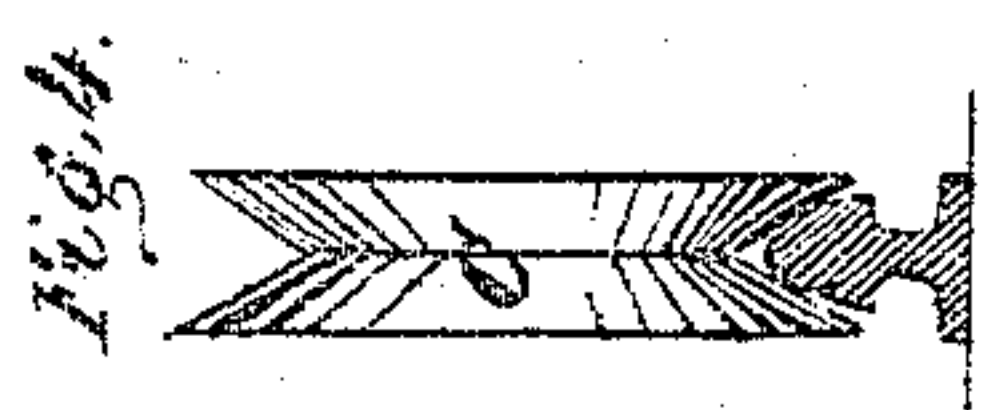
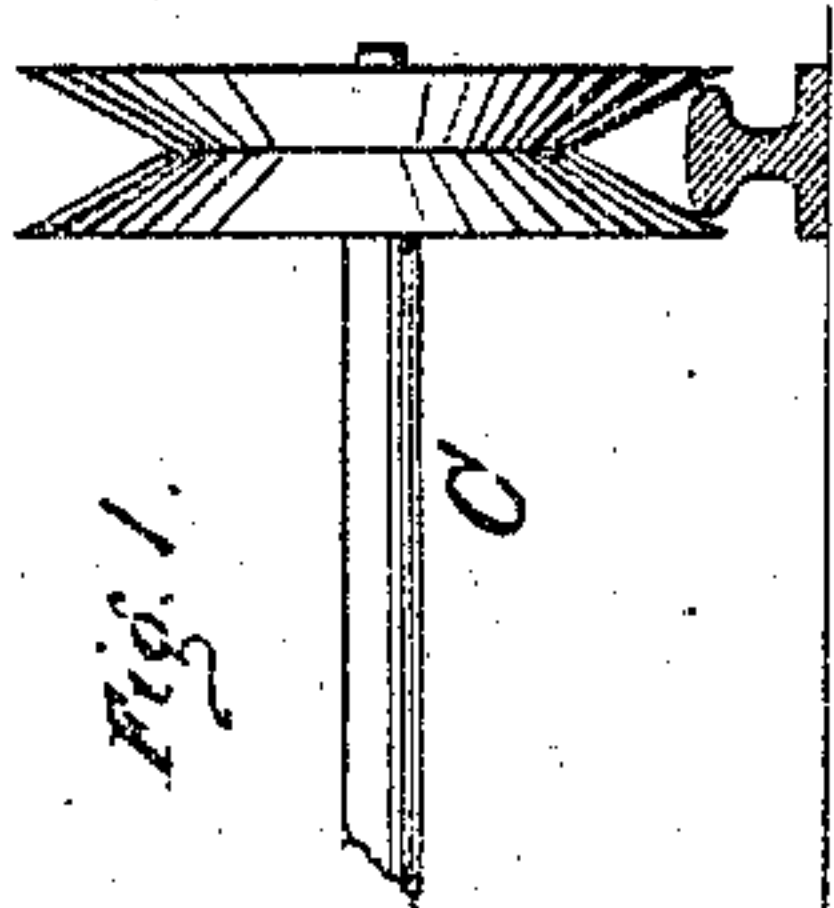
