

(Model.)

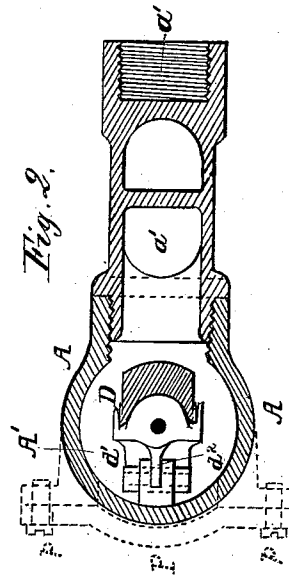
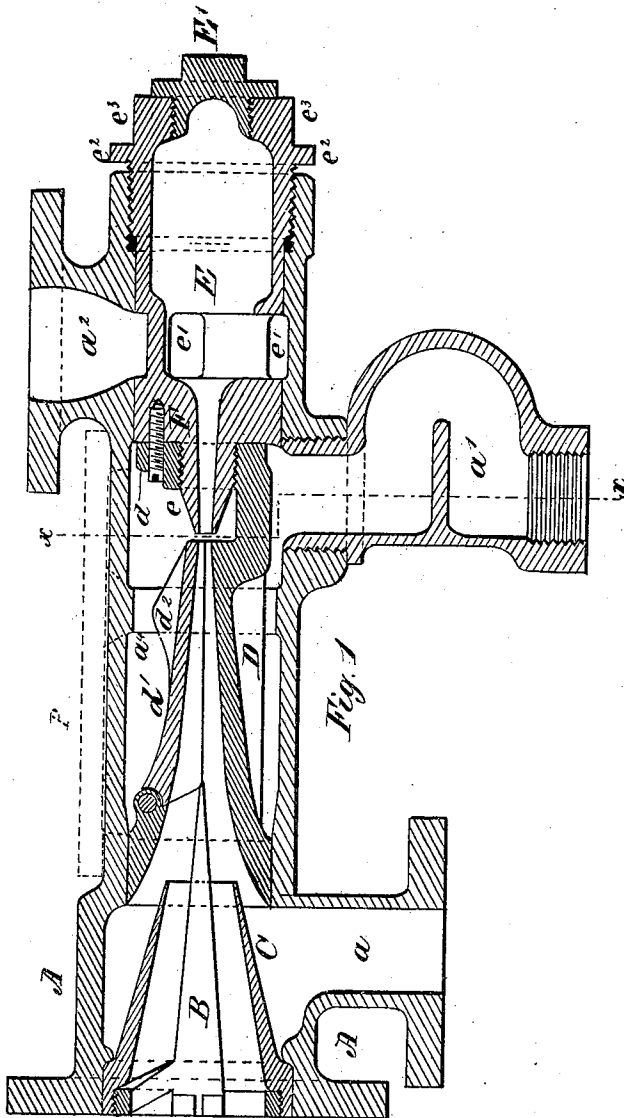
2 Sheets—Sheet 1.

E. DAVIES.

INJECTOR FOR STEAM ENGINES.

No. 245,354.

Patented Aug. 9, 1881.



Witnesses
Wm. A. McElwain
G. B. Towles.

Inventor
Edward Davies.
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att'y.

