(No Model.) 4 Sheets—Sheet 1.

F. F. LANDIS.

TRACTION ENGINE.

No. 266,698. Patented Oct. 31, 1882.

Fig. 1.

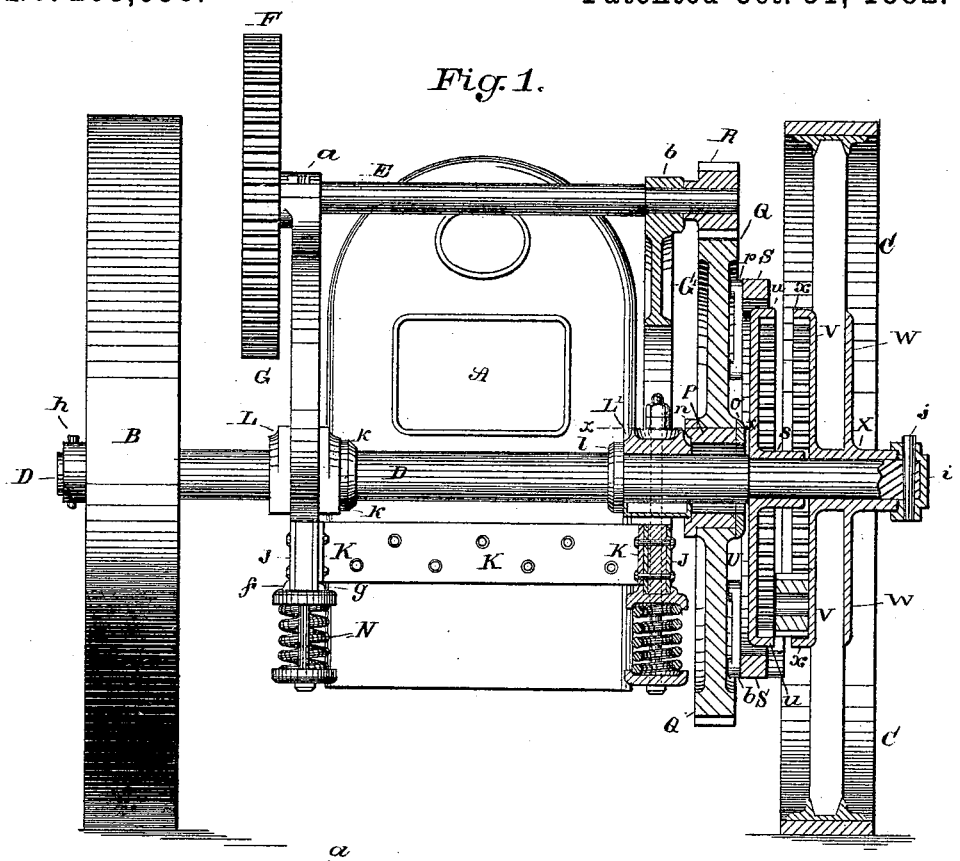


Fig. 2.

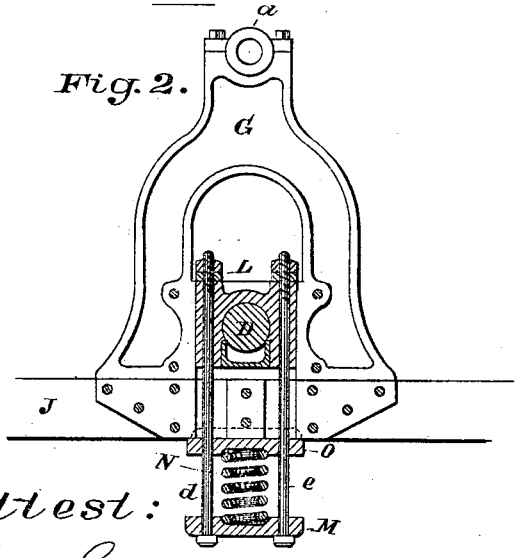
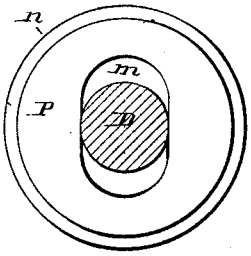


Fig. 3.



