

(No Model.)

3 Sheets—Sheet 1.

R. S. BATTLES.
LOCOMOTIVE.

No. 455,154.

Patented June 30, 1891.

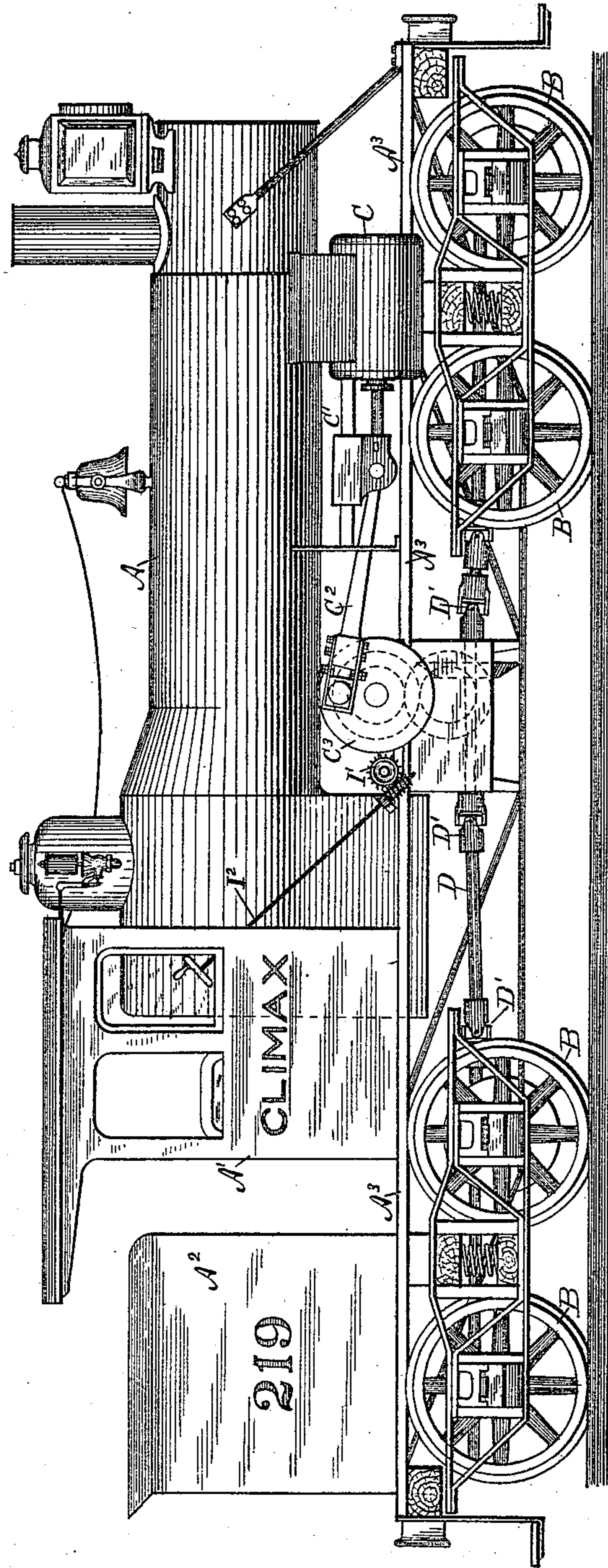


Fig. 1

WITNESSES

S. D. Dobbins.

Chas. G. Brevoort.

