(No Model.)

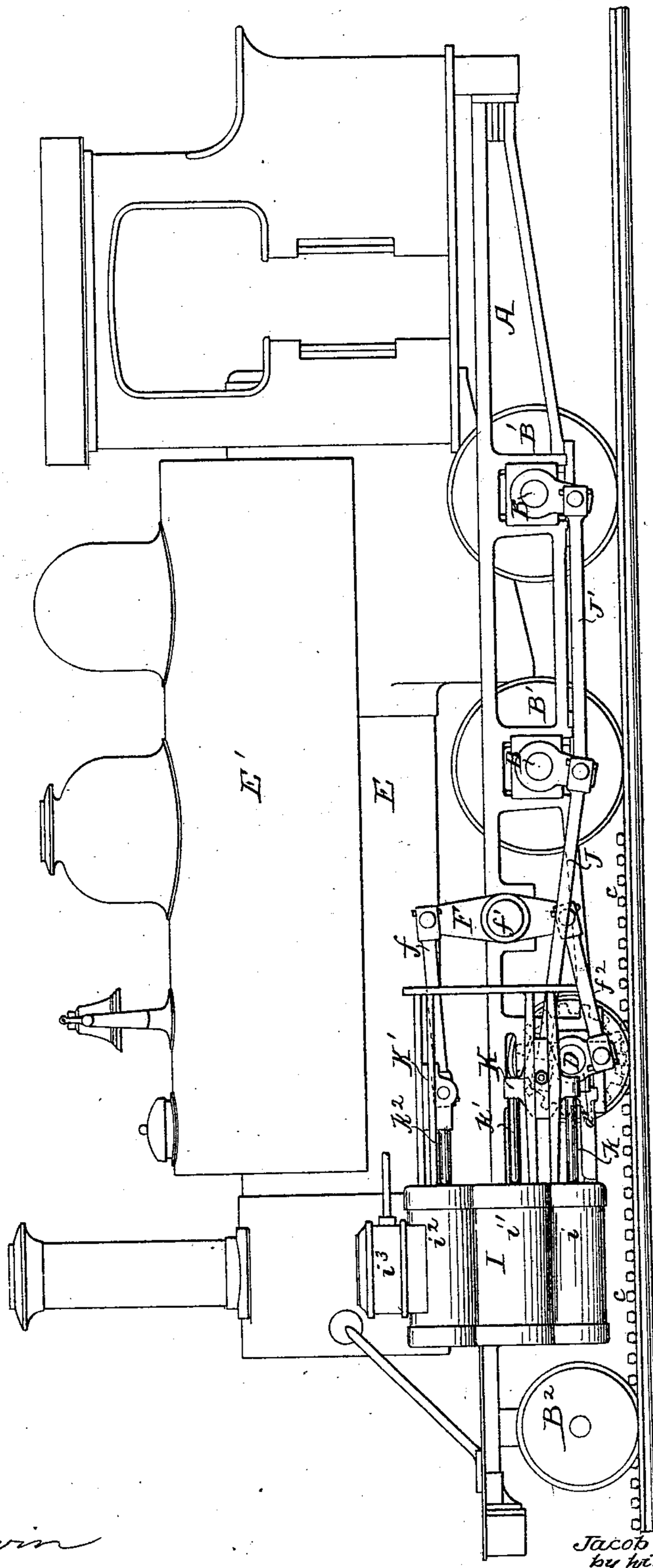
2 Sheets—Sheet 1.

# J. Y. McCONNELL.

## COMBINATION LOCOMOTIVE.

No. 561,022. Patented May 26, 1896.

FIG. 1.




Witnesses:
F. D. Goodwin
Will. A. Barr.

Inventor:
Jacob Y. McConnell
by his Attorneys
Howson & Howson

ANDREW B. GRAHAM, PHOTO-LITHO. WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

# J. Y. McCONNELL.

## COMBINATION LOCOMOTIVE.

No. 561,022. Patented May 26, 1896.