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(No Model.) 4 Sheets—Sheet 2.

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TRACTION ENGINE.

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Fig. 4.

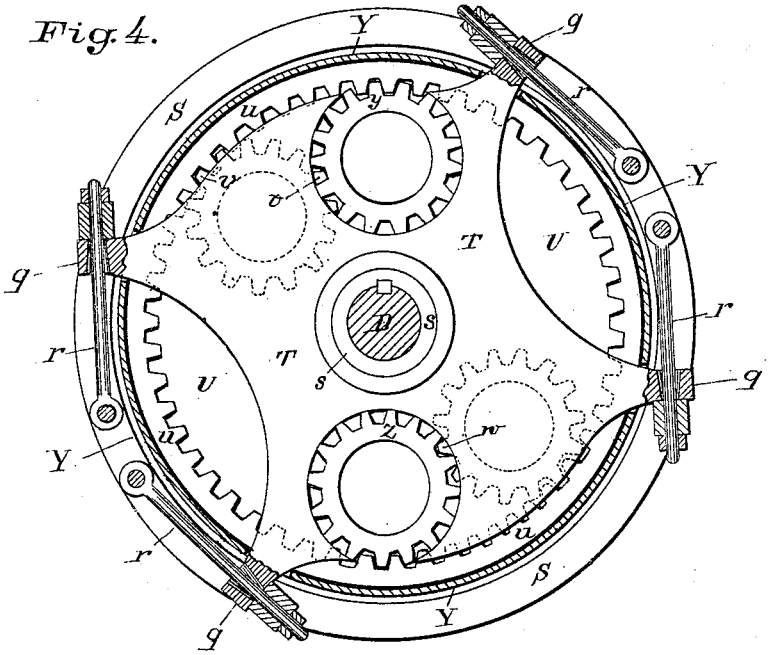
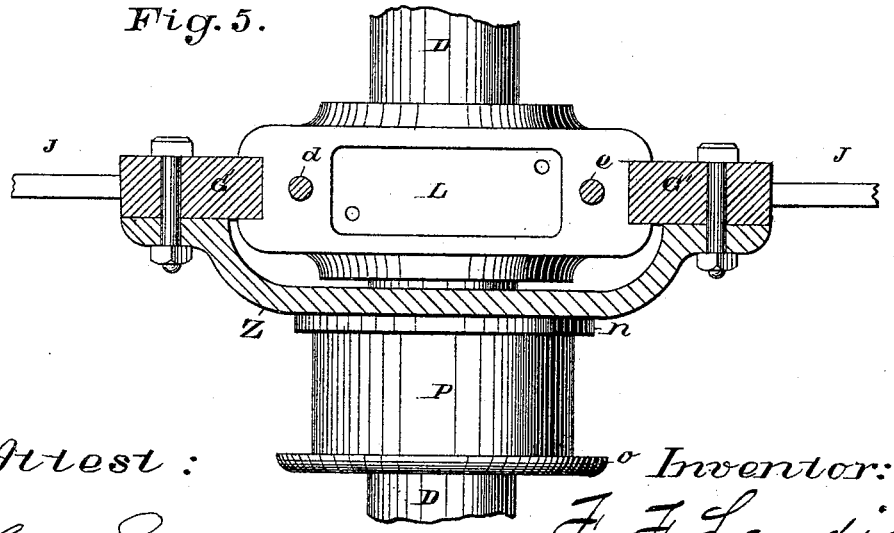


Fig. 5.



