I. DREYFUS.

Feed-Water Regulator.

No. 166,081. Patented July 27, 1875.

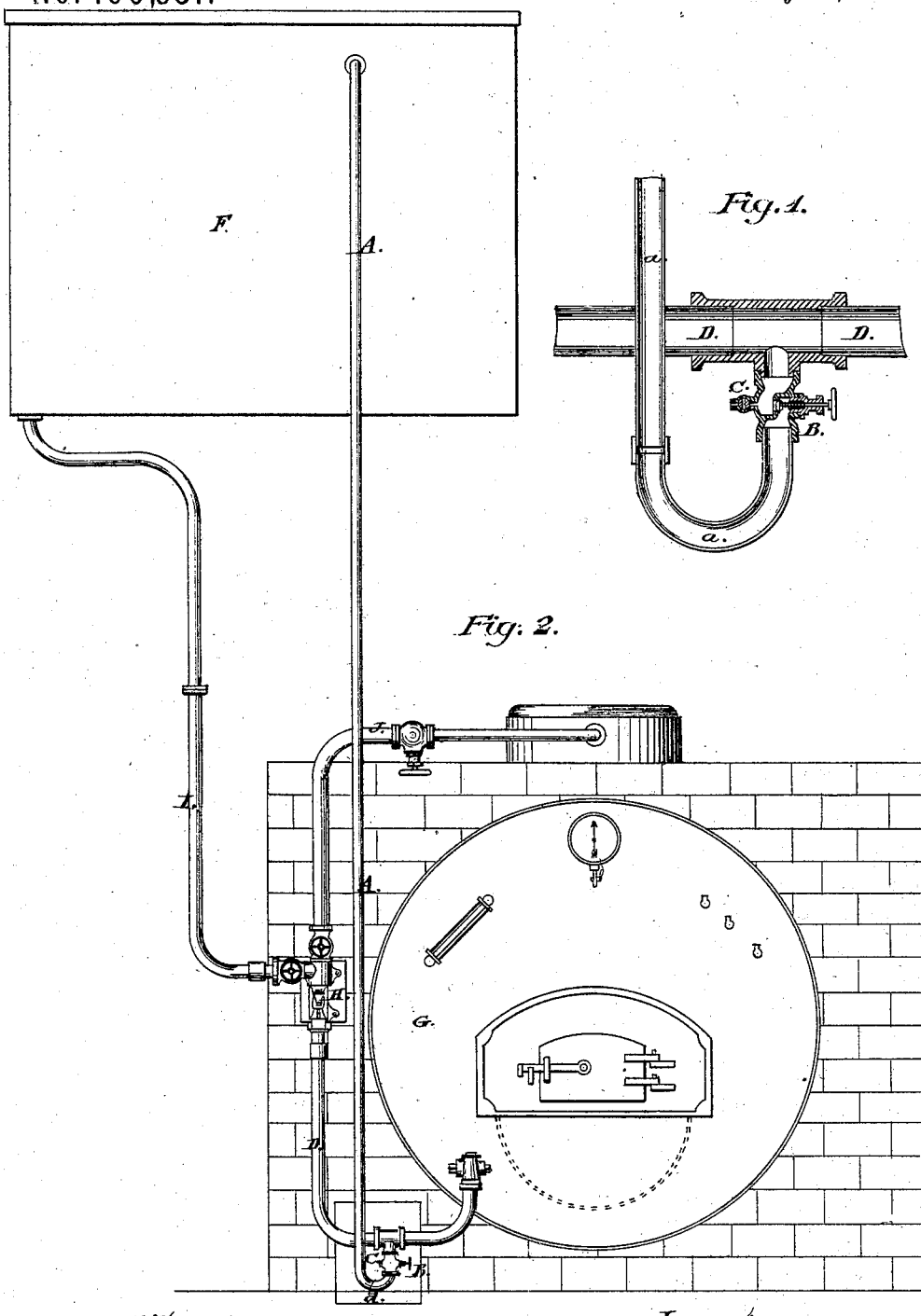

Fig. 1.

Fig. 2.

Witnesses:

Wm. G. Mercy

Charles Judge

Inventor:

Isidore Dreyfus

UNITED STATES PATENT OFFICE.

ISIDORE DREYFUS, OF NEW YORK, N. Y., ASSIGNOR TO NATHAN & DREYFUS, OF SAME PLACE.

IMPROVEMENT IN FEED-WATER REGULATORS.

Specification forming part of Letters Patent No. **166,081**, dated July 27, 1875; application filed July 1, 1875.

To all whom it may concern:

Be it known that I, ISIDORE DREYFUS, of the city, county, and State of New York, have invented certain new and useful Improvements in Feed-Water Regulators for Steam-Boilers, of which the following is a specification.

The want of an apparatus or contrivance to control and regulate the supply of feed-water to steam-boilers, passing through an injector or other boiler-feeder of stated capacity, has long been felt.

