

(No Model.)

A. C. LIPPINCOTT.
STEAM ENGINE INDICATOR.

No. 539,398.

Patented May 14, 1895.

Witnesses

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UNITED STATES PATENT OFFICE.

ALPHEUS C. LIPPINCOTT, OF NEW YORK, N. Y., ASSIGNOR TO JAMES L. ROBERTSON, OF SAME PLACE.

STEAM-ENGINE INDICATOR.

SPECIFICATION forming part of Letters Patent No. 539,398, dated May 14, 1895.

Application filed June 27, 1894. Serial No. 515,861. (No model.)

To all whom it may concern:

Be it known that I, ALPHEUS C. LIPPINCOTT, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Steam-Engine Indicators; 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 contemplates certain new and useful improvements in steam-engine indicators.

The object of the invention is to provide improved simple and inexpensive means whereby, first, the recording device of an indicator can be readily and easily operated; second, to provide for the operation of two or more indicators at the same time, and, third, to render the movement of the card-cylinder and the contact of the marking point or stylus simultaneous.

The invention comprises the novel features of construction, and also the combination and arrangement of parts, substantially as herein-after fully set forth and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view, parts being shown in relatively reduced proportions. Fig. 2 is a side elevation. Figs. 3 and 4 are details.

Referring to the drawings, A designates the pressure-cylinder of any preferred form; a , the stylus arm fulcrumed at a' , and pivotally connected at a^2 to the piston-rod, after the ordinary construction in general use. The fulcrum support of this arm is connected to a sleeve a^3 surrounding the upper end of cylinder A, and from which projects an arm a^4 , the lateral movement of which is limited by a pin a^5 and an adjustable handled rod a^6 said pin extending from a base e^3 . The stylus or pencil a^7 is carried by arm a at the outer, free end thereof.

B is the recording or card-carrying cylinder to the lower end of which is secured a ratchet-wheel b , and immediately above the latter is a circumferential groove b' in which is designed to fit the cord (not shown) con-

nected to the engine-piston for effecting the rotation of said cylinder. This recording cylinder is normally held stationary by a pawl or stop C, fulcrumed at d on base e^3 and having a spring d' bearing upon its outer end. The arm a^4 has a stud d^2 , of preferably triangular form, projecting therefrom with which engages the correspondingly notched portion of a catch d^3 , which latter is pivotally connected at one end to a short lever d^4 fulcrumed at d^5 on base e^3 . The free ends of lever d^4 and pawl or stop C overlap each other a short distance and in such overlapping portions are formed coincident slots d^6 .

D is a fluid-pressure device. It comprises a piston e , and a cylinder e' therefor, from which project two sets of clamping arms e^2 designed to be secured to the connecting base e^3 . Any suitable means may be employed for this purpose. The outer end of the piston-rod e^4 is preferably bent to form a hook e^5 which is extended through the coincident slots d^6 . Hence when the piston is moved outward the pawl C is disengaged from contact with the ratchet-wheel of the recording cylinder to permit the turning of the latter, and the catch d^3 draws laterally on the arm a^4 and turning sleeve a^3 , bringing the stylus point or pencil in contact with the recording surface to effect the recording the same instant that the latter begins to move.

Into the piston-cylinder e' of the fluid pressure device D opens a fluid-supply pipe E, which may be provided with any number of branches according to the number of indicators employed. This pipe is charged with any suitable fluid, such as air, gas, steam, or water, and to it is connected at any suitable point, a tube f having a bulb f' at its outer end. By compressing this bulb the fluid confined in the supply-pipe is caused to force the pistons into their cylinders and effect the movement of the pawls and stylus arms as against the action of the spring-pressure thereon.

I have shown the fluid-supply pipe as having a branch leading to a second indicator f^2 , and a third branch to a third indicator f^3 ; but it is obvious, however, that any number

of indicators may be arranged in series and that the recording cylinder and stylus arm of each indicator will be simultaneously set in motion by pressure upon the bulb f' , and
 5 that upon releasing such pressure the recording cylinders will be prevented by the pawls C from turning and at the same time the stylus or pencil of each indicator will be removed by the lever d^4 and catch d^2 from contact with the recording surface.
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The advantages of my invention are apparent to those skilled in the art to which it appertains and it will be particularly observed that by means thereof the starting and stopping of the recording cylinder is synchronous with the contact and removal of the stylus or pencil; and also that the simultaneous operation of a series of indicators can be controlled from one point, the movement of each
 15 recording cylinder and stylus being accomplished at one and the same moment.