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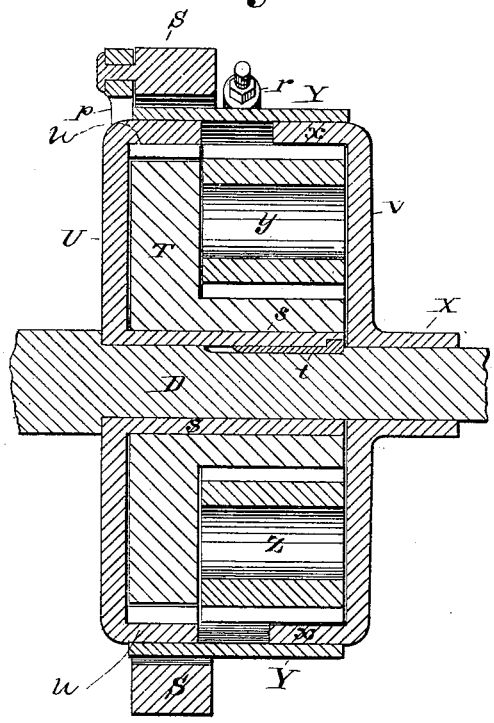
TRACTION ENGINE.

No. 266,698. Patented Oct. 31, 1882.

Fig. 6.



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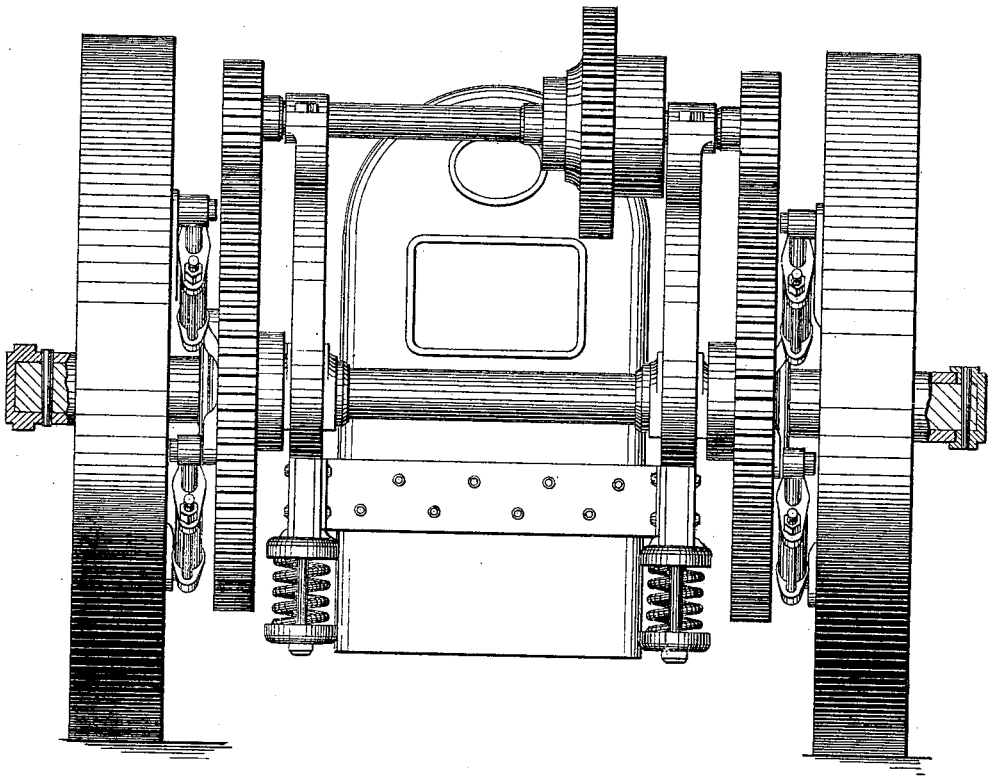
4 Sheets—Sheet 4.

F. F. LANDIS.

TRACTION ENGINE.

No. 266,698. Patented Oct. 31, 1882.

Fig. 7.



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UNITED STATES PATENT OFFICE.

FRANK F. LANDIS, OF WAYNESBOROUGH, PENNSYLVANIA.

TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 266,698, dated October 31, 1882.

Application filed October 22, 1881. (No model.)

