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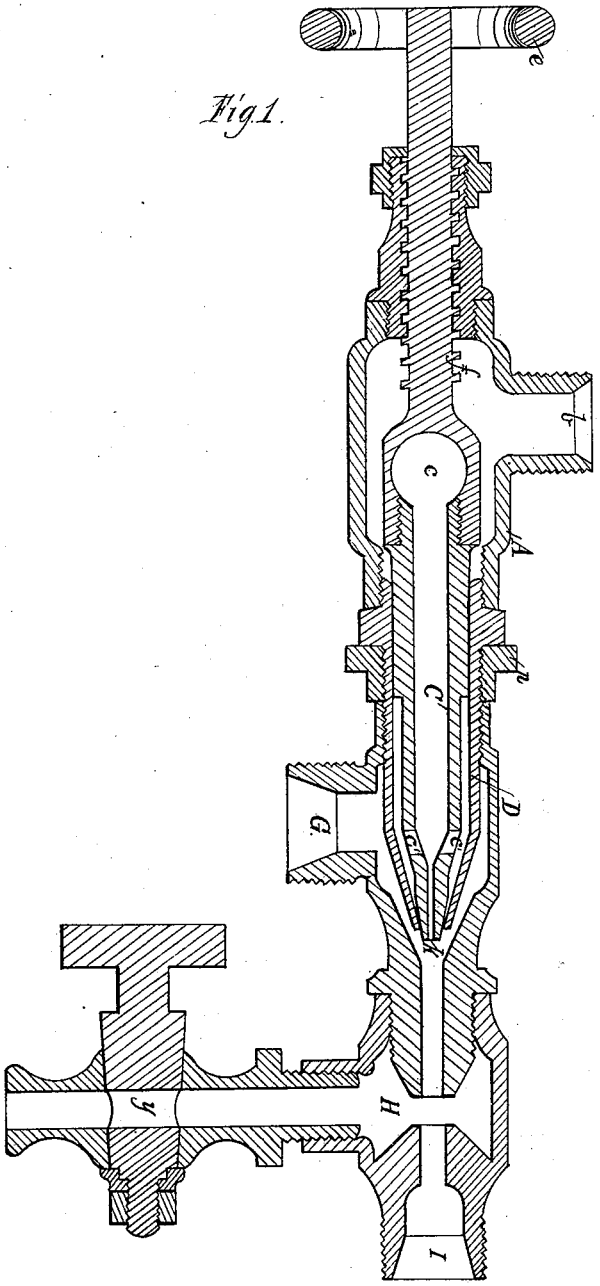
G. H. LITTLE.

Injector or Ejector for Steam-Engines.

No. 163,876. Patented June 1, 1875.

Fig 1.



WITNESSES

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Fig. 2.

