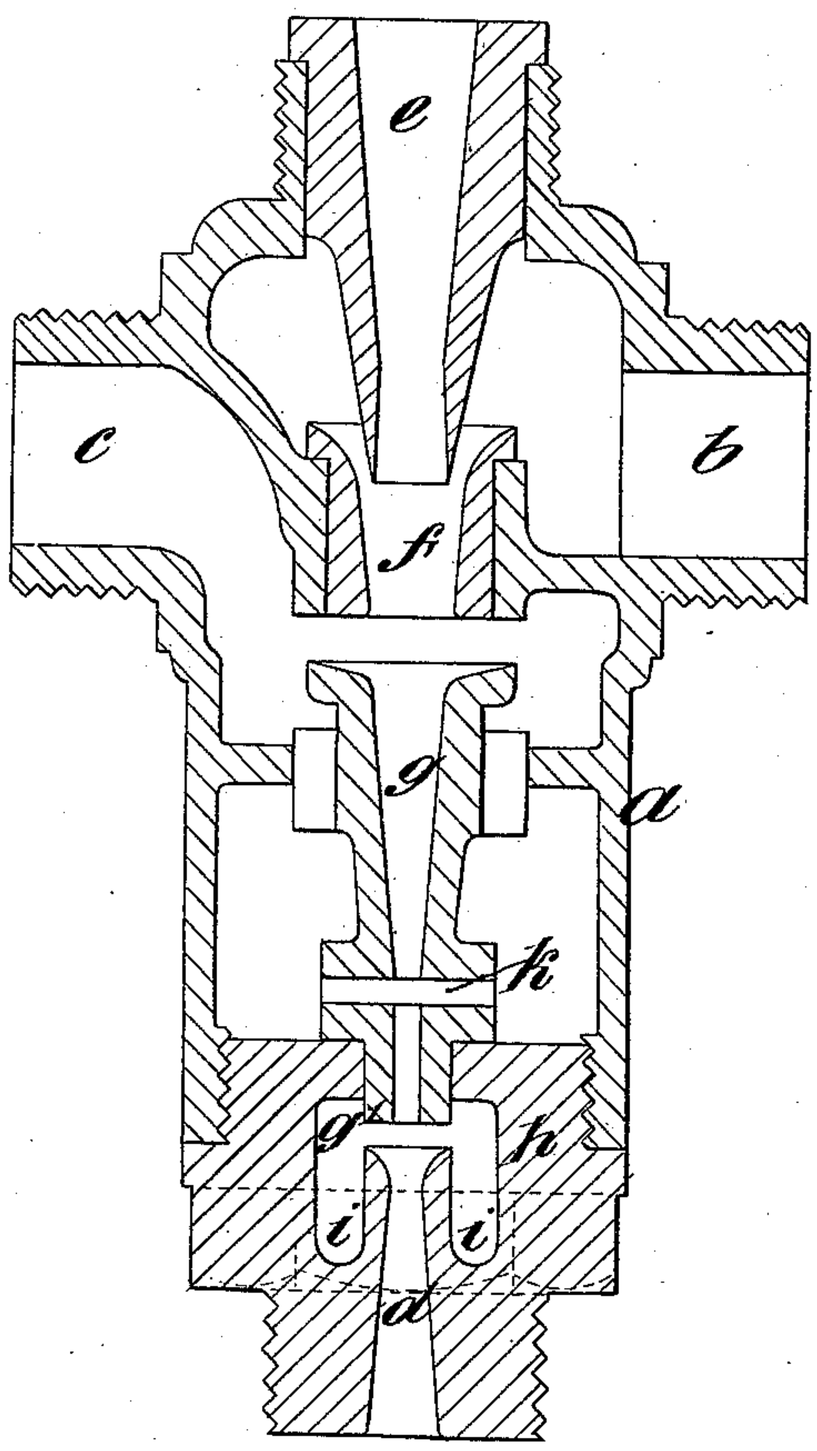
(Model.)