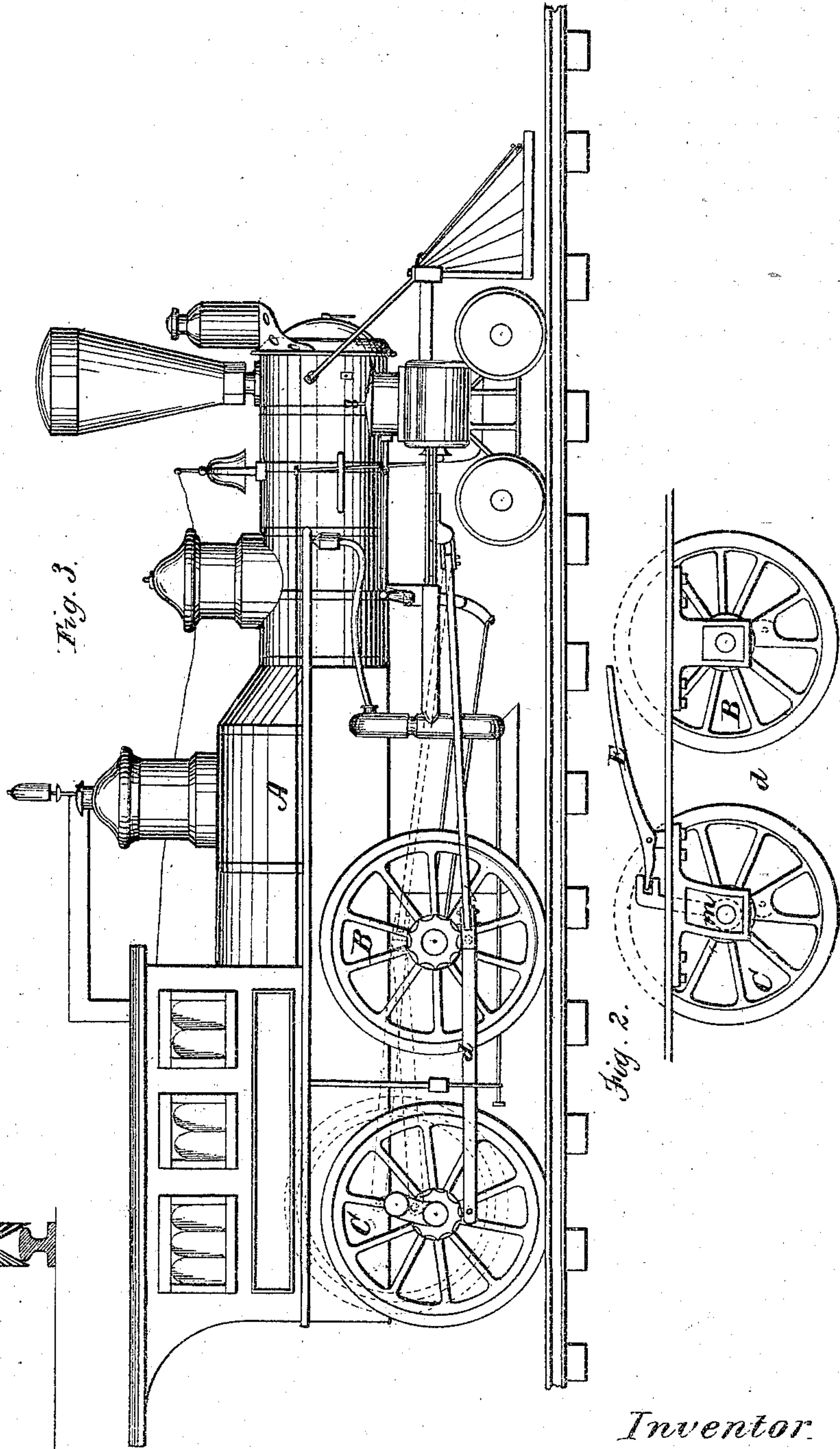


