No. 615,592. Patented Dec. 6, 1898.

M. E. THOMAS.

ELECTRIC LOCOMOTIVE.

(Application filed July 12, 1897.)

(No Model.) 3 Sheets—Sheet 1.

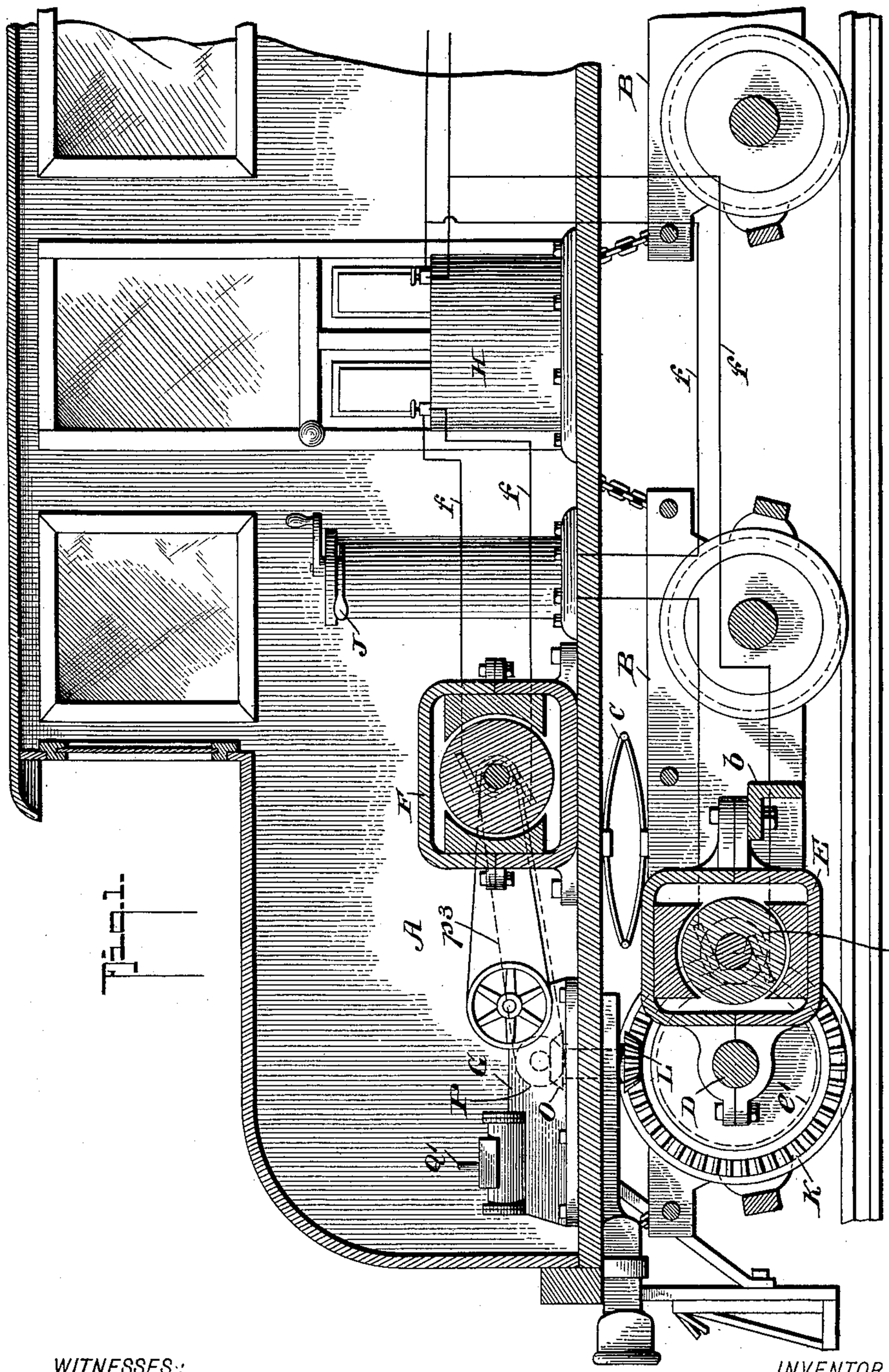

Fig. 1.