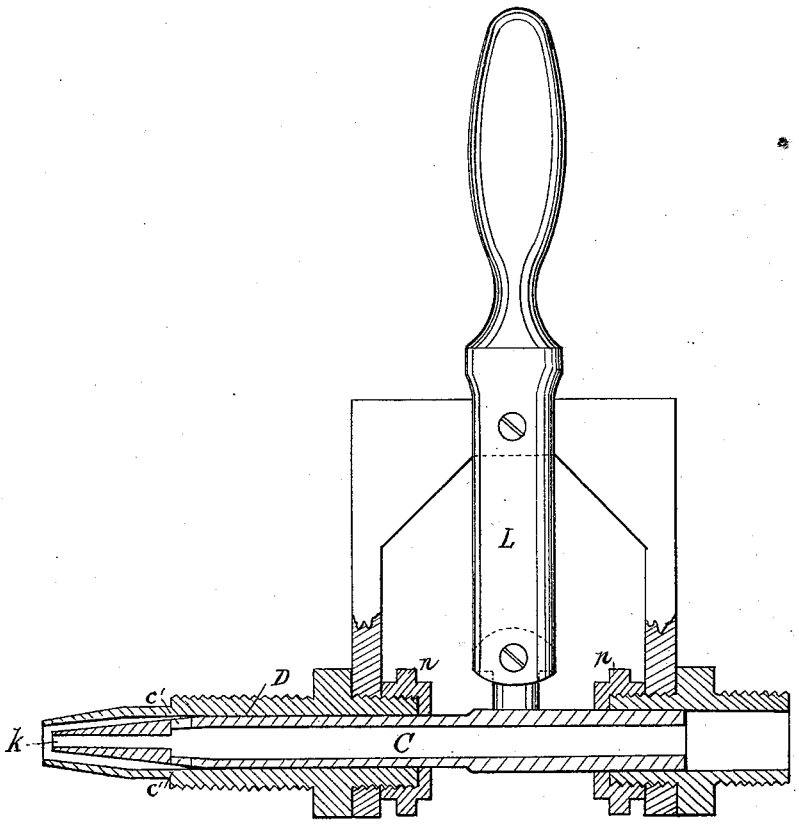

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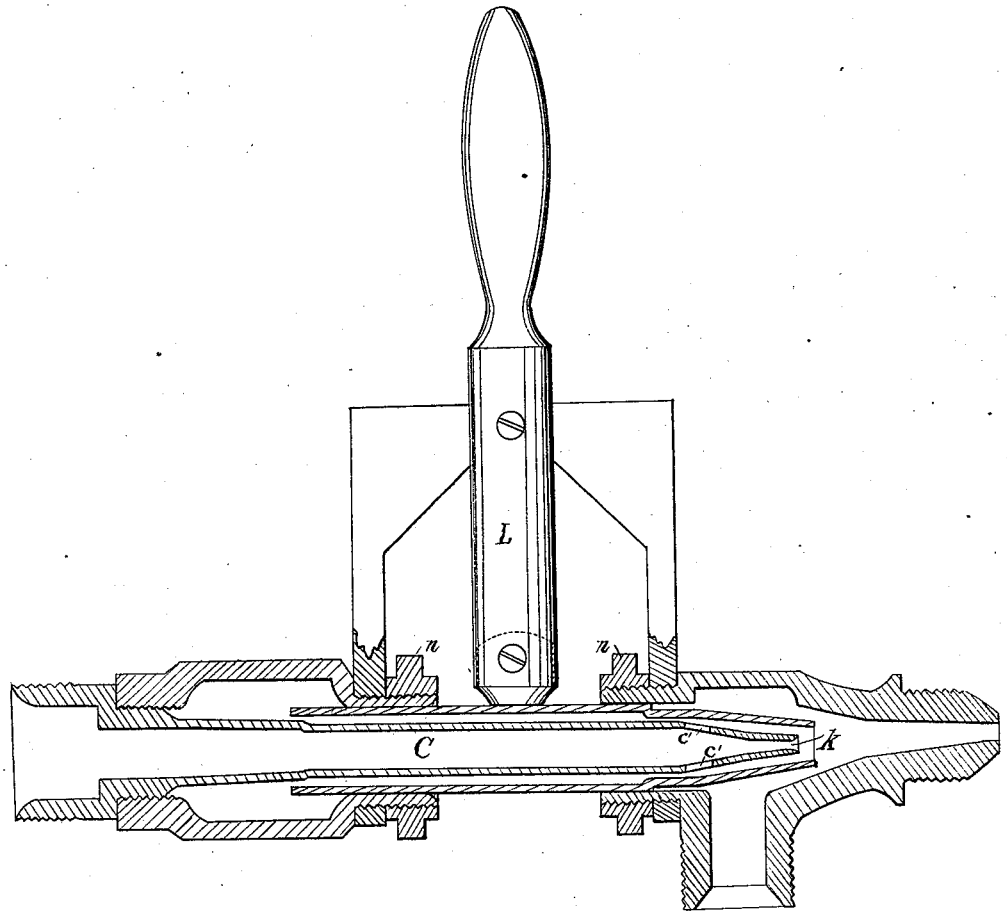
Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE H. LITTLE, OF PEABODY, MASSACHUSETTS.

