

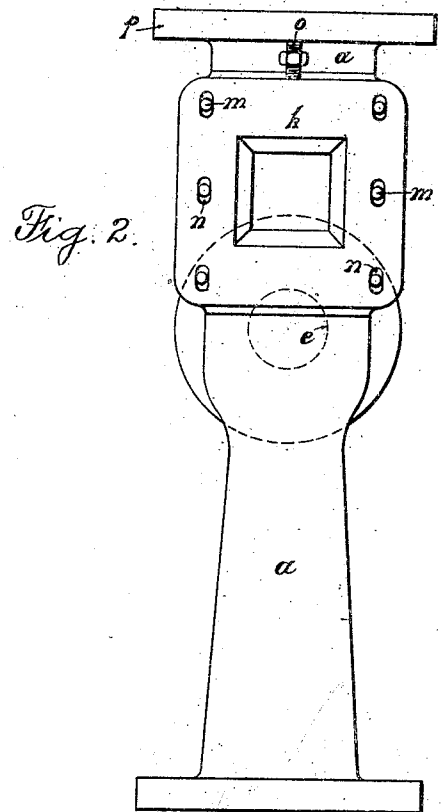
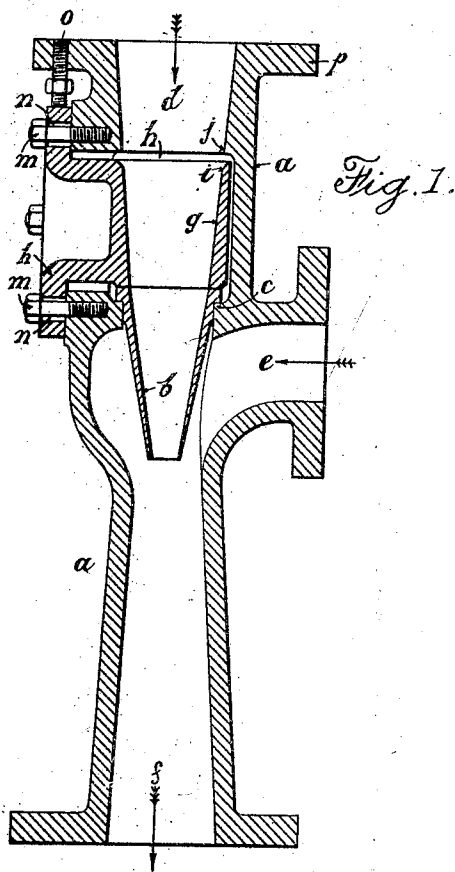
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J. CAUTHERY ET AL

WATER INJECTOR

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ENGLAND.

WATER INJECTOR.

Application filed August 27, 1921. Serial No. 496,573.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that we, JOSEPH CAUTHERY and JAMES WILLIAM BANKS, subjects of the King of Great Britain and Ireland, and residents of Higher Crumpsall, Manchester, in the county of Lancaster, England, and Bradford, in the county of York, England, respectively, have invented certain Improvements in Water Injectors (for which we filed application for Letters Patent in Great Britain January 30, 1920, Patent No. 155,137), of which the following is a specification.

This invention relates to improvements in water injectors used in connection with waste heat economizers and has reference to that type designed to raise the temperature of the feed water to the economizers in order to prevent external corrosion of the pipes of the latter due to the feed water being fed thereto at too low a temperature.

In general the aforesaid type of injector consists of a main body which at the lower end is of hollow conical form and at the upper end of rectangular form in cross section, a flange projecting internally dividing the two portions referred to. This flange supports a hollow conical nozzle provided with a flange to rest upon the internal flange, the nozzle being held in position in an axial direction by means of interengaging lugs formed on the nozzle and on the main injector body respectively, the arrangement being such that the nozzle can be removed when required and passed through an opening in the main body or casing by the removal of a cover therefrom. Below the internal flange previously referred to is an inlet connection communicating with the space around the nozzle and the lower portion of the injector casing which leads to the economizer. The rectangular chamber previously mentioned is provided with an inlet leading from the pump.

An injector of the type referred to is placed in a suitable position in the water feed pipes system between the feed pump and the economizer. The feed water is forced through the nozzle of the injector by the pump. The result of this action is to

create a suctional effect in the conical chamber of the injector beyond the nozzle and so draw hot water into the injector through the side inlet connecting the latter with the hot water outlet pipe of the economizer. Some of the hot water from the economizer, is thus mixed with the cooler water from the feed pump so that the temperature of the feed water entering the economizer is thereby heated to the degree required to prevent external corrosion of the economizer pipes.

It has been found that in water injectors provided with a rectangular upper chamber the angles and pockets result in a loss of energy due to surface and internal friction consequent upon the eddies formed in the incoming water from the feed pipe.

The object of our invention is to remedy this defect and to increase the efficiency of the injector. To this end it consists essentially in the provision of an extension of the nozzle previously referred to so that a continuous hollow conical chamber is provided from the inlet at the upper end of the injector to the discharge end of the nozzle.

Our invention will be fully described with reference to the accompanying drawings in which—

Fig. 1, is a sectional side elevation of a water injector constructed in accordance with our invention,

Fig. 2, front elevation of same.

In the aforesaid drawings *a* indicates the main body of the injector, *b* the usual type of nozzle supported upon the internal flange *c*, *d* the inlet from the pump, *e* the hot water inlet from the hot water outlet pipe of the economizer, and *f* the discharge outlet to the economizer.

In carrying out our invention in a preferred embodiment we employ a metal cone *g* adapted to be placed within the rectangular chamber *h* above the entrance end of the nozzle *b* such cone being of hollow formation and truncated, the smallest diameter being equal to the largest diameter of the nozzle, the conical surface dying out at its upper end *i* substantially flush with the inside of the casing *a* at *j*. The additional conical member fills up the rectangular por-

tion *h* of the casing its lower end resting upon the upper end of the nozzle *b* so as to keep the latter in position, thus doing away with the interengaging lugs of the old type. 5 The conical member may be kept in position laterally by means of a removable cover secured to the casing *a* by studs and nuts and shaped on its inner surface to correspond to the member *g*. The cover may be 10 provided with a set screw to bear tightly against the conical member. By removing the cover both the latter and the nozzle can be easily removed from position. In Figs. 1, and 2, we have shown the cover *k* as part 15 of the cone *g*, the combined unit being secured to the casing *a* by studs and nuts *m*. The studs pass through slots *n* in the cover to enable a jack screw *o* carried by the upper flange *p* of the casing *a* to jam the member 20 *g* down on to the nozzle *b* before the cover is tightened up.

By the arrangements previously described

we obtain the highest efficiency in the water jet issuing from the nozzle.

What we claim as our invention and desire to secure by Letters Patent is:— 25

In an injector, a casing provided with two inlets and one outlet and having an internal shoulder and a lateral opening between the 30 shoulder and one inlet, a nozzle formed in two sections arranged end to end and supported in the casing between the said inlet and the outlet, the outlet section being held against the said shoulder by the inlet section, and the inlet section being removable 35 through the said lateral opening in the casing and provided with a flange which closes the lateral opening, and means which secure the said flange to the casing.

In testimony whereof we have hereunto set our hands. 40

JOSEPH CAUTHERY.
JAMES WILLIAM BANKS.