T. H. WHITE.

INJECTOR.

No. 349,191. Patented Sept. 14, 1886.



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UNITED STATES PATENT OFFICE.

THOMAS H. WHITE, OF SALFORD, MANCHESTER, COUNTY OF LANCASTER, ASSIGNOR TO JOHN HOLROYD, OF MANCHESTER, ENGLAND.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 349,191, dated September 14, 1886.

Application filed March 9, 1886. Serial No. 194,598. (Model.) Patented in England November 14, 1884, No. 15,015.

To all whom it may concern:

Be it known that I, THOMAS HENRY WHITE, a subject of the Queen of Great Britain and Ireland, residing at Salford, Manchester, county of Lancaster, England, engineer, have invented certain Improvements in Injectors, (for which I have obtained a patent in Great Britain, No. 15,015, November 14, 1884,) of which the following is a specification.

My invention relates to the injectors principally used to feed steam-generators with water; and the principal object of my invention is to render the injector automatic, so that it can be started into operation by simply admitting steam to the steam-nozzle. I fit a delivery-tube to slide on the axial line of the injector toward and from the combining-tube.

In the accompanying drawing, *a* is the body of the injector. *b* is the water-inlet. *c* is the water-overflow branch. *d* is the receiving-cone. *e* is the steam-nozzle. *f* is the combining-cone, and *g* is the said delivery-tube.

The tube *g* is fitted to slide easily in the casing and in a seating in a plug, *h*, which carries the receiving-cone and is screwed into the end of the body *a*. One end, *g'*, of the tube *g* is turned to a less diameter than the main part of the tube and slides in a contracted part of the bore in the plug *h*. The end of the part *g'* opens into a chamber, *i*, formed between the part *g'* and the receiving-cone, and surrounding the upper end of the said cone. The upper part of the passage in the tube *g* is coned to suit the passage through the combining-cone *f*. In the example the tube *g* is provided with an overflow-port, *k*, which is similar to the ordinary overflow port or passage; but the injector may be made and used without this overflow.

When the injector is not in action, the tube *g* rests at the bottom of its seating, the shoulder between the parts *g* and *g'* limiting the sliding movement toward the receiving-cone. When in this position, there is a space between the opposed ends of the cone *f* and the tube *g;* but the latter is free to slide toward the former until the two ends meet in contact and for the purposes of the injector form one tube.

The action of the injector is as follows: When steam is admitted to the steam-nozzle, water is drawn in and delivered with the steam to the combining-cone, as is usual. Water issuing from the combining-cone overflows through the space between that cone and the end of the delivery-tube *g*, and in the cases wherein the overflow-port *k* is provided a portion of the water escapes through such port. Water is also forced into the chamber *i*, and a pressure is thereby created in this chamber sufficient to force the tube *g* into contact with the cone *f* by the reaction of the water upon the end *g'* of the tube. When the ends of the cone *f* and the tube *g* are thus brought into contact, the overflow-space between such ends is closed. The pressure within the chamber *i* then becomes in excess of the boiler-pressure, and the water is forced into the receiving-cone *d*. So soon as the water begins to pass into the receiving-cone water from within the chamber *i* is drawn in with the injected stream, so that the said chamber is relieved from pressure and a partial vacuum is formed therein. In some cases I provide the injector with an additional inlet-branch, as indicated by the dotted lines at *l*, and thereby admit an additional supply of hot water or water of a suitable temperature, which water is forced along with the main stream of water into the receiving-cone.

I claim—

1. The combination of the fixed receiving-cone and surrounding chamber, the combining-cone, steam-nozzle, and water-supply of an injector with a sliding delivery-tube between the combining-cone and receiving-cone, substantially as set forth.

2. The combination of the combining-cone and receiving-cone of an injector with a sliding delivery-tube between the two, a chamber, *i*, around the receiving-cone, and a branch water-inlet, *l*, leading into the said chamber, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS H. WHITE.

Witnesses:
EDWARD K. DUTTON,
ARTHUR LEDGER.