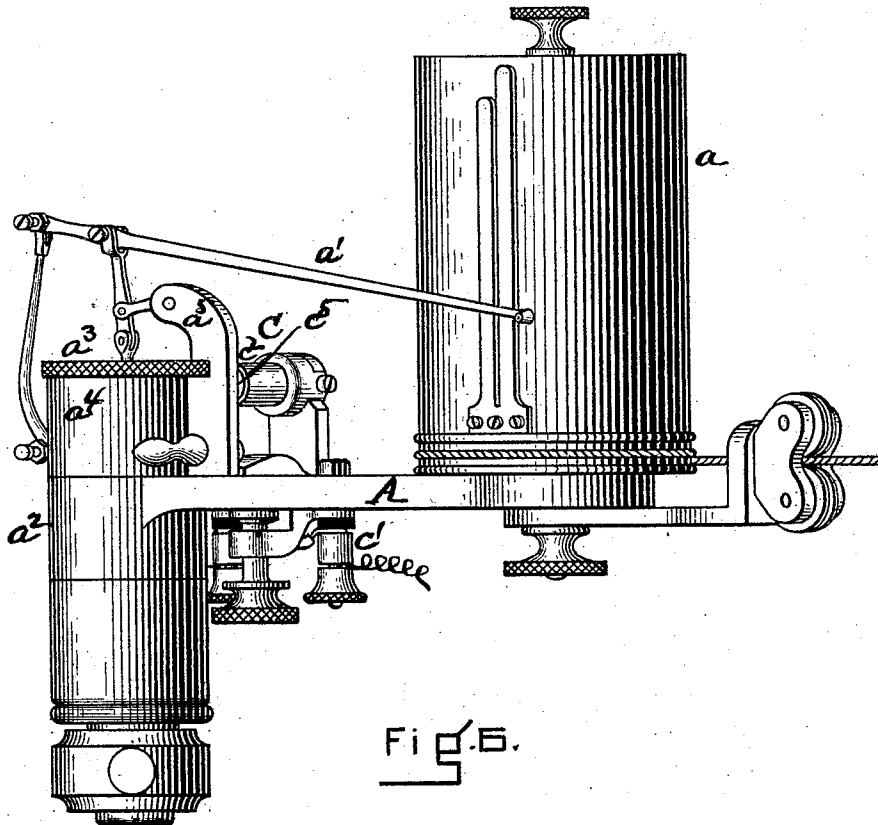


FIG. B.

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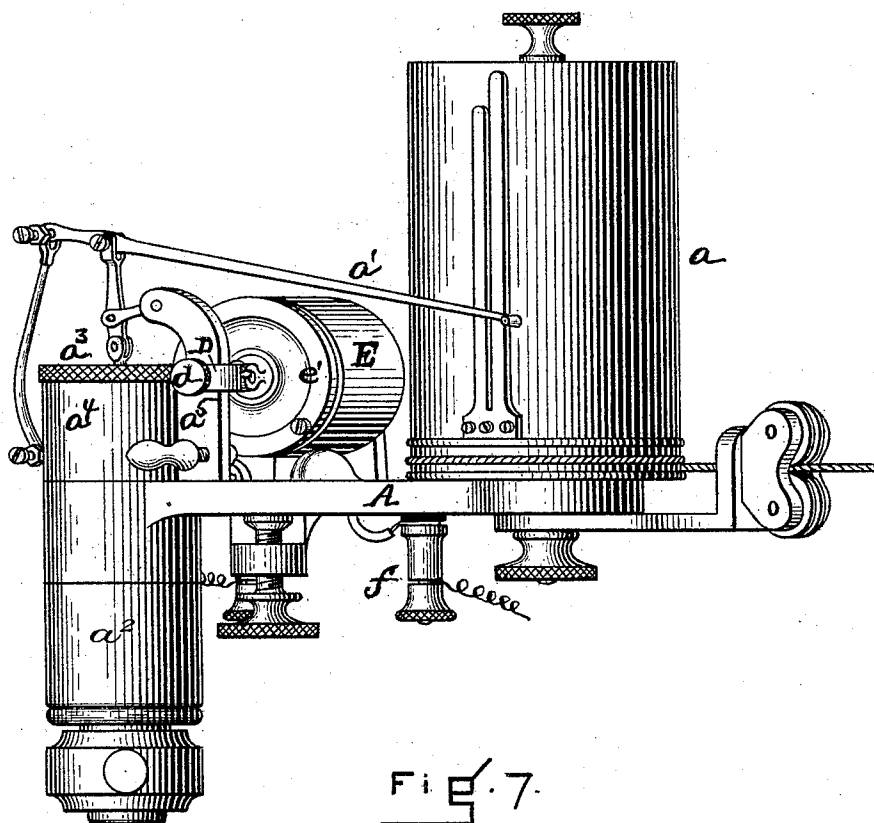


Fig. 7.

