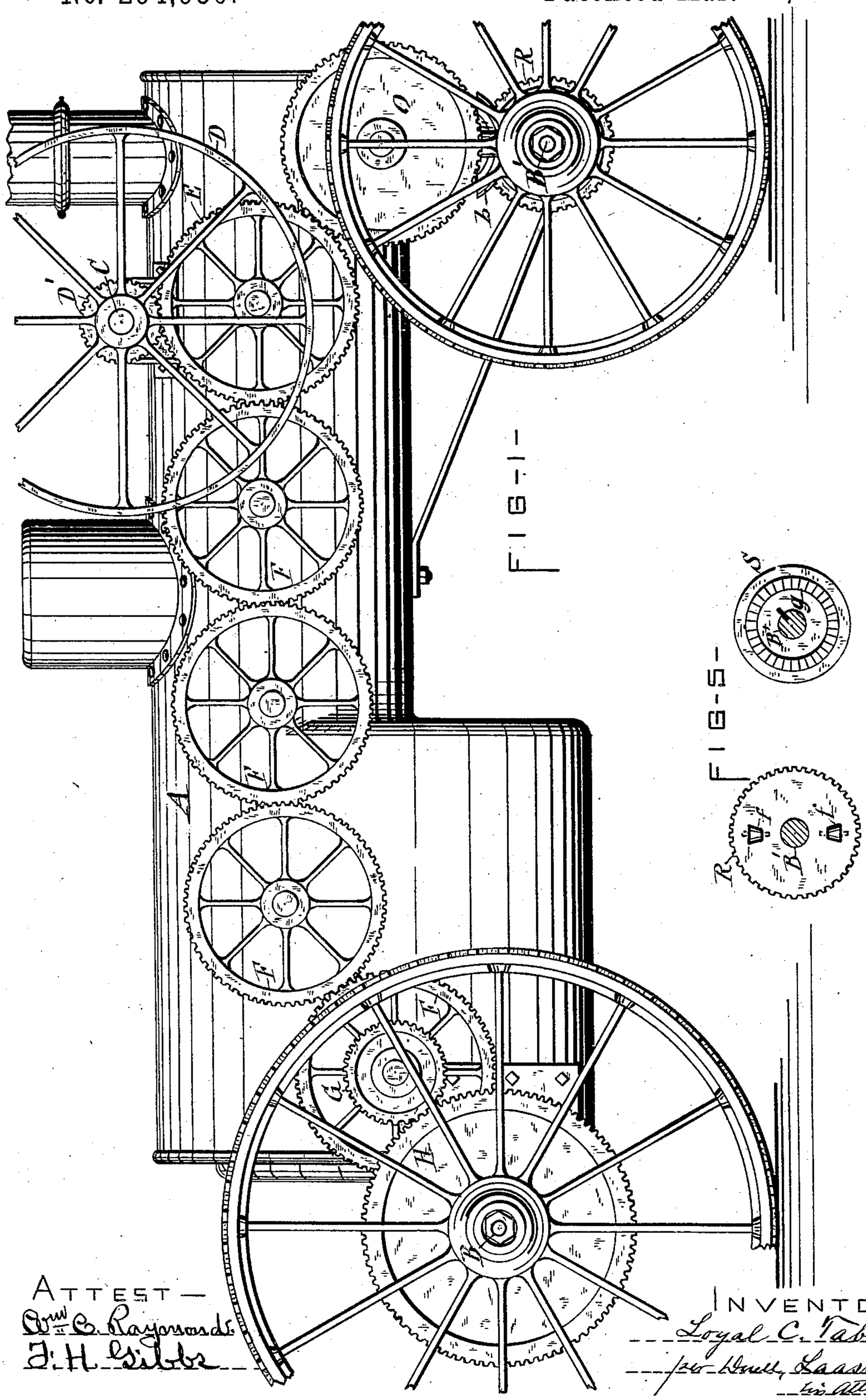
(No Model.) 2 Sheets—Sheet 1.

L. C. TABER.

TRACTION ENGINE.

No. 294,930. Patented Mar. 11, 1884.



ATTEST—
Wm. E. Raymond Jr.
F. H. Gibbs

INVENTOR—
Loyal C. Taber
per Wells, Laass & Hoy
his Attys

(No Model.) 2 Sheets—Sheet 2.

