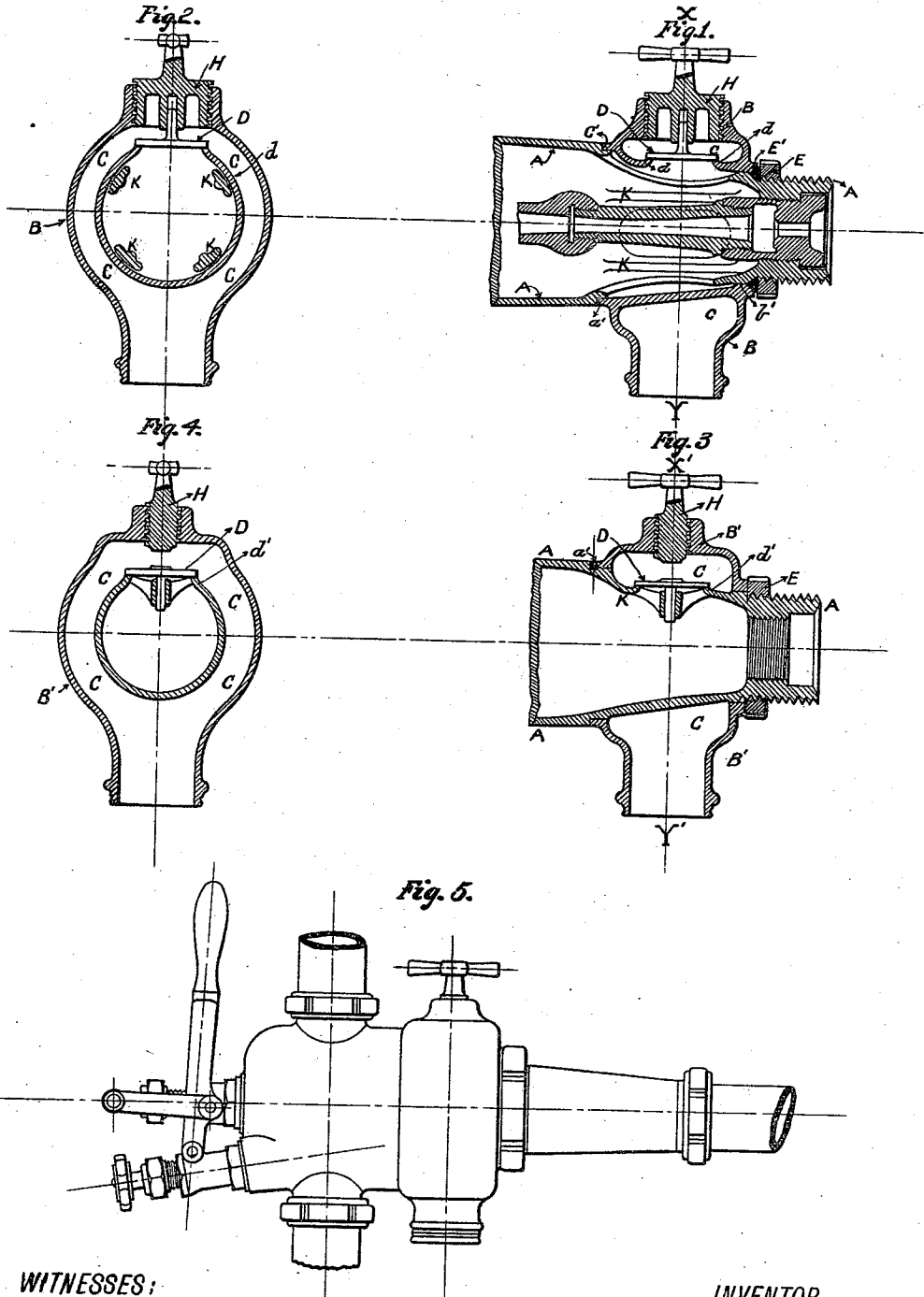


(Model.)

S. L. KNEASS.
INJECTOR.

No. 501 464

Patented July 11, 1893.



WITNESSES:

John L. Phillips
E. R. Harper

INVENTOR

Strickland & Kneass
by Mrs. Sellers atty

UNITED STATES PATENT OFFICE.

STRICKLAND L. KNEASS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
THE WILLIAM SELLERS & COMPANY, INCORPORATED, OF SAME PLACE.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 501,464, dated July 11, 1893.

Application filed June 16, 1892. Serial No. 436,991. (Model.)

To all whom it may concern:

Be it known that I, STRICKLAND L. KNEASS, of the city and county of Philadelphia and State of Pennsylvania, have invented certain
5 new and useful Improvements in Injectors, of which the following is a specification.