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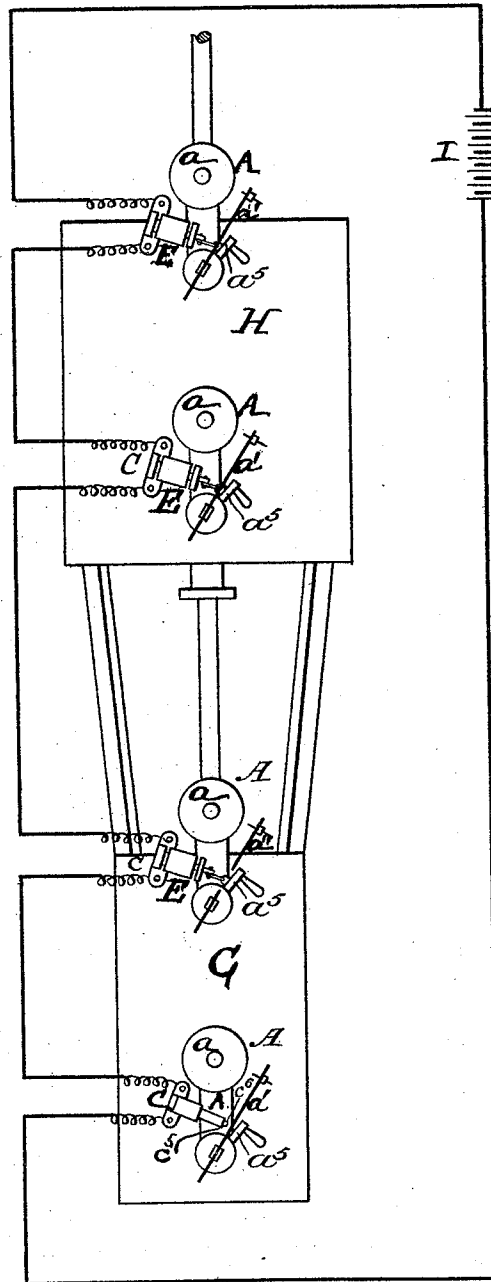


Fig. 8.

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UNITED STATES PATENT OFFICE.

FREDERICK LANE, OF BROOKLINE ASSIGNOR TO THE CROSBY STEAM
GAGE AND VALVE COMPANY, OF BOSTON, MASSACHUSETTS.

INDICATOR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 530,433, dated December 4, 1894.

Application filed December 1, 1893. Serial No. 492,463. (Nomodel.)

To all whom it may concern:

Be it known that I, FREDERICK LANE, a citizen of the United States, residing at Brookline, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Indicators for Engines; 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.

This invention relates to an improvement in indicators for engines, and the object of the invention is to provide the indicator with an electric apparatus so that the indicator may be operated from a distance; and also so that several indicators may be operated at a distance.

In the drawings: Figure 1 represents a top view of an engine indicator provided with a circuit closer. Fig. 2 represents an indicator provided with an electro-magnet for operating the pencil lever. Fig. 3 represents a perspective view of the circuit closer. Fig. 4 represents a longitudinal section through the circuit closer. Fig. 5 represents a longitudinal section through the electro-magnet. Fig. 6 represents a side view of the engine indicator and the circuit closer. Fig. 7 represents a side view of the indicator and the electro-magnet. Fig. 8 is a diagrammatic view representing in plan a compound tandem engine provided with the invention.

In the drawings: the letter A indicates any ordinary steam indicator provided with the usual cylinder, a , the pencil lever, a' , and the steam cylinder, a^2 , these parts being constructed to operate in the usual way.

To the rotating sleeve, a^4 , of the cylinder, a^2 , there is secured a bracket or support, a^5 , which projects from cap, a^3 .

Attached to or near by the indicator, A, is the circuit closer, B, as shown in Fig. 1. This consists of the rest, c , provided with the binding posts, c' , and an insulator. This circuit closer also has a tubular projection, c^2 , having the two chambers, c^3 and c^{14} , one, the former, larger in diameter than the other. Within the chamber, c^3 , are secured the contact pieces, c^4 , being electrically connected with the binding posts, c' . Within the chamber, c^{14} , is

placed the push plug, c^5 , having the exterior projecting part, c^6 , extending out of the hollow projection, c^2 , and the conical head, c^7 , adapted to fit between the contact pieces, c^4 ; also within the chamber, c^{14} , is a helical spring, c^8 , which surrounds the push plug, c^5 , bearing at one end against a shoulder, c^9 , of said plug and at the other end against a shoulder, c^{10} , within the chamber, c^{14} . Extending from the enlarged portion of the plug, c^5 , is a pin, c^{11} , which projects through a slot, c^{12} , of the tubular projection, c^2 . When in position, the binding posts, c' , of this circuit closer are connected with wires which lead to a battery or other source of electrical energy.

