J. HAGGAS.

Feeding Locomotive-Tenders.

No. 206,560. Patented July 30, 1878.

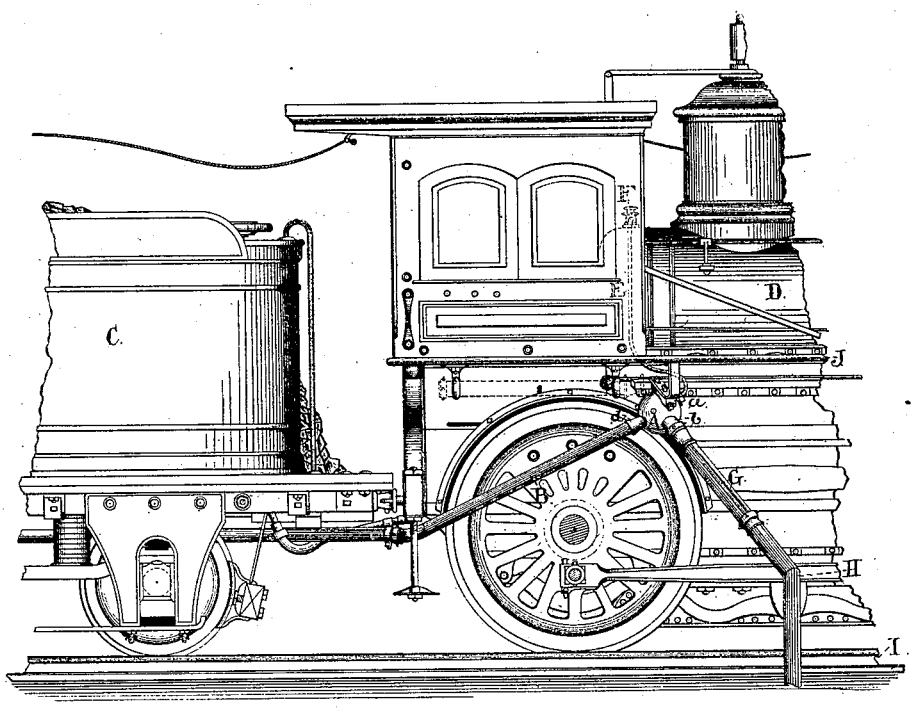

Fig. 1.

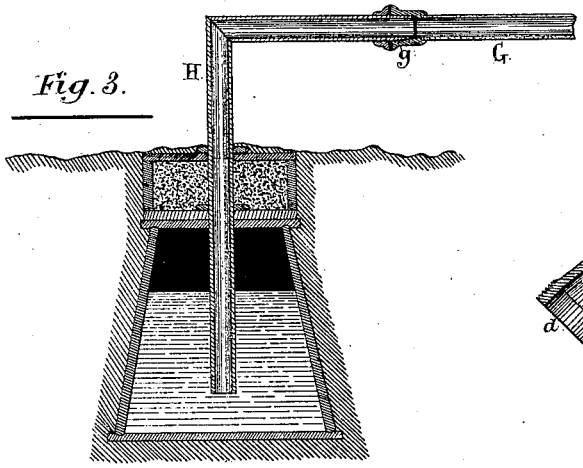

Fig. 3.

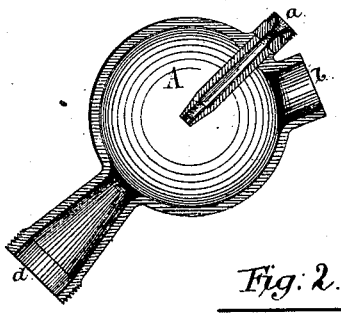

Fig. 2.

WITNESSES:

L. Whitehead.

A. E. Curran.

INVENTOR

Joseph Haggas

by Ridout Aird & Co

Attys

UNITED STATES PATENT OFFICE.

JOSEPH HAGGAS, OF UXBRIDGE, ASSIGNOR OF ONE-HALF HIS RIGHT TO WILLIAM GOODESHAM, OF TORONTO, ONTARIO, CANADA.

IMPROVEMENT IN FEEDING LOCOMOTIVE-TENDERS.

Specification forming part of Letters Patent No. **206,560**, dated July 30, 1878; application filed May 25, 1878.