It will be understood that I do not restrict myself to the exact mechanism herein-described since changes may be made therein
 25 without departing from the scope of my invention.

I claim as my invention—

1. An indicator having its recording surface moved by the engine or the like to which
 30 it is attached, a pivoted spring-pressed stop for normally holding such recording surface stationary, and means, such as the fluid-pressure device herein-described, connected to the outer end of said stop for removing the latter as contact is had between the recording
 35 surface and stylus, substantially as set forth.

2. An indicator having its recording surface moved by the engine or the like to which it is attached, and means for holding said recording surface stationary when the stylus is
 40 out of contact therewith, and means for contacting said stylus with the recording surface and releasing the latter and permitting the movement thereof simultaneous with the contact of the stylus, said means for holding the
 45 recording surface and the means for controlling the stylus arm being operated from a common point substantially as set forth.

3. The combination with an indicator, the
 50 recording surface of which is moved by the engine or the like, to which it is attached, and the movable stylus, of a stop and catch designed, respectively, to normally hold said recording surface stationary and keep said
 55 stylus out of contact therewith, and a fluid-pressure device for moving said stop a catch, whereby said stylus is moved in contact with and disengaged from said recording surface as the movement of the latter is
 60 started and stopped, substantially as set forth.

4. The combination with two or more indicators, the recording surfaces of which are moved by the engine, or the like, to which it is attached, stops for normally holding said
 55 surfaces stationary, fluid-pressure devices for

operating said stops and controlling the contact between the recording surfaces and stylus, and a pressure-regulator for operating all of said devices simultaneously, substantially as set forth.

5. The combination with two or more indicators having movable recording cylinders, stops for normally holding said recording cylinders stationary, the pivotally mounted stylus arms having movable supports, fluid
 70 pressure devices having pistons connected to said stops and movable supports, a fluid-supplying pipe opening into said fluid-pressure regulators and a bulb for regulating the pressure in said pipe and effecting the movement
 75 of said pistons, substantially as set forth.

6. In an indicator and recorder, a recording surface normally held stationary, a spring-pressed stop for holding said recording surface, a stylus arm, a spring for normally holding
 80 the stylus out of contact with said recording surface, and means connected to said stop and also to said stylus-arm for synchronously disengaging said stop and moving the stylus in contact with said recording surface, substantially as set forth.

7. In an indicator and recorder, the combination with the movable recording surface, of the stylus-arm, the laterally-movable support therefor, the fluid-pressure device having
 95 a piston, and connections between said piston and said laterally-movable support, substantially as set forth.

8. In an indicator and recorder, the combination of the recording-cylinder which is
 100 operated by the engine, or the like, to which it is attached, a ratchet-wheel carried by said cylinder, a spring-pressed-pawl engaging said ratchet-wheel, the stylus-arm having a laterally movable support, a fluid-pressure device
 105 having its piston connected to said pawl, connections between said piston and said laterally movable support, and a fluid-pressure bulb or regulator, substantially as set forth.

9. In an indicator and recorder, the combination of the recording-cylinder which is
 110 operated by the engine, or the like, to which it is attached, a stop for normally holding said cylinder stationary, the stylus arm having a laterally-movable support, a spring-
 115 pressed catch engaging said support, a lever to which said catch is connected, a fluid-pressure device having its piston connected to said lever and also to said stop, and a fluid-pressure bulb or regulator, substantially as
 120 set forth.

10. In an indicator and recorder, the combination of the recording cylinder having a ratchet-wheel, a spring-pressed pawl engaging said ratchet-wheel, the stylus-arm having
 125 a laterally-movable support, a lug projecting therefrom, a catch engaging said lug, a spring acting on said catch, a lever to which the latter is connected, said lever and pawl having overlapping slotted ends, the fluid-
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pressure device comprising a piston and its
cylinder, said piston having its rod extended
through said slotted ends of said lever and
pawl, the fluid-supply pipe opening into said
5 cylinder, and the bulb connected to said pipe,
substantially as set forth.

In testimony whereof I have signed this

specification in the presence of two subscri-
ing witnesses.

ALPHEUS C. LIPPINCOTT.

Witnesses:

J. NOTA MCGILL,
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