The construction thus detailed is the one that is to be used when a circuit closer is to be placed adjacent to an indicator, as is shown in Fig. 1 and in detail in Fig. 3, and also at one end of Fig. 8.

When an electro-magnet is to be placed adjacent to an indicator, some modifications are necessary. A clamp, D, Figs. 2 and 7, is fastened upon the support or standard a^5 , by the screw, d . At the other end this clamp, D, has an eye, d' . In this eye, d' , there is secured a hook, e , extending from an armature, e' , of the electro-magnet, E. This magnet is secured in place by the bracket, F, having the usual binding screws, f , connected with the line wire. Extending centrally through the magnet is a bore, e^2 , in which is a helical spring, e^3 . At one end a stem, e^4 , extending from the armature, e' , rests against this spring, e^3 , and against the other end bears a set-screw, e^5 . Within the annular space of the magnet is slipped the coil of wire, e^6 .

As shown in detail in Figs. 2 and 7, and diagrammatically in Fig. 8, an electro-magnet such as described is secured adjacent to the other indicators.

In the diagram shown in Fig. 8, there is illustrated a compound tandem engine consisting of the two cylinders, G and H, each provided at each end with an indicator. One indicator at one end of the cylinder, G, is provided with the circuit closer, C, the protruding end, c^6 , of the push plug, c^5 , being adjacent to the bracket, a^5 . The other indicators of this compound engine are provided

with the electro-magnets constructed and connected up as indicated in Fig. 8 and fully detailed in Figs. 2 and 6. The circuit closer and the several electro-magnets are placed in circuit with the battery, I, as indicated in Fig. 8.

Normally the spring, c^8 , holds the push plug, c^5 , away from the contact pieces, c^4 , and hence, normally, the circuit is opened and the electro-magnets, E, are not vitalized and the springs, e^3 , force the armatures, e' , back, thus keeping the pencil levers, a' , which are connected to the armatures away from the cylinders, a .

The pencil levers are connected to the armature through the sleeves of the indicators and the hooks which hold the armatures to the projections on the sleeves. These hooks are used so that an armature may be detached from a sleeve when a given indicator is not to be used.

When it is desired that the indicator shall operate, the pencil lever, a' , at the circuit closer, C, is turned down upon the cylinder, a , in the usual way. The bracket, a^5 , coming in contact with the end, c^6 , of the push lever, c^5 , forces the latter inward, the conical end, c^7 , coming between the contact pieces, c^4 , and the battery circuit is closed. The electro-magnets, E, then becoming vitalized, draw down the armatures, e' , and pull the other pencil levers, a' , each against its cylinder, a . The result is that there is a synchronous movement of all the pencil levers and the indicators are simultaneously operated. Of course, a reverse movement of the first pencil lever, a' , opens the circuit, the armatures, e' , fall away, and the pencil levers, a' , are moved away from the cylinder, a .

If desired, the circuit closer, C, may not be located at one of the indicators, but another electro-magnet may be there located, and the circuit closer be placed in any convenient

position, and be operated like any ordinary circuit closer.

The invention described produces a simple yet efficient means of automatically setting the indicators for a compound engine whenever it may be desired. By having the armatures of the magnets hooked to the clamps, the attachment of these armatures may be released so that one or more of the indicators may be cut out from the operation of the magnet. The retraction of the armatures is regulated by the tension of the springs, e^3 , and screws, e^7 , which adjust the force of these springs may be used to regulate the movement of the armatures.

Having thus described my invention, what I claim is—

1. A circuit closer, provided with contact pieces, and a push plug, in combination with an indicator, one end of the push plug being near a portion of such indicator and in line with a moving part of such indicator, as set forth.

2. The combination of the magnet and its armature with the indicator, and a hook between the armature and the indicator, whereby the armature may be detached from the indicator, as set forth.

3. The combination of several indicators, one of them with a circuit closer adjacent to an indicator and in line with a moving part of such indicator, and several electro-magnets, one adjacent to each of the other indicators, the armature of each magnet being connected to a moving part of the indicator, as set forth.

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

FREDERICK LANE.

Witnesses:

JOSHUA H. MILLETT,
RALPH W. FOSTER.