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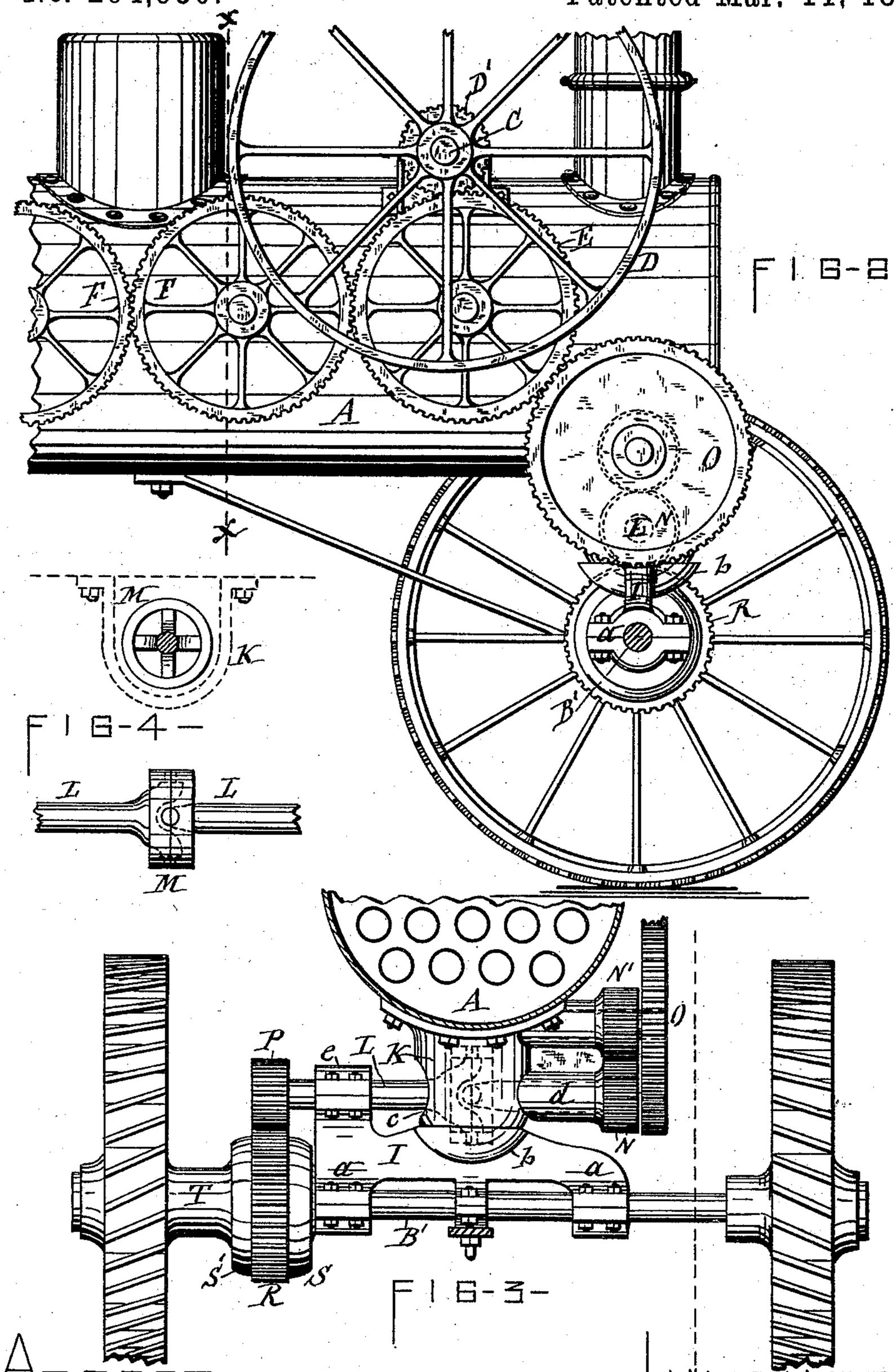

FIG-2-

FIG-4-

FIG-3-

ATTEST—

Wm. C. Raymond.

J. H. Gibbs

INVENTOR—

Loyal C. Taber

per Duell, Lass & Hay

his Attys

UNITED STATES PATENT OFFICE.

LOYAL C. TABER, OF SYRACUSE, NEW YORK.

TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 294,930, dated March 11, 1884.

Application filed December 18, 1883. (No model.)

To all whom it may concern:

Be it known that I, LOYAL C. TABER, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Traction-Engines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to the class of traction-engines which are designed to be self-propelling over ordinary roads.

The object of the invention is to increase the efficiency of said engines in their self-propelling operation and to obtain better control of the guiding of the same; and to that end my invention consists, essentially, in the combination, with the forward or steering truck, of a counter-shaft having a flexible joint to allow one end thereof to accommodate itself to the oscillations of the axle, so as to be maintained at a uniform distance from the same, and mechanism for transmitting motion from the driving-shaft to the counter-shaft and from the latter to the forward axle, all as hereinafter more fully described, and set forth in the claims.

In the annexed drawings, Figure 1 is a side elevation of a traction-engine provided with my improvements. Fig. 2 is a side elevation of the forward part of the same, taken immediately inside of the forward traction-wheel. Fig. 3 is a vertical transverse section taken on line *x x*, Fig. 2. Fig. 4 is a detached front and side view of the universal joint of the counter-shaft; and Fig. 5 illustrates the compensating-gear employed on the forward axle.

Similar letters of reference indicate corresponding parts.

A represents the boiler of the engine, mounted on axles B B′, which are arranged across opposite ends of the boiler, and are each provided with traction-wheels W, which usually have a transversely-ribbed tread to obtain the requisite hold on the ground to propel the engine when desired to move the same from place to place.

C designates the driving-shaft, which receives its motion from the engine in the usual and well-known manner, and does not, therefore, require an illustration here.

D is the combined balance-wheel and driving-pulley, mounted on the driving-shaft C.