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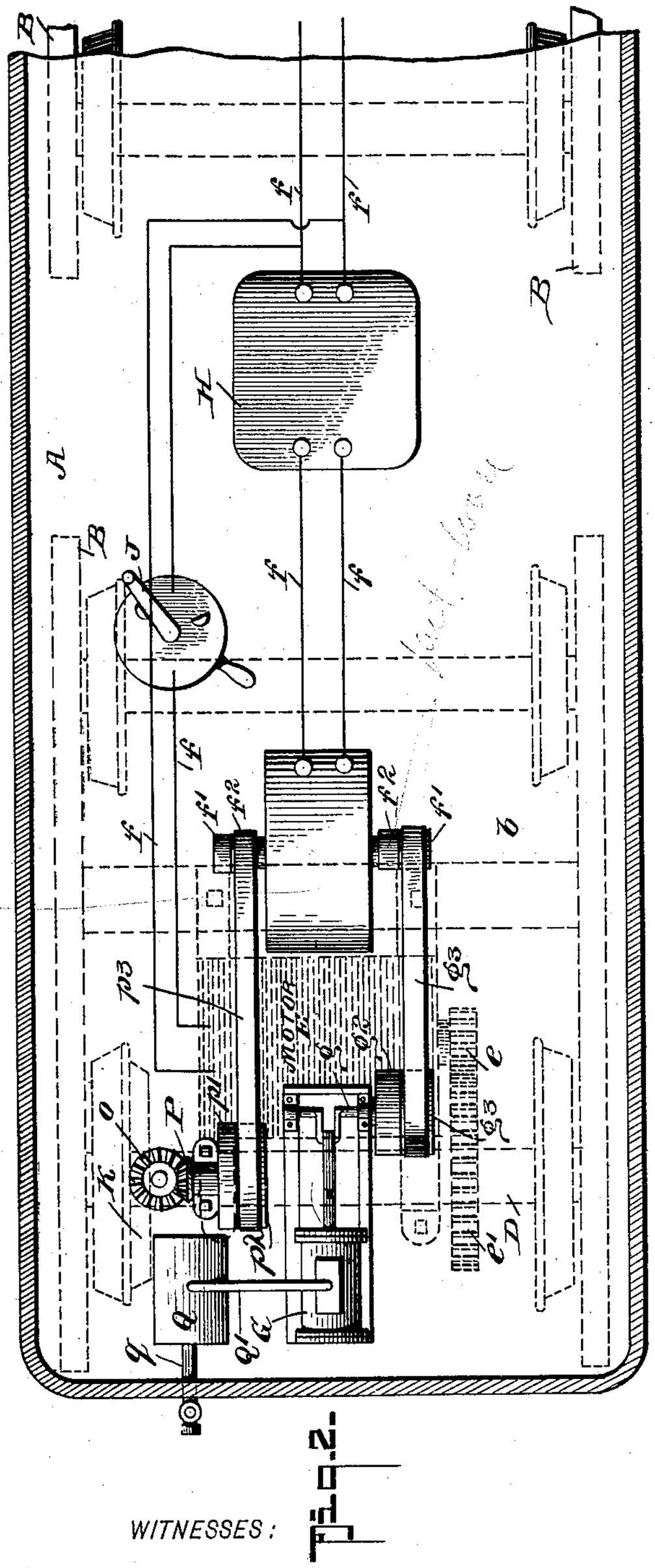

FIG. 2.