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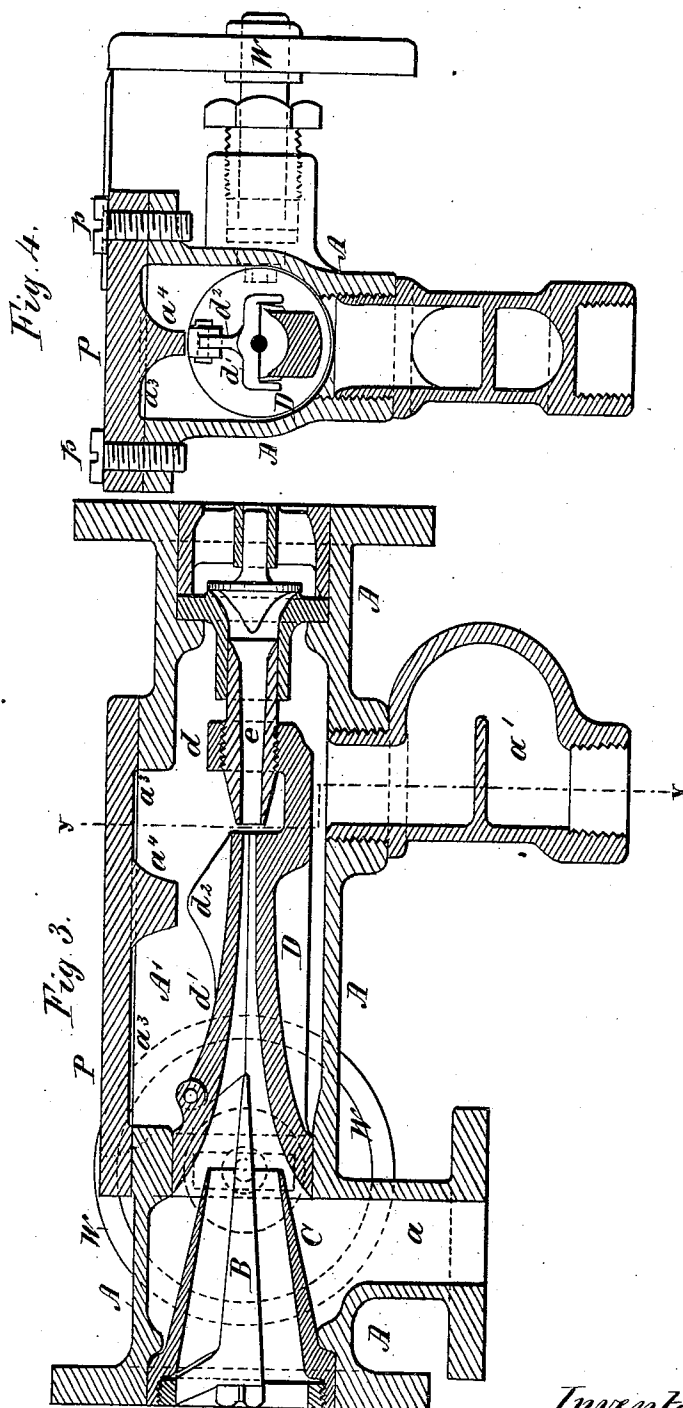
2 Sheets—Sheet 2.

E. DAVIES.

INJECTOR FOR STEAM ENGINES.

No. 245,354.

Patented Aug. 9, 1881.



Witnesses
Wm. A. McClure,
G. B. Fowler.

Inventor
Edward Davies,
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UNITED STATES PATENT OFFICE.

EDWARD DAVIES, OF LLANDINAM, COUNTY OF MONTGOMERY, ENGLAND.

INJECTOR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 245,354, dated August 9, 1881.

Application filed April 27, 1881. (Model.)

To all whom it may concern:

Be it known that I, EDWARD DAVIES, a citizen of England, residing at Llandinam, in the county of Montgomery and Kingdom of England, have invented certain new and useful Improvements in Injectors for Steam-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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to certain improvements in injectors for steam-engines, for which I have obtained Letters Patent of the United States, bearing date the 12th day of April, 1881, No. 240,101; and it consists, essentially, in a certain improved construction whereby the interior parts of the injector may be readily examined and obstructions removed therefrom, or whereby said parts may be withdrawn from the casing for like purposes without removing said casing from its connections with the boiler and steam-supply pipe or pipes.

The invention further consists in a modified construction of the hinged section of the combining-cone.

In the accompanying drawings, Figures 1 and 3 are longitudinal sections, and Figs. 2 and 4 transverse sections, on lines *x x* and *y y* of Figs. 1 and 3, respectively, showing my improved construction of injector.

The injector, in general, is constructed substantially like that shown and described in my Letters Patent above referred to, and is more especially designed to be worked by exhaust-steam, though it may be worked by live steam from the boiler, the difference in their construction lying, chiefly, in the changes necessary to adapt the interior parts for removal from the casing and for inspection through the casing. These features of construction may be applied conjunctively, and in practice I have found it of great advantage to embody them in an injector, yet either of these features of construction may be employed separately with practically good results.

In order that my invention may be better understood, and for the purposes of more clear-

ly setting forth the advantages of the means employed and of their construction, I have shown each of these features as applied separately to an injector.

Referring more particularly to Figs. 1 and 2, A is the casing, open at both ends, and provided with a water-branch, *a*, a sealed overflow-branch, *a'*, and a lateral branch, *a²*, through which the combined steam and water jet is discharged into the boiler, between which and the branch *a²* is interposed a suitable back-pressure or check valve. (Not shown in the drawings.)