To all whom it may concern:

Be it known that I, JOSEPH HAGGAS, of the village of Uxbridge, in the county of Ontario, in the Province of Ontario, Canada, mechanical engineer, have invented a certain new and useful Apparatus for Supplying Locomotive-Tenders with Water, which apparatus is fully set forth in the following specification and accompanying drawing.

The object of the invention is to provide an apparatus for raising water which will enable railway companies to dispense with the expensive elevated tanks and pumping-gear now used and necessary for supplying the locomotive-tenders with water; and it consists in fixing to some convenient part of the locomotive an injector connected to the tender by a suitable pipe, and furnished with other apparatus so arranged that a small quantity of steam taken from the locomotive-boiler will raise water from below the level of the track and force it into the tender.

Figure 1 exhibits arrangement of my elevator connected to a pipe leading to a ground-tank; Fig. 2, sectional detail of my spherical injector; Fig. 3, sectional detail of a ground-tank and pipe.

In all injectors with which I am familiar the amount of steam required to raise a given quantity of water is so excessive as to render them impracticable for lifting a large body of water in a limited space of time. As my injector is designed for a service in which time is a main object and economy in steam necessary, all the details in its construction have been directed toward accomplishing the desired ends.

The injector itself is formed by a spherically-shaped vessel, A, having an inlet-port, *b*, as nearly opposite to the outlet-port *d* as the required position of the steam-pipe *a* permits, the said steam-pipe being relatively of small diameter and projecting within the vessel A beyond the entrance of the port *b*. This arrangement of the ports *b* and *d* and steam-pipe *a* permits the free passage of the water, and does not, as in other injectors, present any angle or obstruction to check the velocity of the water passing through. Consequently, as the full effect of the velocity is retained the amount of steam necessary is considerably lessened, the desired effect being further assisted by the steam-pipe *a* projecting within the vessel A beyond the port *b*. The requisite vacuum is thus better maintained.

The pipe B is attached to the port *d*, and connects the injector to the tank C. The jet *a* is supplied with steam from the boiler D by the pipe E, which is furnished with a cock, F, placed in any suitable position convenient for the driver in charge of the locomotive.

In Fig. 1 I show the suction-pipe G coupled to the inlet-port *d*, and an elbow-pipe, H, which leads into a tank below the level of the track I. This latter pipe is optional, as the suction-pipe G could be lengthened and made to serve the whole purpose. I prefer, however, using an elbow-pipe, H, as a permanent fixture to ground tanks or wells when used.

The joint *g* between the suction-pipe G and elbow-pipe H is a tapered male and female, as shown in Fig. 3, and is not bolted or in any other way fastened together except by the atmospheric pressure. Although it will, of course, be advisable to provide frost-proof tanks at convenient points of the road, one of the many advantages of my invention is that in case of necessity the locomotive can draw water for the tender from an adjacent river or well, the distance being regulated by the length of the suction-hose supplied and the law of pneumatics which governs the height to which water can be raised by atmospheric pressure. It should be noted that the injector A and pipes B and E are permanently connected to the locomotive, while the suction-pipe G is detachable. This latter pipe, when not in use, may be carried under the running-board J, as suggested by dotted lines, or in any other place upon the locomotive which the driver may consider most convenient.

The foregoing description, taken in connection with the accompanying drawing, is sufficient to enable any engineer to understand the application and operation of my invention. I will therefore merely add that the steam, rushing through the jet *a*, produces a vacuum in the injector A, causing the water to rush

through the pipe B into the tank C, the water thus supplied being of course raised in temperature by the steam which accompanies it.

It is not necessary to specify the dimensions or the material used, as the knowledge of the purpose for which the invention is used will enable any competent engineer to determine them.

What I claim as my invention is—

1. A spherically-shaped vessel, A, having inlet and outlet ports and a steam-pipe, all arranged as described, and provided with suitable suction and discharge pipes, combined with a locomotive-boiler, for the purpose of raising water to the locomotive-tank, substantially as set forth.

2. An injector having a suction-pipe provided with the joint *g*, constructed as described, and a tender-supply pipe and connections, combined with and arranged with relation to a locomotive-boiler, substantially as and for the purpose specified.

Dated at Toronto this 1st day of May, A. D. 1878.

JOSEPH HAGGAS.

In presence of—

JOHN G. RIDOUT,

DONALD C. RIDOUT.