(Model.)

M. D. STRICKLAND.

INJECTOR.

No. 333,086. Patented Dec. 22, 1885.

Fig. 1.

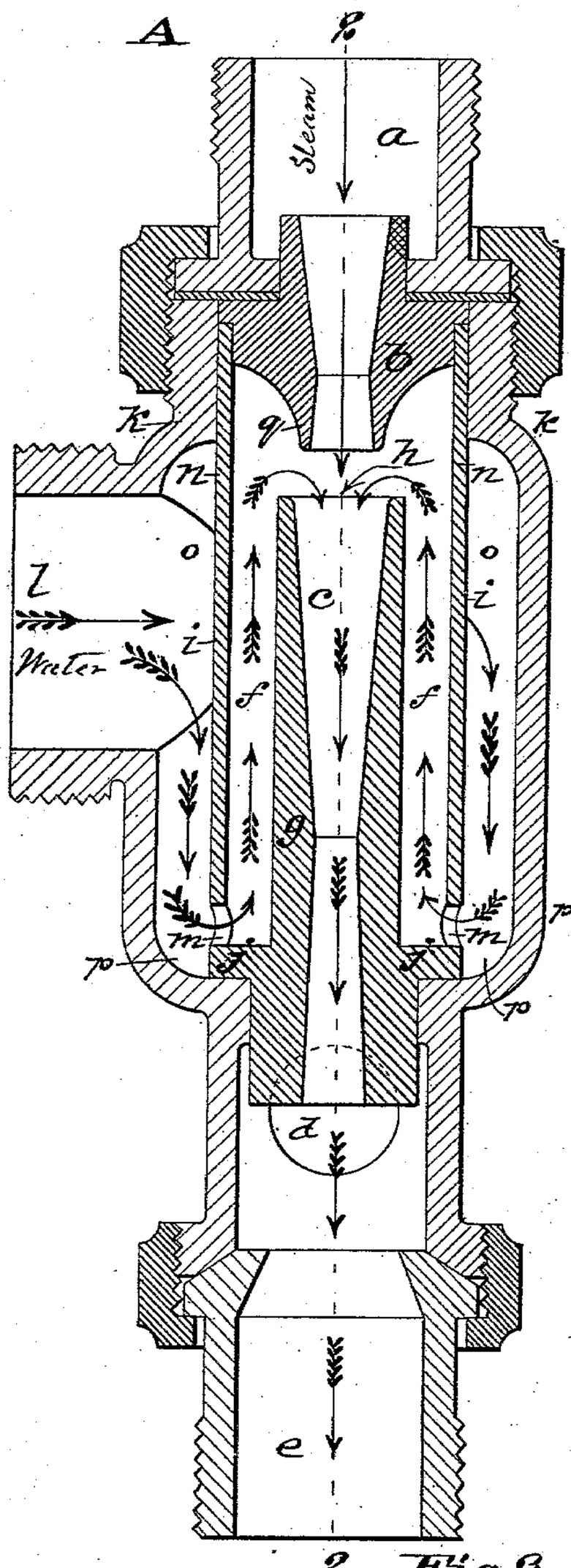
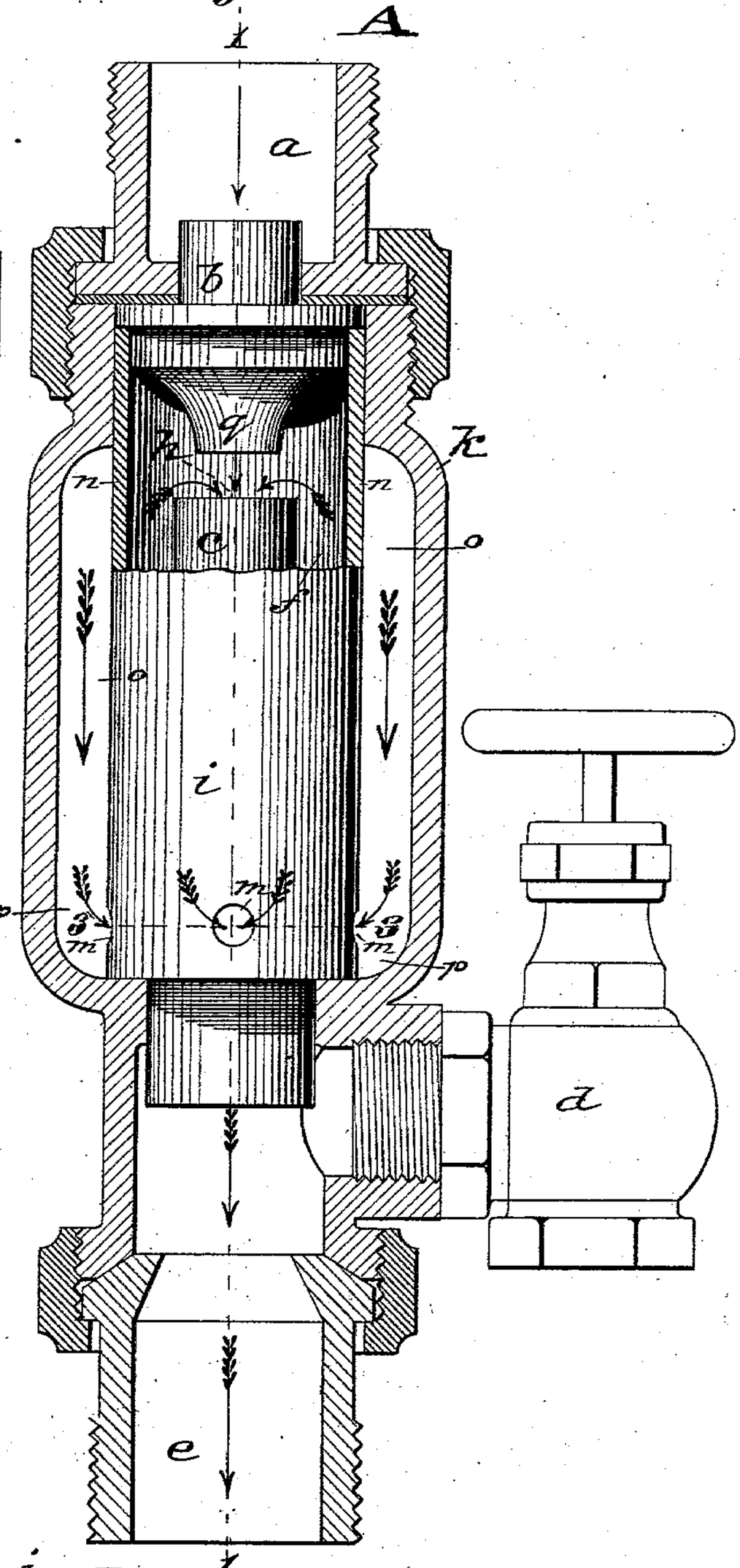
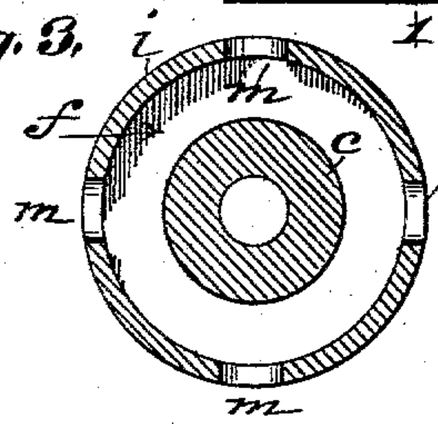