B is the spindle; and C the steam-cone, 65 screwed to the upper end of the casing A, both being stationary relatively to the other elements of the injector.

D is the two-part combining-cone; and *e* the discharging-cone, supported by the fixed half 70 of the combining-cone, as described in Letters Patent above referred to. The discharging-cone *e* here, however, is integral with a tubular casing, E, that is screw-threaded at its outer end, and is screwed into the end of the casing A. The casing E is provided with ports 75 *e' e'*, that connect with the lateral discharge-branch *a²*, through which the combined steam and water jet passes to the boiler. The outer end of the casing E has a flange, *e²*, and a 80 head or boss, *e³*, rectangular in cross-section, to which a key may be applied for the purpose of screwing or unscrewing the casing E and parts connected therewith. The outer end of casing E has an opening, which is closed by 85 a screw-plug, E'.

It will be readily seen that the adjustment of the movable combining and discharging cones relatively to the fixed spindle and steam-cone may be effected by screwing the casing 90 E into or out of the casing A, to contract or enlarge the steam and water passages. When this adjustment is made there is danger, however, of disturbing the relation between the combining and discharging cones, which latter is screwed to a sleeve or bearing, *d*, formed 95 on the former. To avoid such a disturbance or change in the relative position of the cones mentioned, I employ a check-screw, F, that prevents the rotation of the sleeve *d* of the 100 two-part combining-cone D.

When from any cause it becomes necessary

to inspect the interior of the injector the screw-plug E' is removed, and access may be had to the interior at any time after stopping the working of the injector.

5 As shown in Figs. 2 and 4, the casing A, at that part which forms the air-tight chamber A' when the injector is at work, as described in my Letters Patent above referred to, is provided with an opening, a^3 , immediately opposite the hinged section d' of the combining-cone D. This opening is closed by means of a plate or cover, P, which is secured to the casing A in any convenient manner, so as to form an air-tight joint, preferably by means of
10 screws p . The plate may, however, be hinged to the casing A and locked thereto in any desired manner.

By removing or turning up of the cover the combining and discharging cones may be inspected and obstructions removed therefrom, as will be readily understood, since the hinged section of the combining-cone may by this arrangement be turned upon its hinge and access had to its interior. When the plate P alone is employed for the purposes of inspection the lateral discharge-branch a^2 is dispensed with, the injector discharging in a straight line, as usual, and the adjustment of the combining and discharging cones relatively
20 to the steam-cone and spindle is, as described in said Letters Patent above referred to, effected by means of a hand-wheel, as shown at W, Fig. 3.

It will be obvious to all those conversant with this class of apparatus that the advantages derived from the combination of the two means described for inspecting the interior parts of an injector are vastly superior to those derived from either of these means when employed separately.
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In order to enable me to increase the capacity of the air-tight chamber A' , formed by the combining and discharging cones, the sealed overflow-branch, and the combined jet of steam
40 and water, when the injector is at work, and at the same time limit the expansive movement of the movable section d' of the combining-

cone D within proper limits, I form a projection, d^2 , upon said hinged section d' of the cone D, as shown, which projection comes in contact
50 with the abutment a^4 on the casing A or lid P, as the case may be.

Having now described my invention, what I desire to claim, and secure by Letters Patent, is—

1. In an injector for steam-engines, the combination, with the casing, the two-part combining-cone, and the discharging-cone e E, of the screw-plug E' , all arranged, constructed, and operating substantially as and for the purpose specified.
55

2. In an injector for steam-engines, the combination of the casing provided with a lateral water-branch, a^2 , and the fixed spindle and steam-cone with the two-part combining-cone D, the discharging-cone E , connected to said combining-cone, as set forth, and the screw-plug E' , all arranged, constructed, and operating substantially as shown and described.
60

3. In an injector for steam-engines, the combination, with a combining and discharging cone, of a casing provided with an opening, a^3 , and the lid P, arranged and operating substantially as and for the purpose specified.
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4. In an injector for steam-engines, the combination, with a discharging-cone and a two-part combining-cone having the hinged section d' , of a casing provided with an opening, a^3 , and a covering-plate, P, therefor, through which the hinged section of the combining-cone may be swung when said plate is removed, substantially as and for the purpose specified.
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5. The movable section of the combining-cone, provided with the projection d^2 , in combination with the abutment a^4 on the casing, substantially as described, for the purpose specified.
75

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

EDWARD DAVIES.

Witnesses:

PETER J. LIVESEY,
JAMES WOOD.