(No Model.)

A. W. SWIFT.

LUBRICATOR.

No. 272,793. Patented Feb. 20, 1883.

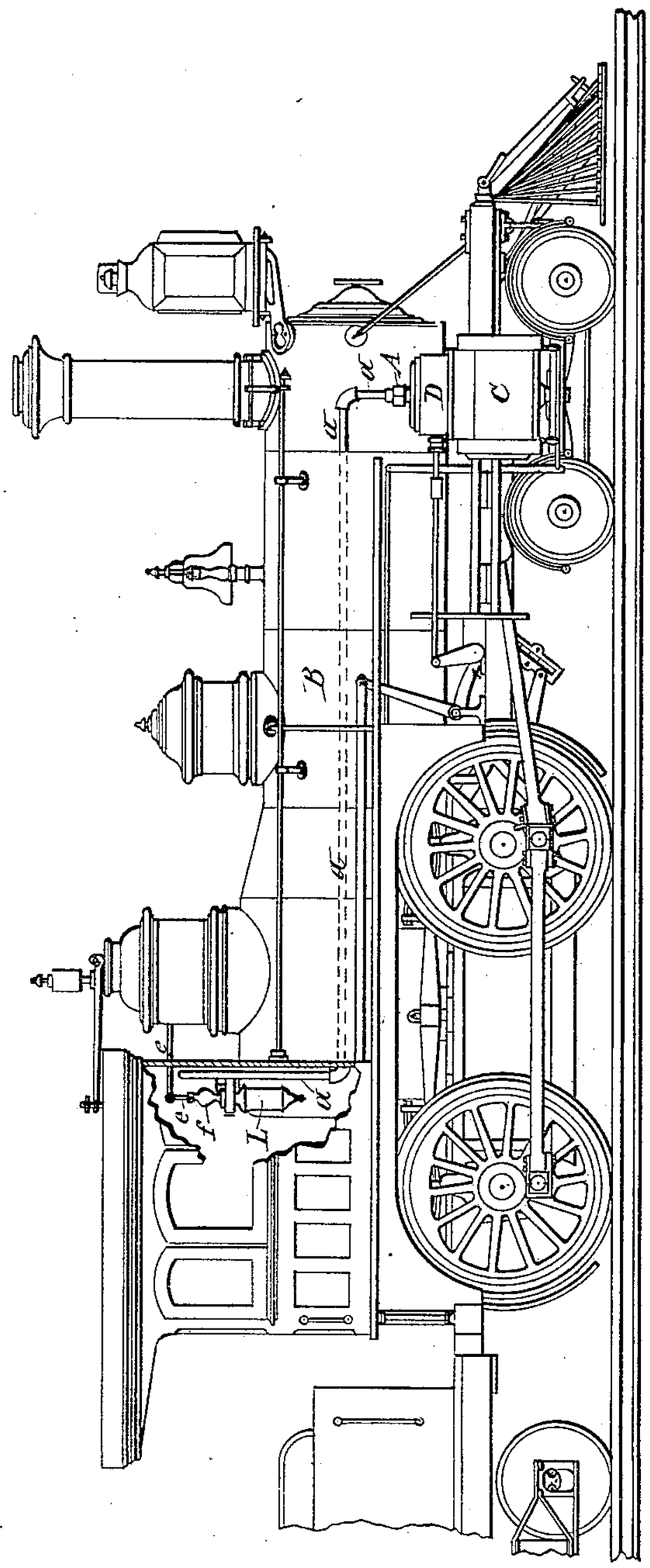

FIG-1-

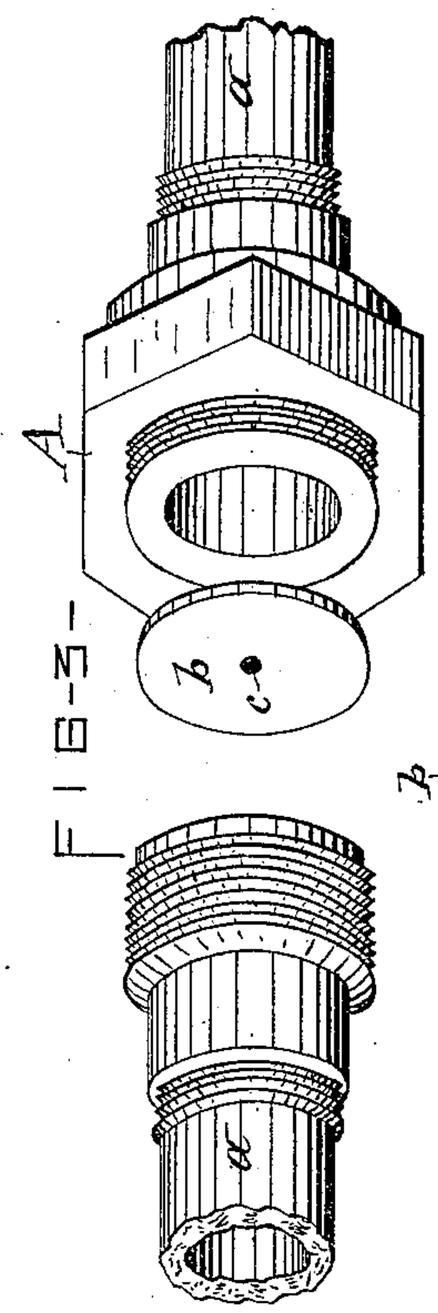

FIG-3-

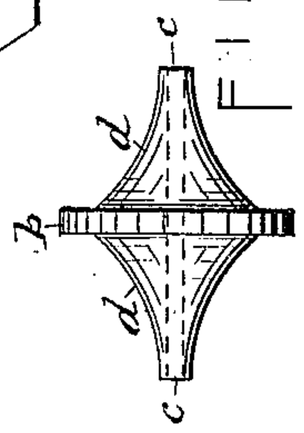

FIG-4-

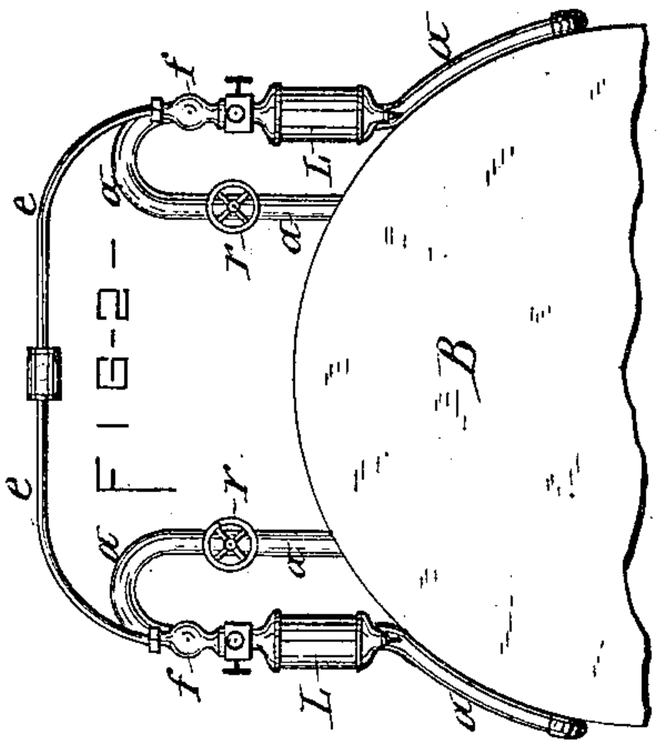

FIG-2-

WITNESSES—

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per Duell, Laasat & Hay

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UNITED STATES PATENT OFFICE.

ALLEN W. SWIFT, OF ELMIRA, NEW YORK.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 272,793, dated February 20, 1883.

Application filed October 21, 1882. (No model.)

To all whom it may concern:

Be it known that I, ALLEN W. SWIFT, of Elmira, in the county of Chemung, in the State of New York, have invented new and useful Improvements in Lubricators, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

The object of this invention is to provide simple and effective means for lubricating steam-cylinders and their valve, especially those which are subjected to various steam-pressure, as is the case with the cylinders and valves of locomotives, where the application of steam is varied according to the power required to carry the engine over the various grades of the road, and in which the action of the valve is sometimes suddenly reversed while the engine is in motion. On such engines it has been found exceedingly difficult to lubricate the cylinder and valve when most needed—*i. e.*, while the engine is running on an ascending grade and the valve at full stroke—owing to the back-pressure of steam on the lubricator or lubricant-duct leading to the steam-chest. The lubrication was therefore performed only when the engine was running on a descending grade and the steam shut off from the cylinder; but when the engine is running in this condition a suction is produced on the lubricant-duct, which causes too rapid and excessive application of the lubricant to the valve and cylinder. The same result is produced when reversing the engine while in motion. All the aforesaid difficulties are overcome in the simplest and most effective manner by the novel construction and combination of the devices hereinafter described, and specifically set forth in the claims.