To all whom it may concern:

Be it known that I, FRANK F. LANDIS, a citizen of the United States of America, residing at Waynesborough, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Traction-Engines; 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 appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification, and in which—

Figure 1 is an end view of a traction-engine, partly in section, with the body and pinions of the compensation-gear removed. Fig. 2 is an enlarged side elevation, partly in section, of the spring and axle-bearing. Fig. 3 is an enlarged front view of the slotted bearing for the driving gear-wheel. Fig. 4 is an enlarged vertical section of the compensation-gear, showing the body of the gear in place and its arms connected to the driving-ring. Fig. 5 is an enlarged top view of the axle-bearing, taken on the line *x x* of Fig. 1. Fig. 6 is an enlarged vertical cross-section of the compensation-gear. Fig. 7 shows an end view of the engine with the compensation-gear over the axle and near the top of the fire-box.

My invention relates to traction-engines; and it consists in the construction and operation of parts, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make the same, I will now proceed to describe its construction and operation.

A represents the steam-generator, B and C the driving-wheels, D the axle, and E the shaft receiving motion from the train of gearing F.

The shaft E is seated in bearings *a* and *b* of standards G and G′. A short distance below the bearings these standards are divided into two descending legs, as shown in Fig. 2 of the drawings, that straddle the axle and its bearing, and are bolted or otherwise secured to side bars, J J, and back plates, K, which are in turn bolted or riveted to the plates of the generator, unless they form a part of the engine-frame.

Above the side plates or bars, J J, and between the legs of the standards G G′, two bearings, L and L′, are placed, one on each side of the machine, resting on the axle D and against the inside of the legs, where they may be confined to a true vertical movement by flanges, tongue and groove, or any other suitable construction of the bearings and legs. The weight of the after part of the engine is suspended from these bearings by means of rods secured to the bearings and passing down on either side of the axle through the engine-frame, cap-plate, and bottom plate, as shown in Figs. 1 and 2 of the drawings. In the sectional view of these bearings (shown in Fig. 2 of the drawings) M represents the lower plate, resting upon the projecting flanges of the heads of the rods *d* and *e*, and recessed to form a seat for the spring N, that rests upon this plate and sustains the cap-plate O, which is recessed to receive the spring N, and perforated by two holes to receive the rods *d* and *e*, upon which the plate has a free vertical movement. This plate is provided with two flanges, *f* and *g*, upon its upper side, within which that part of the engine-frame immediately beneath the axle-bearing rests. The rods *d* and *e* pass on upward from the plate O, through openings in the frame between the legs of the standard, and through the bearing to the top, where the proper adjustment is made, and they are held securely by means of nuts on the threaded ends of the rods, or by any other suitable means, suspending the weight of the after part of the engine, the fire-box, and the gearing from the axle-bearings.

The axle D is round, and revolves in the axle-bearings and hub of the wheel C; but is secured to the wheel B by means of a pin, *h*, passing through the hub and the end of the axle, or it may be secured by a key. The wheel C is held on the axle by means of a cap, *i*, with dust-flanges passing over the end of the hub, and a pin, *i*, passing through the cap and the axle. The axle is provided with two circular flanges, *k* and *l*, that form the inner bearings for the axle-bearings L and L′.

In juxtaposition to the axle-bearing L′, upon the axle D, is placed the bearing P, upon which the driving gear-wheel turns, which is constructed with a slot, *m*, of sufficient width to permit the axle D to pass through it, and