FIG. 2.

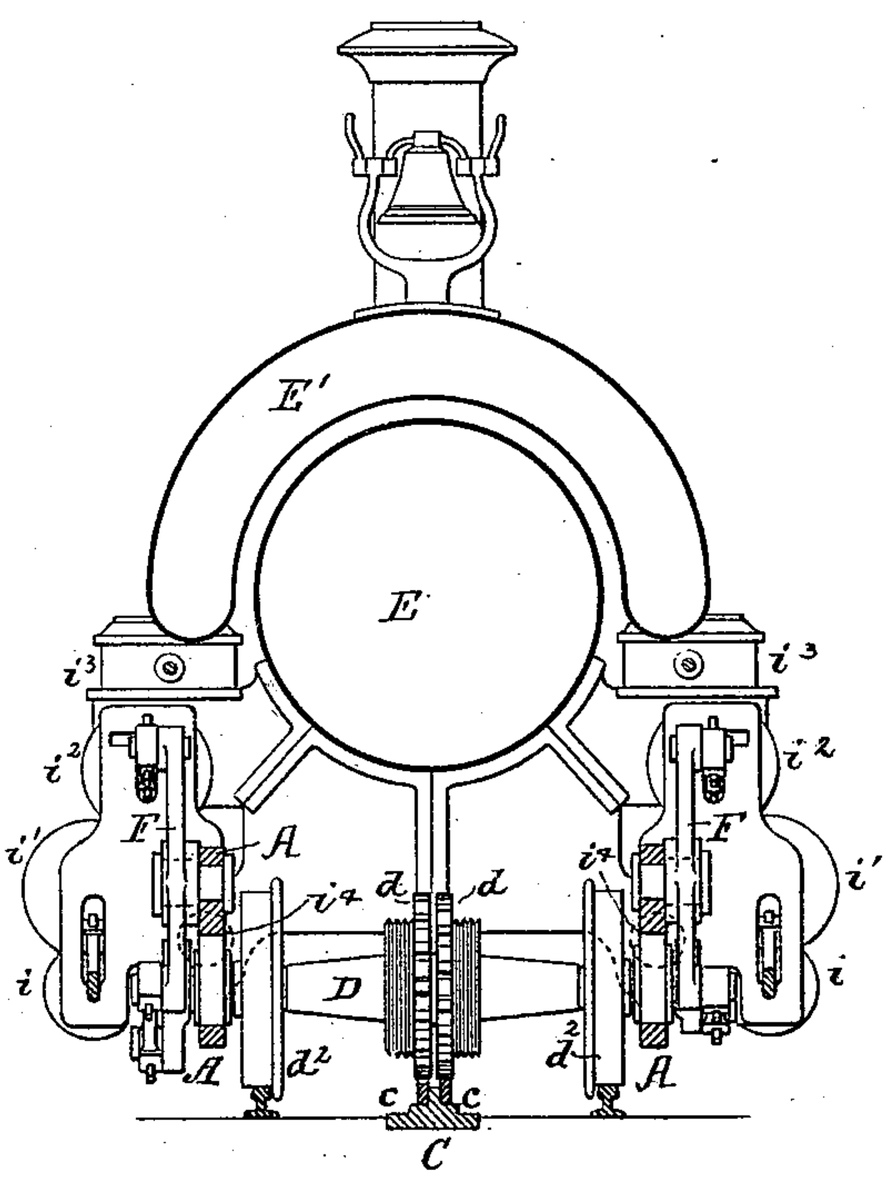



FIG. 3.