INVENTOR

R. S. Battles

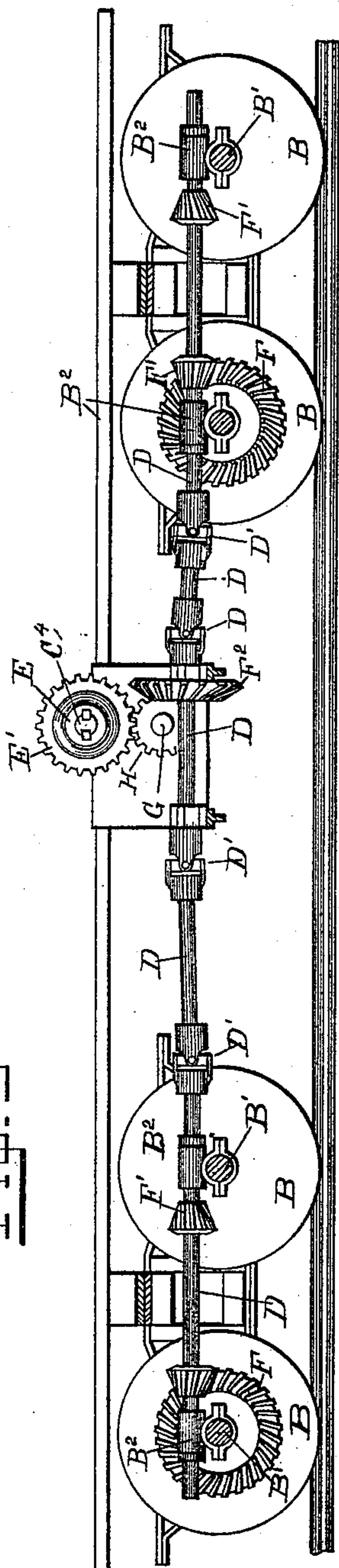
BY HIS ATT'YS. *Hall & Hall*

R. S. BATTLES.
LOCOMOTIVE.

No. 455,154.

Patented June 30, 1891.