In the annexed drawings, Figure 1 is a side elevation of a locomotive provided with my improvement. Fig. 2 is an enlarged rear end view of the same. Fig. 3 is an enlarged detail view of the diaphragm or partly-choked throat which serves to equalize the flow of the lubricant, said figure illustrating the adaptability of applying to the duct or pipe interchangeable diaphragms having lubricant-passages of different sizes, according to the flow of the lubricant required; and Fig. 4 illustrates the means of guarding against the clogging of the lubricant-channel through the diaphragm.

Similar letters of reference indicate corresponding parts.

B denotes the boiler of a locomotive, C the cylinder, and D the steam-chest inclosing the valve of the cylinder.

L represents a lubricating-cup of any desired or suitable form and construction, it being in this case shown in the form of a so-called "displacement" lubricator, which automatically feeds the lubricant to the parts to be lubricated by condensed steam entering the cup and displacing a corresponding quantity of the lubricant, said lubricator being attached to and having its lubricant-duct communicating with a steam-pipe, *a*, which is extended preferably from the front part of the boiler to the steam-chest D, as shown in Fig. 1 of the drawings. By means of a stop-cock, *r*, connected with the pipe *a*, the flow of steam through the same can be regulated, said pipe serving to conduct the lubricant to the steam-chest. A small tube, *e*, extended from the dome of the boiler to the usual condensing-chamber, *f*, of the lubricator, supplies the requisite steam for displacing the lubricant in the cup and forcing it into the pipe *a*, which conveys it to the steam-chest, as aforesaid.

At a convenient point in the length of the pipe *a*, preferably at or near the steam-chest, I provide said pipe with a joint and coupling, A, and between said joint I introduce a diaphragm or disk, *b*, which has a small aperture, *c*, for the passage of the lubricant. The interposition of said disk in the steam-pipe *a* forms a contracted or choked throat, which intercepts, to a great extent, the pressure of steam from either direction, and equalizes said pressure in the pipe *a* between the coupling A and lubricator L, and consequently equalizes also the flow of lubricant, which readily finds its way through the aperture *c* of the disk, and thence to the interior of the steam chest and cylinder. Even when the engine is running under a full head of steam the constant pressure of steam in the pipe *a* toward the steam-chest enables the lubricant to force its way through the partly-choked throat or aperture *c* of the disk *b*; and in case a vacuum is produced in the cylinder by shutting off the

steam, or by reversing the engine while in motion, the disk arrests the rush of steam through the pipe *a* and maintains the steam at nearly or quite a uniform pressure in said pipe, and thus equalizes the flow of the lubricant under all circumstances. By placing the disk *b* removably in the joint of the pipe *a*, as before described, I am enabled to use interchangeable disks, each having an aperture of a different size, according to the size of the pipe and the flow of the lubricant desired.

In order to guard against clogging of the aperture *c*, I provide the sides of the disk *b* with attenuated projections *d*, through which is extended a channel coinciding with the aperture *c*, as illustrated in Fig. 4 of the drawings.

Having described my invention, what I claim is—

1. The combination, with a steam-cylinder and its valve, of a steam-duct communicating therewith, and having a partly-choked throat, and a lubricant-cup having its delivery connected with said duct at a point between the choked throat and steam-receiving end thereof, substantially as shown.

2. The combination, with a steam-cylinder and its valve, of a steam-duct having a partly-choked throat, a lubricant-cup having its discharge communicating with the steam-duct back of the choked throat thereof, and a steam-condenser delivering the water of condensation to the interior of the lubricant-cup, for displacing the lubricant and forcing the same into the aforesaid steam-duct, substantially as described and shown.

3. In combination with the lubricant-duct *a*, having its extremities communicating, respectively, with the boiler and steam-chest of the engine, and the lubricant-cup having its discharge connected with said duct, the disk *b*, arranged within the duct *a*, and having the projections *d* and the channel *c*, for the passage of the lubricant through said disk, substantially as described and shown, for the purpose specified.

In testimony whereof I have hereunto signed my name and affixed my seal, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 9th day of October, 1882.

ALLEN W. SWIFT. [L. S.]

Witnesses:
WM. C. RAYMOND,
F. H. GIBBS.