long enough to permit the required oscillation of the bearing P during the vibrations of the springs. This bearing is secured to the standard G′ or engine-frame by any suitable means, such as the plate Z, (shown in Fig. 5 of the drawings,) and is provided with flange *n* and plate *o*, between which the driving gear-wheel Q is held and revolves freely upon the face of the bearing. The driving gear-wheel Q engages with pinion R, that is keyed to and receives power from the shaft E, and is attached to the connecting-ring S by drag-links *p*, said connecting-rings S being in turn attached to the projecting arms *q* of the body-piece T of a compensation-gear by drag-links *r*. The body T of the compensation-gear revolves upon the hub *s* of a flanged disk, U, that is keyed to the axle D by a feather, *t*, and is set up close to the bearing and within the connecting-rings S. The flange *u* of the disk U is provided with internal gear-teeth for engagement with the pinions *v* and *w*, seated in the body T, and this flange extends inward to the side of the projecting arms *q*. On the opposite side of the body a similar disk, V, with an internally-toothed flange, *x*, extending inward to the arms *q*, is placed on the axle D, up to the end of the hub *s* of the disk U, embracing part of the body T. The teeth of the flange *x* engage with the pinions *y* and *z*, that are seated within the body T. The disk V forms the inside of the hub X, the plate W forming the outside. These plates or disks V and W may be of any suitable form and united in any suitable manner for receiving the spokes of the wheel; or they may be cast in one piece of metal with the hub, or constructed separately and united to the hub; or they may be constructed in any other suitable manner, the hub proper not being a part of my present invention. A thin sheet or band of metal, Y, is attached to the arms *q* of the body T, and extends across the open space between the two flanges *u* and *x*, and is for the purpose of excluding dust from the compensation-gear.

The cavities in the body T, within which the pinions *v* and *w* on one side and *y* and *z* on the other are seated, are of but little greater diameter than the pinion, and their sides form the bearing-surface for the pinions. These cavities are projected inward from opposite sides of the body—one or more on each side—the depth of the cavity being the length of the pinion. Opposite cavities, as *y* and *v* and *z* and *w*, so overlap and communicate with each other that the teeth of the pinion will project into the opposite cavity and engage with the teeth of the pinion therein for about one-half of the length of the pinion. The center of the circle described by the cavity is placed near enough to the outer edge of the body T to cause the teeth of the pinion to project beyond the line of the body a sufficient distance to engage the internal gear-teeth of the adjoining disk for about one-half of the length of the pinion. Thus it will be seen that the outer end of the pinion *y* meshes with the internal teeth of the flange *x*, and the inner end projects into the cavity and meshes with the teeth of the inner end of the pinion *v*, which in turn meshes with the teeth of the flange *u*. By this construction and arrangement, when both of the flanges *x* and *u* revolve in the same direction their tendency is to require the pinions meshing with each other to revolve within their bearings in like direction; but these pinions, intermeshing at their inner ends, lock each other and their flanges, for intermeshing pinions must revolve in opposite directions or remain stationary with regard to each other.

In this device the motive power is applied to the projecting arm of the body T, and it will be remembered that the pinions are seated within this body, and that the wheels revolve separately, each being rigidly connected to one of the disks with which the pinions mesh. Now, when power is applied through the arms *q* to the body T the intermeshed pinions are carried around and take the engaged disks with them until one of the wheels meets with a greater obstruction than the other, as in the case of making a sharp turn, in which case the inner wheel is bound and held. This retains the disk secured to that wheel, and the body T, continuing its motion, carries forward the pinion meshing with the retained disk, which gives this pinion a backward revolution, which terminates the lock and permits the other intermeshing pinion to take a forward revolution and transmit the motive power to the outer wheel. This terminates as soon as the resistance to both driving-wheels becomes uniform. The action of both sets of pinions in the body T is the same, although for the purpose of description I have referred to but one set.

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

1. The combination of the driving gear-wheel Q, the body T of a compensation-gear, and means for connecting them with the toothed disks, and pinions connecting respectively the axle and the driving-wheel, substantially as shown and described.

2. The body T, having projecting arms *q*, and sheet of metal Y, in combination with the disks U and V, substantially as shown and described.

3. The body T, provided with projecting arms *q*, in combination with connecting-ring and any suitable means for connecting them, substantially as shown and described.

4. The body T of a compensation-gear, provided with arms, as *q*, projecting from its periphery for connection with the motive power, substantially as shown and described.

5. The combination of the axle D, hub X, revolving upon said axle, having a flanged internally-toothed disk, V, with the disk U, keyed to the shaft D, and body T, revolving upon the hub, and pinions *v y* and *w z*, substantially as shown and described.

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