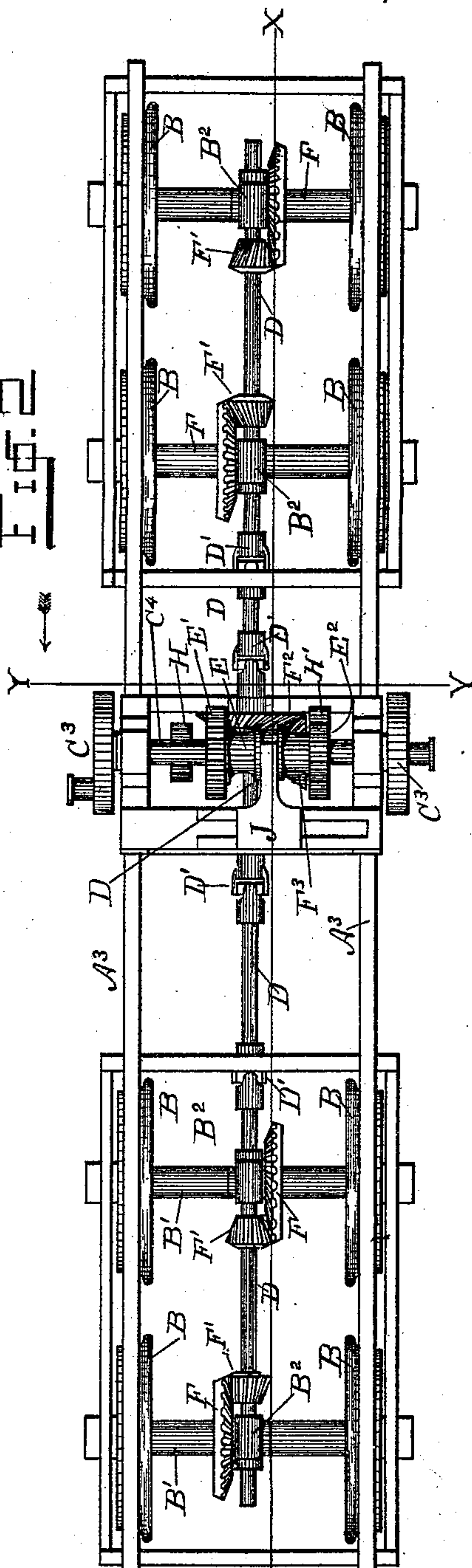
FIG. 3



Witnesses

S. H. Robbins.
Chas. G. Bravillier.

FIG. 2



Inventor

R. S. Battles
by Hallock & Hallock
attys.

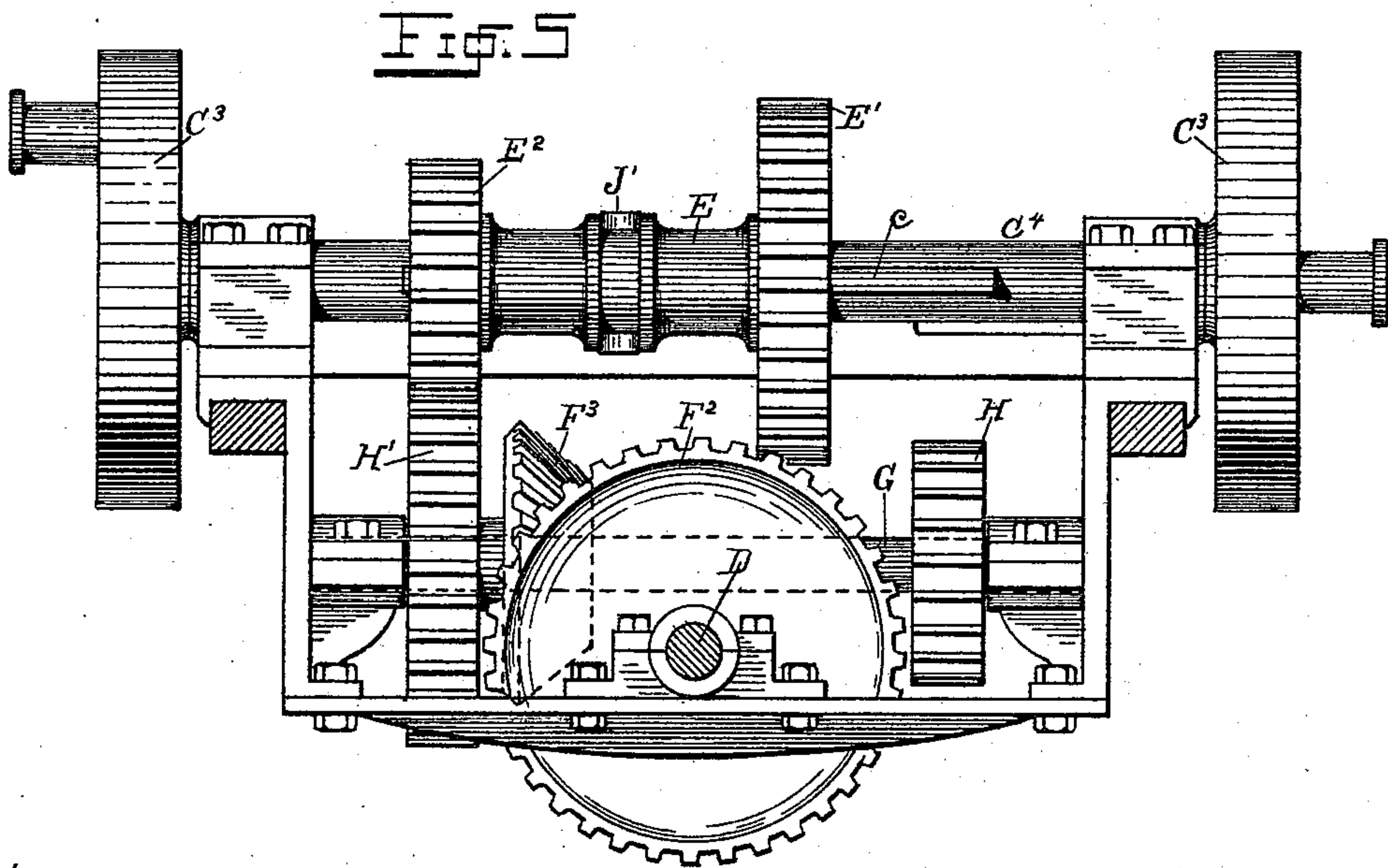
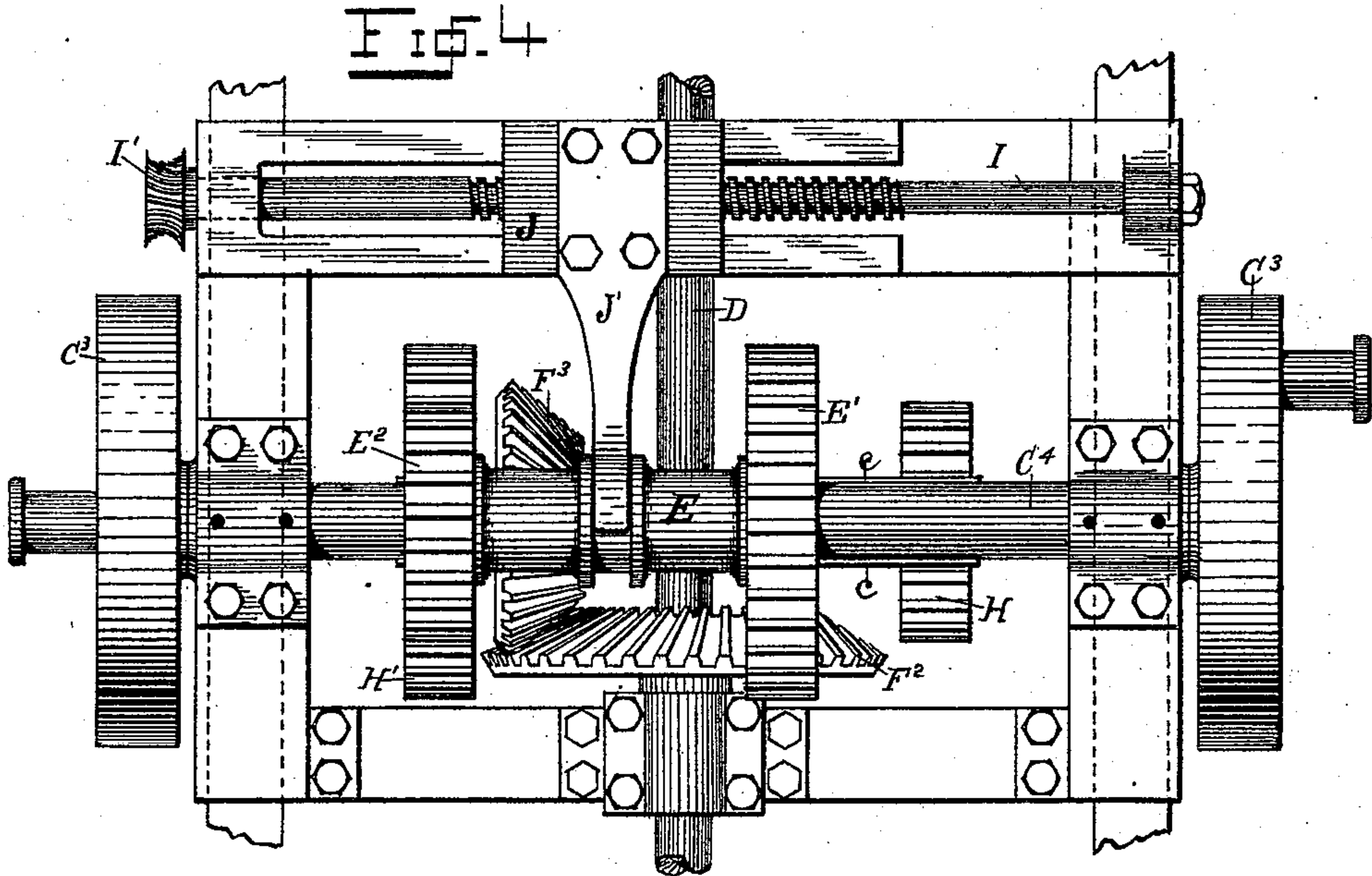
(No Model.)