IMPROVEMENT IN INJECTORS OR EJECTORS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **163,876**, dated June 1, 1875; application filed February 13, 1875.

To all whom it may concern:

Be it known that I, GEORGE H. LITTLE, of the town of Peabody, county of Essex and State of Massachusetts, have invented new and useful Improvements in Injectors and Ejectors; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

My improvements have for their object the drawing of water a great distance, and at the same time forcing it in a steady stream into the boiler without breaking the stream or current. To this end my improvements consist in the employment of an inner tube, through which all or nearly all the steam passes, and which is seated near the point of an outer tube, the inner tube projecting through the outer tube with a small orifice through the pointed end of such inner tube, which will admit steam through the injector, when first let on, without moving any of the parts; the construction being such that by moving the inner tube back after the steam has been thus let on, so as to admit steam not only through it, but also out from side openings into the inner tube, which encompasses it, the water shall be forced into the boiler.

Figure 1 illustrates a longitudinal section of an injector embodying my invention. Figs. 2 and 3 are modifications of the same.

A is the body of the injector having a steam-inlet, *b*. C is the inner or steam-tube, *c* its inlet, and D the tube surrounding it, and within which the steam-tube is longitudinally adjustable by means of the handle *e*, and the screw-thread *f* on its shank. G is the inlet for the water-supply; H, the overflow-chamber, and I the outlet leading to the boiler.

The inmost or steam-tube C is made with a tapering point with side outlets *c'*, and with a small discharging-orifice, *k*, and when advanced to the position shown in Fig. 1 it becomes closely seated within tube D, which, for this purpose, should have its bore slightly tapering, thus preventing the passage of steam by any other passage or route than through the tube C, or through its side orifices *c'*; but when by means of turning back the screw the steam-tube C is released from its seat, leaving a small annular space between its exterior and the interior of D, at their tips where tube C had previously seated on tube D, then the water, which the steam current has caused to be drafted and supplied at G, is forced by the joint action of both the steam currents toward and into the boiler.

It will be observed that I have no valve in my apparatus. On the contrary the end of the inmost or steam tube makes a seat at the outer end of its surrounding tube; also that all the steam passes through the tube C, except what may perchance leak at the joint in moving the tube back.

In using the inner tube with an axial hole through its end I get a straight run for the steam to draft, and upon turning back this inner tube a large portion of the steam passes around this inner tube, while the remainder passes through this axial outlet, thus making nearly a solid body of steam; and the steam is still passing through the inner tube while the injector is at work, thus helping to keep up the draft, so that it is not likely to break its current, but on the contrary to preserve and maintain a continuous flow.

In Fig. 2, instead of shifting the inner or steam tube by means of a threaded shank, I actuate it by a lever, L, centered upon any appropriate projection or bracket on the outer tube.

In Fig. 3 the lever is connected with and shifts the tube, which surrounds the inmost or steam tube, and in both these figures the steam has a straight run instead of through a T, and consequently encounters less friction.

The injector may be made with a straight or with an increasing-taper opening. Appropriate check-nuts *n* may be used to set the parts for regulating the water-supply.

In my construction the chamber from the water-inlet to the overflow may be made either straight or tapering; the opening leading out from the overflow may be straight or of gradual increasing size; and I prefer to use a straight-way cock with full side opening out from the overflow, as shown at *y*.

I claim—

1. The described construction, consisting of the inner steam-tube C having the small out-

let *k* and the side outlets *c' c'*, in combination with the outer tube D, the one tube being adjustable relatively to the other, as set forth, and whereby, when the tubes are seated together, the letting on of steam will draft water without moving any of the parts, and the unseating of these tubes from each other will force the drafted water into the boiler.

2. In combination, the inner steam-tube C, the outer tube D, the regulating nut or nuts, overflow-cock having a full-sized opening; the overflow-chamber, straight or tapering; and the outlet I, straight or of increasing size, the parts being arranged and operating substantially as shown and described.

GEORGE H. LITTLE.

Witnesses:
G. FRED. OSGOOD,
WM. H. LITTLE.