As a general thing the evaporation of water in steam-boilers is very unequal; it varies in proportion to the quantity of steam required to perform the work the engine may be called upon to do, which may be more or less, according to circumstances. For instance, there is a great difference between the quantity of water evaporated in the boiler of a locomotive when going uphill, where it is taxed to its utmost capacity, and when going over a long down-grade, where little or no steam is required—the engine running by the force of its own gravity; and so with stationary engine and other boilers where the duty to be performed is more or less unequal. Now, if an injector or other boiler-feeder of a stated capacity is required to work all the time, and it is very desirable for many reasons that it should, such injector or boiler-feeder, on account of the inequalities of the evaporation occurring as before mentioned, may deliver sometimes more, and sometimes less, feed-water than is needed for the proper generation of steam in the boiler. Hence an apparatus or contrivance that will control and regulate the water-supply to the boiler in the exact quantity required under these differences in evaporation is most useful and desirable.

The result I obtain by diverting from the feed-water supply that portion which may at any time be in excess of the demand—this excess, in its heated state, being carried back to the reservoir, or delivered to any other required point.

To thus divert a portion of the feed-water, I employ what I shall term for convenience' sake a return-pipe, which communicates with the feed-water delivery-pipe at a point between the injector or other boiler-feeder and the boiler. The other end of this pipe communicates with the water-reservoir, or with any other receptacle into which the surplus water is to be discharged, or with any other apparatus in connection with which the water is to be made use of. Communication through this pipe is regulated by a valve or cock, or other suitable means.

An apparatus thus organized, capable of regulating the supply as readily to one gallon as to five or ten gallons per minute, is shown in the accompanying drawing, in which I have represented my invention as applied to a stationary boiler.

G is the boiler; F, the water tank or reservoir; H, the injector; I, the water-supply pipe; J, the steam-pipe, and D the delivery-pipe. These parts are organized to operate together in the usual way to supply water to the boiler.

To the delivery-pipe D, at a point between the injector or other boiler-feeder and the boiler, is connected the pipe A, which is the return-pipe hereinbefore mentioned. This pipe, communicating at one end with the delivery-pipe, leads to the tank, tender, or reservoir, whence the supply of feed-water is drawn, or to any other place or reservoir, as may be required. In this instance it leads back into the tank F. On the pipe A is a valve, B, or cock, or other suitable means to shut off, let on, and regulate the flow of return-water through said pipe. At this point I also find it convenient to locate a blow-off or drain cock or valve, as shown at C, to blow out the steam or water in the feed-delivery pipe D.

With this simple device I am enabled to carry my invention into effect.

Suppose the injector or boiler-feeder to be at work delivering water to its stated capacity. If at any time it becomes necessary to diminish the supply of feed water, the valve or cock B is opened more or less, according to the circumstances of the case. A portion of the water, determined by the extent to which the valve is open, will at once be diverted from the delivery-pipe, and, heated as it is, will, by the combined pressure of injector and boiler, be driven back with great velocity through the return-pipe to the tank F, whence

it originally came, and this action will continue so long as the cock or valve B remains open.

This apparatus enables the injector or other boiler-feeder to feed to the boiler hotter water than could otherwise possibly be fed. It allows part of the steam and water to mingle in the injector, and by the opening given acts as an outlet or additional overflow. It also, by its action in not allowing the steam or heated water uselessly to heat the injector, promotes the healthy action of the injector in every part.

I have described my invention with reference to a stationary or marine boiler; but, as before remarked, it is equally applicable to a locomotive-boiler.

The apparatus described can without difficulty be made automatic or self-acting, as desired. The regulating cock or valve B, for this purpose, can be connected with a mechanism operated by difference of water-level in the boiler, or in any other suitable way, to effect the opening and closing of said valve, according to the conditions of the case.

When the valve or cock is operated by hand a graduated scale may be applied thereto to indicate the extent to which the valve should be opened, according to varying circumstances.

Having now described my invention, and the manner in which the same is or may be carried into effect, what I claim, and desire to secure by Letters Patent, is—

1. The described combination of the feed-water-forcing apparatus, the boiler, the feed-delivery pipe, and the return or diverting pipe, which communicates with the feed-delivery pipe at a point between the feeder and the boiler, and through which, when open, and to the extent to which it is open, water from the feed-delivery pipe is driven under the combined pressure of the boiler and the boiler-feeder, substantially as set forth.

2. The combination, with a constantly-working injector, of the feed-delivery pipe, the boiler, and the return-pipe, communicating with the feed-delivery pipe at a point between the boiler and the injector, said parts being constructed and arranged for joint operation, in the manner and for the purposes substantially as shown and described.

3. The combination of the boiler, the injector or other feeder, the water-tank, the delivery-pipe, and the return-pipe, provided with a regulating valve or cock, and connected at one end with the tank, and at the other end with the delivery-pipe at a point between the injector or other feeder and the boiler, substantially as set forth.

In testimony whereof, I have hereunto signed my name this 5th day of June, 1875.

ISIDORE DREYFUS.

Witnesses:
WM. G. ULERY,
CHARLES JUDGE.