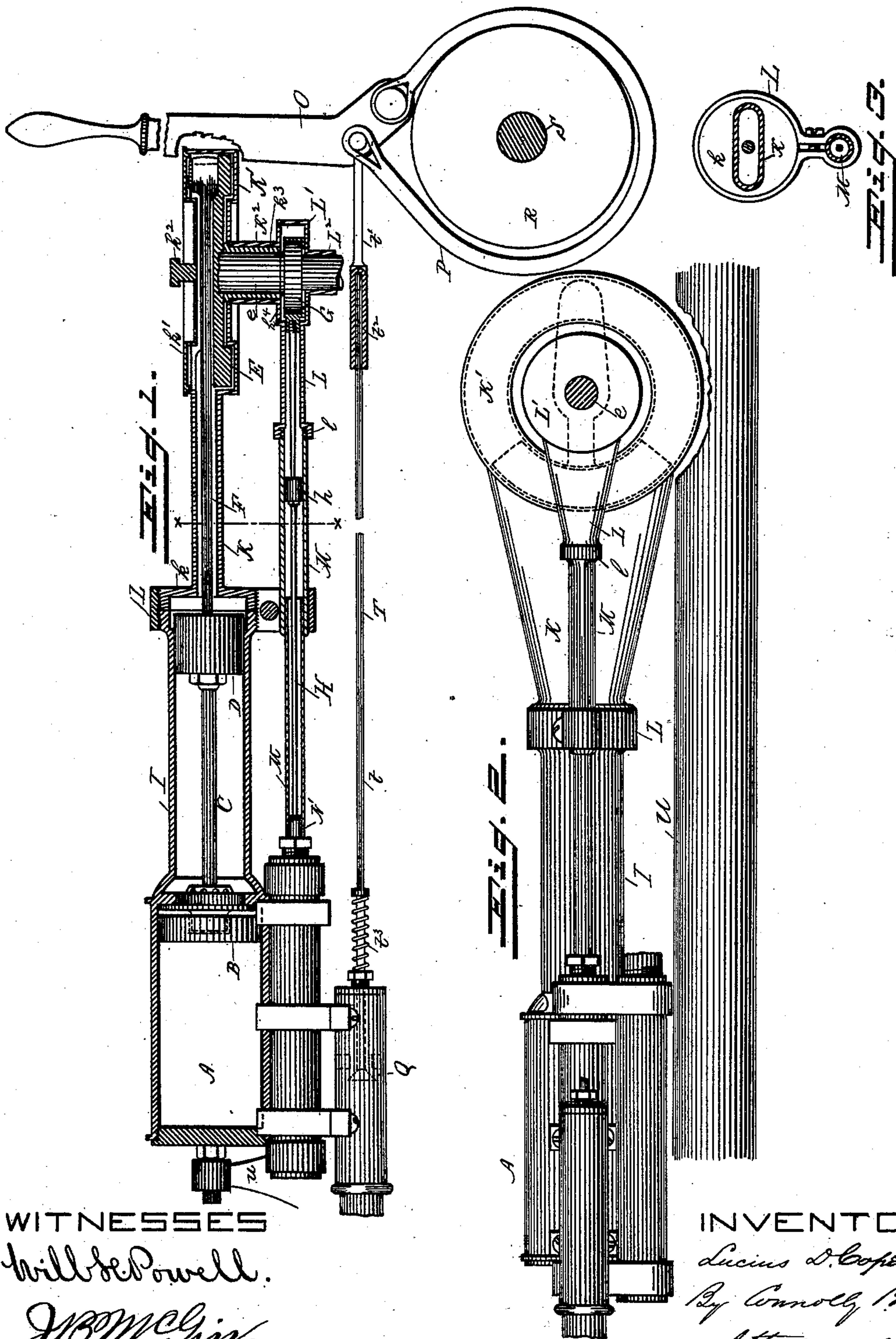


(No Model.)

L. D. COPELAND.
STEAM ENGINE.

No. 360,761.

Patented Apr. 5, 1887.



WITNESSES

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LUCIUS D. COPELAND, OF CAMDEN, NEW JERSEY.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 360,761, dated April 5, 1887.

Application filed October 11, 1886. Serial No. 215,883. (No model.)

To all whom it may concern:

Be it known that I, LUCIUS D. COPELAND, a citizen of the United States, residing at Camden, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a horizontal section, partly in plan, of a steam-engine with throttle-lever and brake in elevation. Fig. 2 is a side elevation of engine and support. Fig. 3 is a vertical section on line *x x* of Fig. 1.

My invention has for its primary object to provide a self-contained engine, and one in which the moving parts ordinarily left wholly or partly exposed shall be completely covered in a casing adapted and designed to hold a lubricant and to exclude dust, said casing forming a support or bearing, as hereinafter explained.

My invention has for its further object to provide means whereby the application of a brake will close the throttle, as hereinafter set forth.