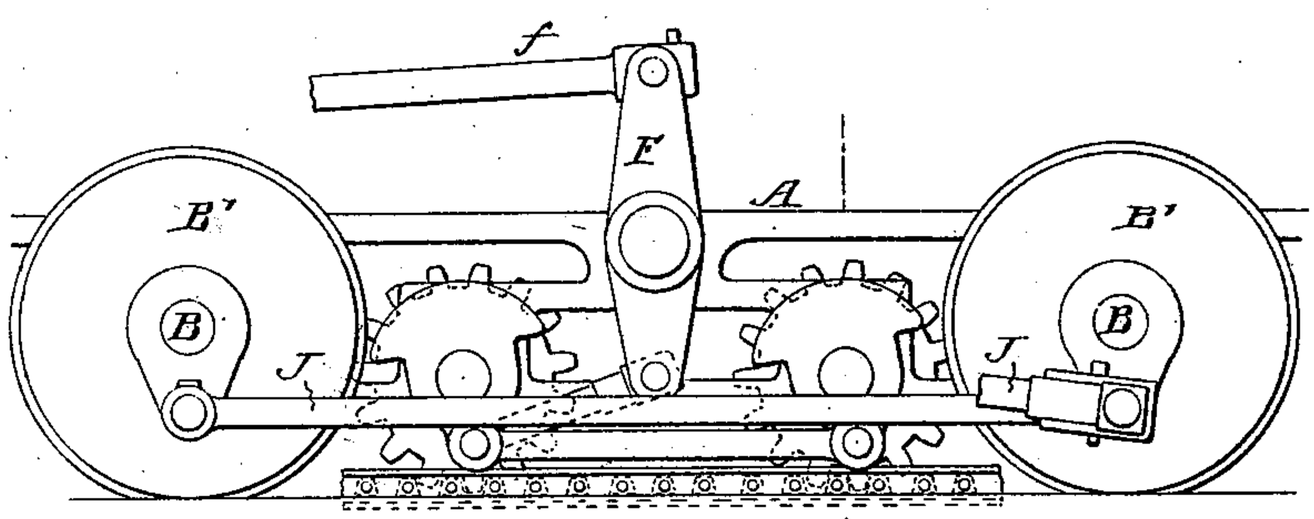
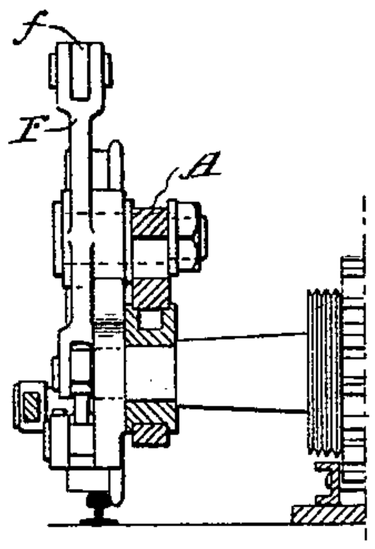



FIG. 4.




Witnesses:
F. D. Goodwin
Will A. Barr

Inventor:
Jacob Y. McConnell
by his Attorneys
Howson & Howson

ANDREW B. GRAHAM, PHOTO-LITHO. WASHINGTON, D.C.

# UNITED STATES PATENT OFFICE.

JACOB Y. McCONNELL, OF DARBY, PENNSYLVANIA, ASSIGNOR TO GEORGE BURNHAM, EDWARD H. WILLIAMS, WILLIAM P. HENSZEY, JOHN H. CONVERSE, WILLIAM L. AUSTIN, SAMUEL M. VAUCLAIN, ALBA B. JOHNSON, AND GEORGE BURNHAM, JR., OF PHILADELPHIA, PENNSYLVANIA.

## COMBINATION-LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 561,022, dated May 26, 1896.

Application filed April 11, 1895. Serial No. 545,388. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB Y. MCCONNELL, a citizen of the United States, and a resident of Darby, Delaware county, Pennsylvania, have invented certain Improvements in Combination-Locomotives, of which the following is a specification.

My invention relates to that class of locomotives in which are combined the adhesion driving-gear and the rack driving-gear.

The object of my invention is to so combine these two features in a locomotive that a single frame at each side may be used and the cylinders for the rack mechanism may be arranged on the outside of the framework.