3 Sheets—Sheet 3.

R. S. BATTLES.
LOCOMOTIVE.

No. 455,154.

Patented June 30, 1891.



WITNESSES

INVENTOR

S. W. Robbins.
Chas. G. Bravillier.

R. S. Battles

By his Att'ys. *Hollock & Hallack*

UNITED STATES PATENT OFFICE.

RUSH S. BATTLES, OF GIRARD, PENNSYLVANIA.

LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 455,154, dated June 30, 1891.

Application filed April 7, 1891. Serial No. 387,934. (No model.)

To all whom it may concern:

Be it known that I, RUSH S. BATTLES, a citizen of the United States, residing at Girard, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Locomotives; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-
10 pertains to make and use the same.

This invention relates to locomotives; and it consists in certain improvements in the construction thereof, as will be fully set forth, and pointed out in the claims.

15 This invention is illustrated in the accompanying drawings, as follows:

Figure 1 is a side elevation view of a locomotive containing my improvements. Fig. 2 is a top or plan view of the running-gear of the locomotive with the boiler, engines, cab, &c., removed. Fig. 3 is a longitudinal section view of the running-gear, taken on the line *xx* in Fig. 2. Fig. 4 is a top or plan view of the driving-gearing, as seen in Fig. 2, but
20 much enlarged. Fig. 5 is an end elevation of the driving-gearing, looking from the line *yy* in Fig. 2, in the direction of the arrow.

Like letters refer to like parts in all the figures, as follows:

30 A is the boiler; A', the cab; A², the tank and coal-box; A³, the main frame-work of the locomotive; B, the wheels; B', the axles; C, the engine-cylinders; C', the cross-heads; C², the connecting-rods; C³, the crank-disks; C⁴, the crank-shaft; D, the drive or main shaft; D', the universal couplings in the drive-shaft; F, the gear or pinions on the axles; F', the pinions on the drive-shaft; F², the main driving-gear on the drive-shaft; F³, the driving-gear
40 on the counter-shaft; G, the counter-shaft; H and H', the driving-gears on the counter-shaft; E and E², the driving-gears on the crank-shaft, and E a sliding sleeve on the crank-shaft carrying the gears E and E².

45 *c c* are feathers on the crank-shaft, which fit in grooves in the sleeve E.

J' is a shifter, which moves the sleeve E, and J a sliding block, which carries the shifter J'.

50 I is a screw-shaft, which moves the block J; I', a worm-wheel on the screw-shaft I, and I² a worm-shaft, which extends from the cab to the worm-wheel I'.