My improvements consist in the peculiar construction and combinations of parts, hereinafter fully described, having reference, principally, to the combination, with the engine, of a peculiarly-designed casing, hereinafter described, and also in the combination, with the throttle and a brake, of a lever for simultaneously operating both, as hereinafter described and claimed.

Referring to the accompanying drawings, A represents the cylinder; B, the piston; C, the piston-rod; D, the cross-head; E, the crank; F, the connecting-rod; G, the valve-eccentric, and H the valve-rod, having a cross-head, *h*, the said several parts being of the usual construction employed in reciprocating engines, and which need not, therefore, be herein particularly described. All of said parts are inclosed in a casing, whereby dust is excluded and a chamber formed for oil or other lubricant, in which said inclosed parts run. That portion of the casing which incloses the piston-rod C and cross-head D consists of a shell, I, which is a prolongation of or extension on the cylin-

der, and forms a guide for said cross-head. That portion of the casing which incloses the connecting-rod and crank is a flat shell, K, which has a round end, *k*, which is attached to the end of the part I by a screw-joint or threaded split coupling, L, said shell having at its opposite end a circular head, K', which receives on one side a detachable screw disk or cap, *k'*, which can be removed when the crank is to be put on or off its shaft *e*, said disk having a centrally-located angular nut or projection, *k''*, for the application of a wrench. The opposite side of head K' has a hollow boss, K², which forms a bearing for the crank-shaft *e*, and receives a steel bushing, *k''*. Said bearing K² is formed with a threaded flange, *k''*, which constitutes one side of another circular head, L', that forms the part of the casing inclosing the valve-eccentric G, and has a bearing, L², which forms the second bearing of the crank-shaft *e*. This head L' is on a flat portion of the casing, (marked I,) in which the valve-connecting rod moves, and which has at one end a threaded mouth, *l*, which receives the end of a telescopic pipe, M, in which the rod H and cross-head *h* move, said cross-head being guided in said pipe, and the latter being slid onto a projecting portion, N', of the stuffing-box of the valve-stem N, and is also supported, nearly midway of the engine, by the threaded split coupling L, said coupling being drawn tightly around said pipe, and also around the two parts of the engine I and K, by means of a screw or bolt.

It will be noted that the several parts of the casing described form practically one chamber, inclosing the portions of the engine ordinarily left exposed, said casing operating to exclude dust, and said chamber being adapted to receive and hold oil for lubricating the moving parts of the engine. Said casing is so made that it can be readily disjointed or taken apart and put together again. When in place, the casing prevents contact, accidental or otherwise, with the usually exposed moving parts of the engine, which is of special importance for the particular service for which the engine is primarily intended—viz., as a motor for a tricycle or other riding-vehicle.

I am aware that engines have been heretofore incased, the entire structure being in one large chamber, and hence I do not broadly

claim a casing for an engine. In my construction, however, the parts comprising the casing are close fitting and compact, and while there is communication between the parts of the casing, yet in a sense there are separate chambers for the moving parts, thus materially reducing the bulk or dimensions of the structure.

O represents the lever by which the throttle-valve Q is controlled, and it is connected with a brake-strap, P, or equivalent shoe, operating on a brake-wheel, R, which may be on the eccentric-shaft or engine-shaft *e*, or on another shaft, S, receiving motion by any suitable form of gearing from said eccentric-shaft.

T represents the connecting-rod for the throttle-valve, and it is in two sections, *t* and *t'*, the latter having a socket, *t''*, which receives the end of the former. When the brake is thrown off by the action of the lever O, the rod T is pressed inwardly, (to the left in the drawings,) thereby opening the throttle against the opposing influence of a spiral spring, *t''*, which pushes said rod outwardly and closes the throttle when said lever is operated to throw on the brake. By these means the throttle and brake are simultaneously moved by a single lever, the throttle being opened when the brake is thrown off and closed when said brake is put on.

In the use for which this engine is primarily designed—viz., as a motor for a tricycle—the throttle will be connected in the manner de-

scribed with the ordinary brake-lever used on such machines.

The self-contained and incased engine herein described is secured by its casing at the crank end to the "backbone" or frame-piece of a tricycle, or to any other suitable support, (designated by the letter U in the drawings,) and at its opposite end to such frame-piece or support by a bracket, *u*.

What I claim as my invention is—

1. The combination, with an engine, of a casing comprising a tubular part which incases the piston-rod and forms a guide for the piston cross-head, another tubular part which incloses the valve-rod and forms a guide for the valve cross-head, and a part which incloses the crank-shaft and forms bearings therefor, said three parts being communicating and separable, substantially as shown and described.

2. The combination, with an engine, of an inclosing-casing comprising the separable parts I, K, L, and M, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 8th day of October, 1886.

LUCIUS D. COPELAND.

Witnesses:

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R. DALE SPARHAWK.