Fig. 2.



2 Fig. 3.



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UNITED STATES PATENT OFFICE.

MORGAN D. STRICKLAND, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO CHARLES D. CARROLL, OF SAME PLACE.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 333,086, dated December 22, 1885.

Application filed August 17, 1885. Serial No. 174,659. (Model.)

To all whom it may concern:

Be it known that I, MORGAN D. STRICKLAND, of St. Louis, Missouri, have made a new and useful Improvement in Injectors, of which the following is a full, clear, and exact description.

By means of the present improvement, which renders an injector more reliable and efficient, the feed-water in its flow to the injector is directed in such a manner as to render it useful in keeping down the temperature of the combining-tube, especially at its narrowest part; and also in presenting the parts in the immediate vicinity of the inlet to the combining-tube from becoming overheated.

The means for carrying out the improvement are shown in the annexed drawings, making part of this specification, in which—

Figure 1 is a longitudinal section of an injector having the improvement. The section is on the line 1 1 of Fig. 2. Only that portion of the injector is exhibited as is necessary to an understanding of the improvement. Fig. 2 is a section on the line 2 2 of Fig. 1. The casing around the combining-tube is shown partly in elevation and partly in section. Fig. 3 is a cross-section on the line 3 3 of Fig. 2.

The same letters of reference denote the same parts.

Saving as modified by the improvement, the injector A is of the customary form, the steam-supply inlet *a*, the steam-jet tube *b*, the combining-tube *c*, the overflow *d*, and the water-outlet *e* being substantially such as are commonly used in injectors. Surrounding the combining-tube, and so as to inclose an annular space, *f*, or substantially an annular space around the combining-tube and extending from opposite, or thereabout, the narrowest part *g* of the combining-tube to the inlet *h* into the combining-tube, is a casing, *i*. It is preferably in the form of a tube, and it is preferably made in one piece with the combining-tube by extending it from the flange *j* of the combining-tube, substantially as is represented in the drawings, and it is preferably extended past the inlet *h*, and adapted at its upper end to support the steam-jet tube *b;* but however shaped or extended at its upper end, the casing so connects with the shell *k* of the injector as to prevent the feed-water from flowing from the water-supply pipe *l* directly to the inlet *h*. On the contrary, the only or perhaps the chief inlet for the water coming from the pipe *l*, by which it can enter the space *f*, is the perforation or perforations *m* in or near the lower end of the casing. The flow is therefore first to that part of the space *f* which surrounds the neck of the combining-tube, and then along the combining-tube to its inlet *h*. The coolest water is thus brought in contact with that part of the combining-tube which most needs cooling, and as the space *f* is a comparatively narrow one there is no opportunity for the water to become stagnant, and then in a short time heated at any point along the route which it takes through the space *f*, and especially opposite the part *g;* but all of it must flow regularly into the combining-tube. At the same time it will be noticed the inflowing water from the pipe *l* comes against the outer side of the upper end, *n*, of the casing. This is important, for the heat of the steam, the steam-jet tube, and the parts surrounding the steam-jet tube is continually being communicated to the casing or whatever incloses the water opposite the inlet *h*, and the water within the casing, in consequence, is liable to be overheated, and but for the contact of the inflowing water with the exterior of the casing at the point in question the casing would become so heated as in turn to heat the water within it. As it is, the water encounters the exterior of the casing throughout or substantially throughout its length, and the desired result—namely, a comparatively cool body of water throughout the space *f*, is obtained. The pipe *l*, it will be seen, communicates with the annular space *o* (which surrounds the casing *i*) opposite the upper end of the casing. This is better than arranging the pipe *l* at a lower level. The pipe *l* in diameter might equal the height of the casing. It is preferable, however, to construct it as is represented, and cause the water to flow against the part *n* of the casing, and thence pass downward into the lower end, *p*, of the space *o*, whence it flows through the openings *m*, as indicated by the arrows in Figs. 1, 2.

The steam-jet tube may or may not have a nozzle, *q*.

I claim—

1. An injector having a casing within the in-

jector-shell and surrounding the combining-tube, allowing the feed water to flow against the exterior of the casing, but cutting off the direct flow of the feed-water to the combining-tube inlet, and directing it first to around the lower end of the combining-tube and thence along the combining-tube to its inlet, substantially as described.

2. The combination of the shell *k*, the steam-jet tube *b*, the combining-tube *c*, the flange *j*, and the tube *i*, substantially as described.

3. The combination of the shell *k*, the steam-jet tube *b*, the combining-tube *c*, the casing *i*, perforated at *m*, and the water-supply pipe *l*, leading into the annular space *o*, which in turn extends below the pipe *l* at *p*, substantially as described.

Witness my hand.

MORGAN D. STRICKLAND.

Witnesses:

C. D. MOODY,

J. W. HOKE.