All injectors have an overflow opening from the nozzles through which an escape of water takes place until the jet has acquired sufficient velocity to enter the boiler, and when-
10 ever a casing is employed to maintain the nozzles of the instrument in proper relation with each other, this overflow opening forms a part of this casing, or is rigidly attached thereto. In all injectors which are adapted
15 to restart themselves, when from any cause the jet is broken, the overflow passage must be very large as compared with those which are manipulated to restart, and it frequently
20 occurs that in placing such injectors in the position they are required to occupy for working, this fixed overflow passage is a serious inconvenience, so much so in fact, as to limit the position of the instrument. For example,
25 lifting injectors are preferably employed upon locomotive engines, because they can be placed in the cab above the level of the water in the tank, and thereby avoid waste of water through the injector. In this position
30 it is frequently desirable to place the instrument so that its discharging end shall be outside the cab, while the handles for manipulating it, shall be inside, but with a fixed overflow passage this is impossible, without
35 cutting a hole through the cab large enough to admit this overflow passage, and when the injector is in place, this hole must remain open to permit the prompt removal of the instrument if required. The direction of the
40 overflow may require to be adjusted to the right or to the left, dependent upon which side of the locomotive it is placed, so that when two injectors are used on each locomotive,
45 which is now the universal practice, the injectors must be inclined in opposite directions or the pipes which receive the overflows must be bent, either of which is very undesirable.

The objects of my present invention therefore are, to provide short and direct overflow
50 passages of sufficient cross sectional area to

permit automatic restarting and to arrange the overflow passage so that its relation to the instrument can be modified at will.

To these ends my invention consists in an overflow chamber and a removable casing
55 which encircles this chamber, provided with a check valve to prevent the admission of air to the chamber, through which casing the overflow has exit, and it further consists in
60 an overflow chamber provided with a check valve to prevent the admission of air to the chamber, and a removable casing which encircles the chamber and the check valve,
65 through which casing the overflow has exit.

Figure 1 represents a vertical longitudinal
70 section through the forward end of an injector embodying one form of my present improvement. Fig. 2 is a transverse section through the parts shown in Fig. 1 on the line
75 X Y. Fig. 3 is a vertical longitudinal section of the forward end of an injector showing a modification of the overflow casing. Fig. 4 is
80 a transverse section through Fig. 3 on the line X' Y'. Fig. 5 is an outside elevation of an injector provided with an overflow casing
85 which is here shown as applied to the rear end of the overflow chamber of an injector.

A, Fig. 1, represents the forward or delivery end of an injector.

B is a removable overflow casing provided
90 with a check valve D resting upon the seat *d* formed in the casing and guided by the bearing in the screw H. The overflow duct *c c c* from the check valve is contained entirely
85 within the overflow casing and the injector may be rotated within the casing to any desired position without affecting the alignment
90 of the valve or its action, the valve remaining always above the overflows in the tube and keeping them flooded.

Large openings are provided in the body of
95 the injector underneath the casing B to permit the free discharge of steam and water from the injector under the check valve D. Ribs K K may be provided to strengthen the
100 body A as shown in Figs. 1 and 2, the intermediate shell being cut away. With this construction the joint between the casing B and body A will evidently be subjected to the same pressure as the overflow chamber of the in-

jector. The casing is aligned on the body by the seats a' b' , is seated against the shoulder c' so as to be steam tight and is held in place by the retaining nut E which may be formed with or arranged to press against the triangular ring E' which fits into a V shaped recess formed between the body A and casing B, or any of the ordinary methods of packing may be employed to render this joint steam tight. In the construction shown in Fig. 3 the difficulties of making this joint are avoided by making the valve seat d' in the body A and providing a guide for the valve stem below the valve. The joint between the casing B' and the body A in this construction has to resist the pressure of steam only slightly above the atmospheric pressure, the escape duct being formed between the exterior of the body A and the interior of the casing B'. With either form the injector may be placed partly through the front of a locomotive cab, by removing the casing and putting the body of the injector through a hole bored of the proper size to fit it and then replacing the casing. This removable casing serves to concentrate and direct the overflow water, when there is such water, without affecting the operative parts of the instrument, as it will operate as an injector when the overflow casing is removed. For some purposes it is more convenient to place the overflow casing nearer the rear end of the injector as indicated in Fig. 5, it being clear that all that is required is that the opening for the valve D shall be in free communication with the overflow chamber of the injector so as to permit free escape of steam and water from the overflow chamber as in starting, and to prevent en-

trance of air when the injector is running. The screw H serves to hold the valve D firmly to its seat when it is necessary to use the injector as a heater. In Fig. 1 it is shown as also forming the guide for the stem of the valve D.

In order that the injector may be capable of re-starting under all practical conditions of steam pressure and height of lift, it is essential that the overflow openings shall be large enough to permit the free escape of all the steam delivered by the steam nozzle without injurious back pressure. In many cases it may be found preferable to provide in addition to the lower discharge shown, a discharge opening above the check valve that by means of a short pipe will carry the steam above the top of the cab of the locomotive, care being taken to divert any entrained water to the lower overflow which could then be made smaller.

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

1. In combination with an injector, a removable overflow casing which encircles the body of the injector and contains a passage for the overflow, between the overflow chamber of the injector and the air.

2. A removable overflow casing which encircles the body of an injector, and contains a passage for the overflow, between the overflow chamber of the injector and the air, in combination with a check valve in the passage for the overflow.

STRICKLAND L. KNEASS.

Witnesses:

JOHN L. PHILLIPS,
E. R. HARPER.