J. S. FRENCH.
Locomotives.

No. 144,271.

Patented Nov. 4, 1873.



Witnesses.
C. H. Brown.
W. K. Olmsted

Inventor.
Jas. S. French.
by his Atty.
W. K. Olmsted

UNITED STATES PATENT OFFICE.

JAMES S. FRENCH, OF ALEXANDRIA, VIRGINIA.

IMPROVEMENT IN LOCOMOTIVES.

Specification forming part of Letters Patent No. **144,271**, dated November 4, 1873; application filed June 7, 1873.

To all whom it may concern:

Be it known that I, JAMES S. FRENCH, of the city and county of Alexandria and State of Virginia, have invented a new and useful Improvement in the Running-Gear of Locomotives; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a detached view of the grooved driving-wheel resting on the common rail. Fig. 2 is a longitudinal vertical section, showing one method of raising and lowering the grooved driving-wheels. Fig. 3 is a side view of the locomotive, and Fig. 4 represents a single wheel resting on a rail of peculiar shape adapted to the purpose.

Similar letters of reference indicate corresponding parts.

This invention is an improvement upon the device patented by James S. French, April 19, 1870, No. 102,107, which consisted in the employment of grooved driving-wheels having wedge-shaped grooves, upon locomotives, for the purpose of increasing adhesion to the track without correspondingly increasing the weight of the wheel or engine. My present improvement consists in adapting the pair of driving-wheels thus grooved to be raised and lowered at pleasure by the engineer; and my object in thus constructing the locomotive is twofold, viz: First, to enable the engineer to raise the grooved wheels out of the way when passing switches, frogs, or other obstructions, also when passing short curves, so that a locomotive can turn almost any curve, however short, without danger of running from the track, or of straining the wheels; secondly, to enable him to apply the grooved wheels to the track at the inclines, and when great adhesion is required, but to hold them suspended out of contact with the rails at other times.

In the drawings, A is the locomotive; B, the forward driving-wheels, which are made with the ordinary flat tread, as heretofore, and may consist of one or more pairs; two pairs serving better to balance the weight of the locomotive; and C, the wedge-shaped grooved driving-wheels, constructed and operating in the manner and for the purposes clearly set forth in my former patent above referred to,

the said grooved wheels gripping the rails when pressed down, on the principle of the wedge. These wheels C C are connected by the ordinary rod *d* to the wheels B B; and they are attached to an axle or axles, whose journal-boxes can be raised or lowered by means of a lever, E, or a screw, eccentric, or other hoisting device, operated either by hand, or by power obtained from the locomotive or any other available source. Of course, the path through which the journal-boxes move in rising and falling must be the arc of a circle, whose radius is the connecting-rod *d*, and whose center is at the axis of the forward drivers B B, in order that the parts may not cramp when their position is changed; and any guide, *m*, or other practicable device, may be employed for the purpose of producing this result. As shown in Fig. 3, the wheels B B are behind the center of gravity of the locomotive, so as to support the engine properly when the rear wheels are raised; and the apparatus may be so constructed that, by depressing the rear wheels to a sufficient extent, the forward wheels can themselves be lifted from the track, and the whole weight of the rear end of the locomotive be thrown upon the grooved wheels, thereby increasing their adhesion to the rails to almost any degree.

The hoisting apparatus shown in Fig. 2 is not intended to represent the devices which I shall employ in practical working locomotives, but only to show the principle of the invention, and one mode of carrying it into practice.

Another mode is to secure an eccentrically-slotted plate to each end of the shaft worked by the lever, and attach a pin to the axle-box, so as to project into or through the slot and rise or fall as the lever is raised or depressed. The device is very simple and effective; and the wheels, whether raised up or pressed down, may be kept in place by a catch holding the lever. If it be preferred to raise or depress the wheels by steam, then a small cylinder may be secured to the frame-work of the engine, the piston-rod of which shall connect with the lever, and the valve of the cylinder be operated by a rod placed within easy reach of the engineer. I do not, however, regard the means for hoisting as essential, but consider myself at liberty to use any practicable

means whatever without thereby departing from the spirit of the invention. The amount of power required to raise and lower the wheels will be very small, and can be applied to great advantage, as there is abundant room for leverage. The handle of the working-lever should always be in the cab within easy reach of the engineer. This invention is particularly adapted to narrow-gage railroads where the grades are heavy, the running-gear light, and heavy locomotives are not practicable. On such roads, the weight of the engine is not sufficient to give it the requisite traction power, which must be supplied by causing the wheels to adhere to the track by mechanical means. But this necessity for greater adhesion is not constant or uniform, and the apparatus should be always under the complete control of the engineer, who should be able to apply it to any extent required, or dispense with it altogether, whenever and as long as he deems best. The invention herein described is believed to answer all these requirements to as complete an extent as is practicable. The cost of thus constructing a locomotive is little, if any, more than that of constructing an old-fashioned one of the same size. It requires no additional central rail, and no new or pe-

culiar form of rails, but is adapted to any railroad as now constructed, and to any form or size of locomotive.

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

1. The pair of adjustable grooved driving-wheels C C, in combination with the common driving-wheels B B and the connecting-rod *d*, substantially as described, for the purposes set forth.

2. The combination of the common driving-wheels B B with the grooved driving-wheels C C, the connecting-rod *d*, the curved guide *m*, and the hoisting apparatus E or its equivalent, substantially as and for the purposes herein described.

3. One or more pairs of ordinary driving-wheels connected with a pair of wedge-shaped grooved driving-wheels, which may be lifted above the rails, or pressed down upon the rails, at the will of the engineer, substantially as described.

JAMES S. FRENCH.

Witnesses:

JAS. H. STRINGFELLOW,
JNO. LONERGAN.