By means of a driving-belt extended from the wheel D to the driving-pulley of a thrashing-machine, wood-sawing machine, or any other machine adapted to be driven by the engine, said machine receives its power. On the driving-shaft is fastened a pinion, D′, which meshes in a spur-wheel, E, and from the latter motion is transmitted to the rear axle, B, by the medium of a train of gears, F F F F, mounted on gudgeons secured to the side of the boiler, and a pinion, G, on the last of said gears, engaging with a gear-wheel, H, fixed to the axle. On engines of this class carrying the boiler horizontally the propelling-power has heretofore been applied only to the rear axle, owing to the difficulty of connecting the driving mechanism with the forward axle, which changes its lineal position when turning to travel around curves. I overcome this difficulty by the following instrumentalities: On the forward axle, B′, is mounted a saddle or truck frame, I, provided with suitable bearings, *a a*, in which the axle is allowed its rotary motion. The saddle I is formed with a spheroidal step, *b*, in which is seated a semi-spherical bearing, K, firmly bolted to the under side of the boiler, said step and bearing constituting the pivotal support of the forward end of the boiler. The bearing K is hollow, and has on one side an opening, *c*, and on the opposite side a rigid sleeve, *d*, projecting therefrom. Diametrically through the aforesaid bearing is extended a counter-shaft, L, one end of which is journaled in the sleeve *d*, and the opposite end projects through the opening *c*, and is journaled in a bearing, *e*, rigidly attached to the saddle I, as shown in Fig. 2 of the drawings. Said counter-shaft is made flexible by a universal joint, M, one form of which is illustrated in Fig. 4 of the drawings. This joint is located in the center of the pivotal support of the boiler, and allows one end of the counter-shaft to follow the axle B′ in its oscillatory movement, while the opposite end of the counter-shaft is maintained parallel with the driving-shaft C by means of the sleeve *d*. This lineally-confined end of the counter-shaft projects at the end of the sleeve, and has fixed to it a pinion, N, which meshes in a pinion, N′, mounted on a gudgeon rigidly attached to the boiler. The pinion N′ has on its outer face, and concentric with it, a gear-

wheel, O, which meshes in the same spur-wheel E from which motion is transmitted to the rear axle, in the manner hereinbefore described. All of the described gears are so proportioned as to equalize the travel of the rear and forward traction-wheels. The forward traction-wheels receive their motion from the counter-shaft L by means of a pinion, P, on the vibratory end of said shaft, which pinion engages a compensating-gear, R, mounted on the axle, said compensating-gear being more fully illustrated in Fig. 5 of the drawings, and consists of supplemental pinions *f f*, arranged in openings in the web of the gear, and pivoted with their axes radial to the axes of the gear. Said gear is loose on the axle and stands between two collars, S and S′, which have on the side adjacent to the gear R an annular gear, *g*, engaging the supplemental pinions *f f*. The collar S is keyed or otherwise rigidly fastened on the axle, while the collar S′ is formed on the end of the hub T of the traction-wheel, mounted loosely on the axle.

The effect of the described compensating-gear is obvious. When the engine travels in a straight line, the traction-wheels at opposite ends of the axle revolve at a uniform speed; hence the supplemental pinions *f f* of the compensating-gear are dormant and simply perform the function of a clutch, which, by its engagement with the fixed collar S, compels the axle to rotate with the compensating-gear. When, however, the axle is swung to guide the engine around a curve, the outer wheel travels faster than the inner wheel, and consequently the collars S and S′ have a differential movement, which imparts a rotary motion to the supplemental pinions *f f* of the compensating-gear.

It will be observed that by means of said compensating-gear power can be transmitted to two differentially-moving wheels.

By applying motive power to the forward wheels as well as the rear wheels, I obtain increased tractive power, and am allowed to better distribute the weight over the length of the engine, and am enabled to better guide the engine in its movement from place to place, inasmuch as the augmented weight on the forward wheels affords a better hold on the ground.

Having described my invention, what I claim as new is—

1. In a traction-engine, an oscillatory supporting-axle having a central pivoted connection with the boiler, a counter-shaft extended through the center of said pivot and provided thereat with a universal joint, and mechanism for transmitting motion to the oscillatory axle through the medium of the said counter-shaft, substantially as set forth and shown.

2. In a traction-engine, the combination of a saddle or truck frame mounted on the forward axle and provided with a semi-spherical step, a hollow hemispherical bearing secured to the boiler and seated in the step, and provided on one side with an opening and at the opposite side with a rigid sleeve, a counter-shaft journaled in said sleeve and extended through the hollow bearing and its side opening, and provided in the center of said bearing with a flexible joint, a journal-bearing on the saddle for the oscillatory end of the counter-shaft, pinions on opposite ends of the counter-shaft, a gear-wheel on the axle meshing in the pinion on the oscillatory end of the counter-shaft, and a train of gears arranged to transmit motion from the driving-shaft to the pinion on the lineally-rigid end of the counter-shaft, substantially as described and shown.

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 14th day of December, 1883.

LOYAL C. TABER. [L. S.]

Witnesses:

FREDERICK H. GIBBS,

C. H. DUELL.