The construction and operation are as follows, so far as relates to my invention: The engines are placed on the sides of the boiler 55 near the front end, and the crank-shaft is placed below the boiler and at right angles thereto near the fire-box. Directly below the crank-shaft is placed a counter-shaft G, which is parallel with the crank-shaft and at right 60 angles to the main shaft D. On the counter-shaft are two driven gears H and H', of which H is of less diameter than H'. On the crank-shaft C⁴ is a sliding sleeve E, on which are two gear-wheels E' E², of which E' is of much 65 greater diameter than E². The sleeve E is feathered to the shaft C⁴, and is always moving with it. As shown in the drawings, in Figs. 2, 3, and 4, the sleeve E is in such a position on the shaft C⁴ as to bring the small 70 gear E² in gear with the large gear H' on the counter-shaft, thus giving the counter-shaft a less rapid motion than the shaft C⁴; but if the sleeve E was shifted so as to bring the large gear E' into gear with the small gear H 75 the counter-shaft G would have a more rapid movement than the crank-shaft. The sleeve E is moved by a shifter J', which is attached to a sliding block J, which is moved by a screw-shaft I, and the screw-shaft I is moved 80 by a worm-shaft I², which extends from the cab and acts upon a worm-wheel I' on the shaft I. The engineer in the cab, by rotating the shaft K² one way or the other, moves the sleeve one way or the other and brings 85 the gear E' or E² into gear with the gear H or H', as he desires, and thus regulates the speed of the counter-shaft, making it greater or less than the crank-shaft, as he may elect. The main shaft D runs along over the axles 90 B' at right angles thereto and below the counter-shaft G. This main shaft is provided at proper points with universal joints D', as is commonly done in similar constructions, and is supported by cross-boxes B² on the axles. 95 On each axle is a driven gear F with skew-cogs, and on the shaft D adjoining each axle is a skew-pinion F'. Thus motion from the shaft D is communicated to each of the axles simultaneously. On the shaft G is a skew- 100 driving-gear F³, which engages with a skew-driven gear F² on the shaft D. The motion is communicated from the counter-shaft G to the main shaft D. It will therefore be seen

that all the axles of the locomotive are driven and all the wheels are drive-wheels, and that the speed with which they are driven can be changed by operating the worm - shaft I² without changing the speed of the engines. This is important, for when it is necessary to ascend a grade or draw an extra load the engineer can so shift the gears that the locomotive will run slow, while the engines may run at such speed as to develop their maximum power.

What I claim as new is—

1. In a locomotive, the combination, with the engines and crank-shaft C⁴, moved by said engines, of the sliding sleeve E on said shaft, means for moving said sleeve, the gears E' E² of different diameter on said sleeve, the counter-shaft G, the gears H and H' on said shaft, adapted, as shown, to consort, respectively, with the gears E' and E², the gear F³ on said counter-shaft, the gear F² on the main-line shaft D, the gears F' on said main shaft in proximity to the axles, and the gears F on said axles, which gear with the gears F'.

2. In a locomotive, the combination, with the engines, of the crank-shaft C⁴, the counter-shaft G, parallel with said crank-shaft, gearing for operating said counter-shaft from said crank-shaft at different speeds, a main-line shaft at right angles to said crank-shaft and counter-shaft and the axles of the wheels, which is located midway between said wheels, gearing on said counter-shaft for communicating power from the former to the latter,

and gearing on said main shaft and said axles for communicating power from the former to the latter.

3. In a locomotive, the combination, with the engines, of a crank-shaft C⁴, a counter-shaft parallel with said crank-shaft, a sliding sleeve E on said crank-shaft, a shifter for moving said sleeve, a screw-shaft for moving said shifter, gearing for moving said shaft, which is operated from the cab, gears of different diameter on said sleeve and on said counter-shaft, whereby the speed of said counter-shaft may be made greater or less than said crank-shaft, a main-line shaft, gearing for moving the same from said counter-shaft, and gearing on said main shaft and the axles for moving said axles from the main shaft.

4. In a locomotive, the combination of engines located on the sides of the boiler at the front end, a crank-shaft located below the boiler back of the engines, a counter-shaft parallel with the crank-shaft and below the same, a main driving-shaft located midway between the wheels below the counter-shaft and at right angles to the same, gearing for moving the counter-shaft, and gearing for moving the main shaft from the counter-shaft.

In testimony whereof I affix my signature in presence of two witnesses.

RUSH S. BATTLES.

Witnesses:

JNO. K. HALLOCK,
WM. P. HAYES.