In the accompanying drawings, Figure 1 is a side view of sufficient of a locomotive to illustrate my invention. Fig. 2 is a transverse sectional view. Figs. 3 and 4 are views of a modification of the arrangement of the mechanism.

Referring to Figs. 1 and 2, A A are the side frames of the locomotive, shaped to accommodate the boxes of the axles B B of the driving-wheels B′, and also adapted to receive the boxes of the axle D, carrying the toothed wheels *d d*, which mesh with the racks *c c* on the central rack-bar C.

$B^2$ are the pilot-wheels. E is the boiler. E′ is the water-saddle, and I is the cylinder-casting.

The cylinders *i i′* are the high and low pressure cylinders of the adhesion mechanism, being compounded in the present instance. The piston-rods *k k′* of the cylinders *i i′* are attached to a head K, which slides in suitable ways and is connected to the crank of the forward driving-wheel by a rod J. The rear driving-wheel is connected to the forward driving-wheel by a parallel rod J′.

A cylinder $i^2$ of the rack mechanism is arranged on each side of the locomotive, and in the present instance above the cylinder *i′* the piston-rod $k^2$ of the cylinder $i^2$ is attached to a head K′, which is connected to a lever F by a rod *f*, and this lever F is pivoted at *f′* to the frame A at each side and the lower arm of the lever is connected by a rod $f^2$ to a crank *d′* on the axle D, on which the toothed wheels *d* are secured.

The axle D is provided in the present instance with flanged carrying-wheels $d^2$, which rest upon the rails of the track and act to steady the axle and its toothed wheels.

$i^3$ is the steam-chest for the cylinder $i^2$, and $i^4$ is the steam-chest for the compound cylinders, as illustrated by dotted lines in Fig. 2.

I have not shown the valve mechanism for either section of the engine, as any mechanism may be used without departing from my invention. It will also be understood that while I have shown the axle D provided with two toothed wheels *d d* a single wheel may be used in connection with a plain rack, as shown in Fig. 4.

It will be seen by the above description that I dispense entirely with the secondary frame usually employed in locomotives of this class, as I mount the rack mechanism on the side frames. Furthermore, I so construct the locomotive that the cylinders for the rack mechanism are on the outside of the frames within easy access in case of repairs, and while I have shown the rack mechanism mounted in advance of the adhesion-drivers it may be mounted between the drivers and arranged as shown in Figs. 3 and 4.

I have illustrated in Fig. 3 two axles, each carrying a toothed wheel and having their cranks connected together by parallel rods. The carrying-wheels $d^2$ are dispensed with in this instance.

I claim as my invention—

1. The combination in a locomotive, of driving-wheels adapted to run on the ordinary rails, a toothed wheel adapted to mesh with a rack-rail, side frames carrying the bearings for the axles both of the ordinary driving-wheels and of the rack-wheel, and separate power-cylinders and transmitting mechanism for driving the axles independently, said cylinders and transmitting mechanism being outside of the side frames, substantially as specified.

2. The combination in a locomotive, of the side frames, the adhesion driving-wheels,

axles therefor mounted in the side frames, a toothed wheel adapted to engage with a rack, an axle on which the toothed wheel is mounted, said axle being adapted to the side frames, cranks on the axle beyond the side frames, a cylinder on each side of the engine and levers pivoted to the side frames on each side of the engine, the cranks being connected to one arm of said lever and the piston-rod of the cylinders being connected to the opposite arm, substantially as described.

3. The combination in a locomotive, of the side frames, two sets of cylinders mounted beyond each side frame, adhesion-wheels, axles therefor, said axles being mounted in the side frames, a central toothed wheel or wheels adapted to engage with the rack, an axle for said wheel and carrying-wheels on said axle adapted to the tracks, cranks on the axle, a lever hung to each side of the frame, one arm of said lever being connected to the cranks of the axle and the other being connected to the piston of the cylinder, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JACOB Y. McCONNELL.

Witnesses:
WILL. A. BARR,
HENRY HOWSON.