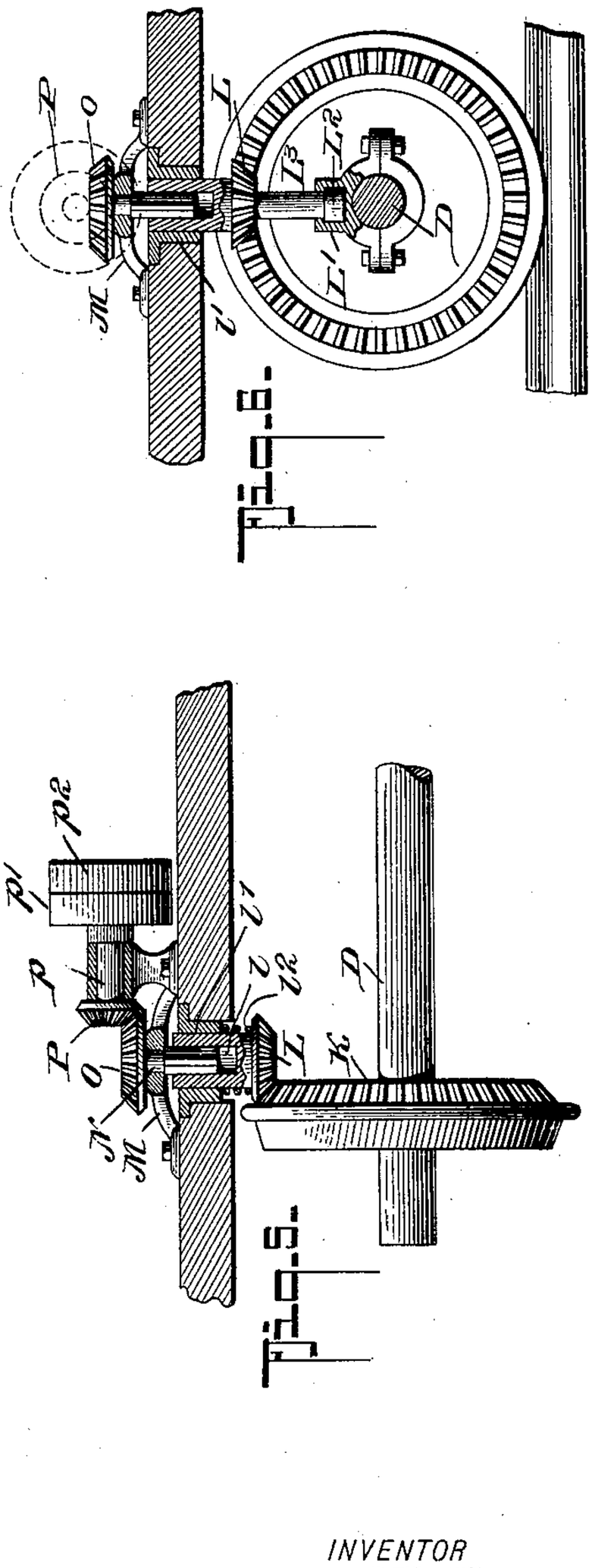

FIG. 3.

FIG. 4.

FIG. 5.

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Fig. 3.

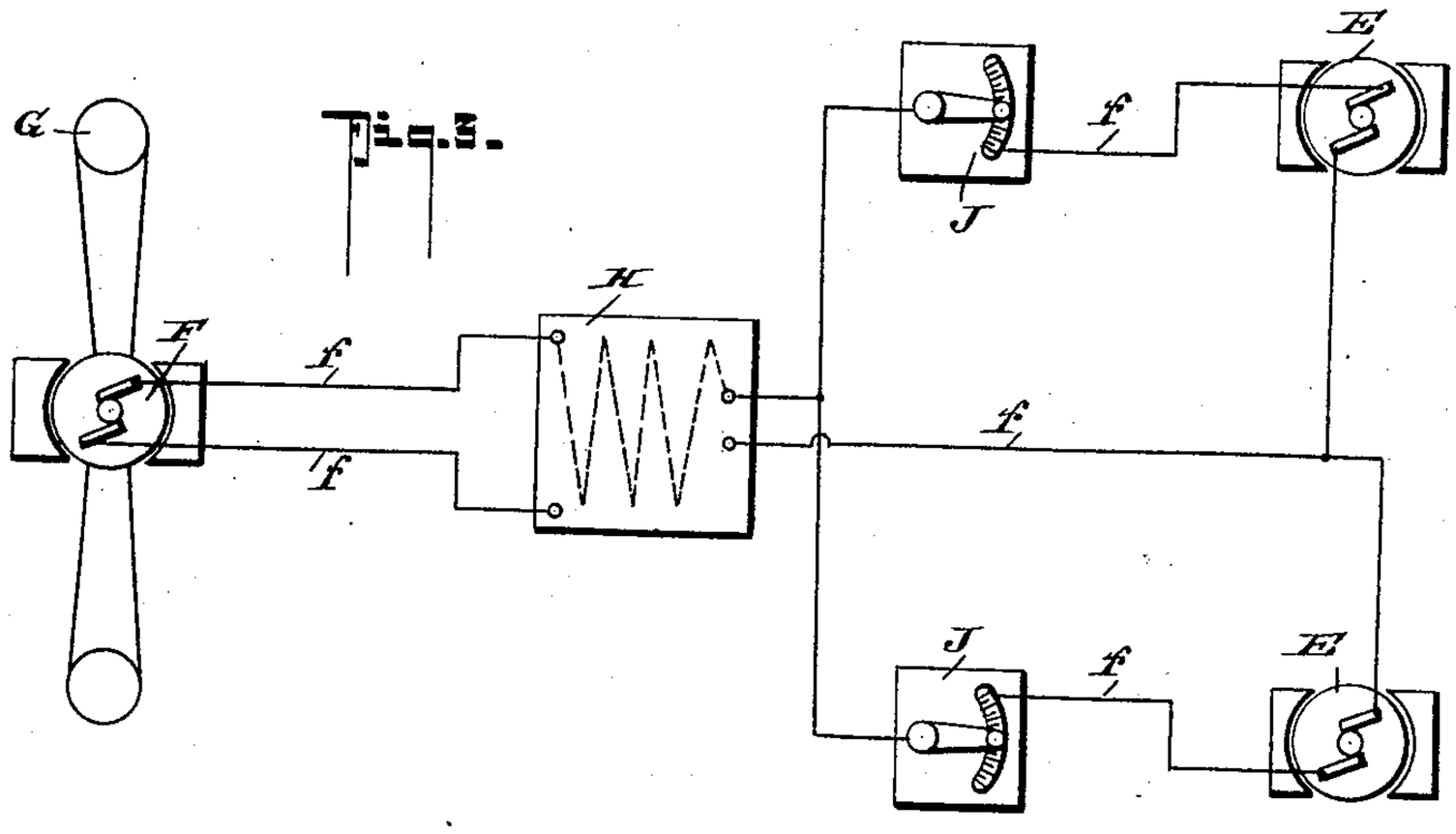
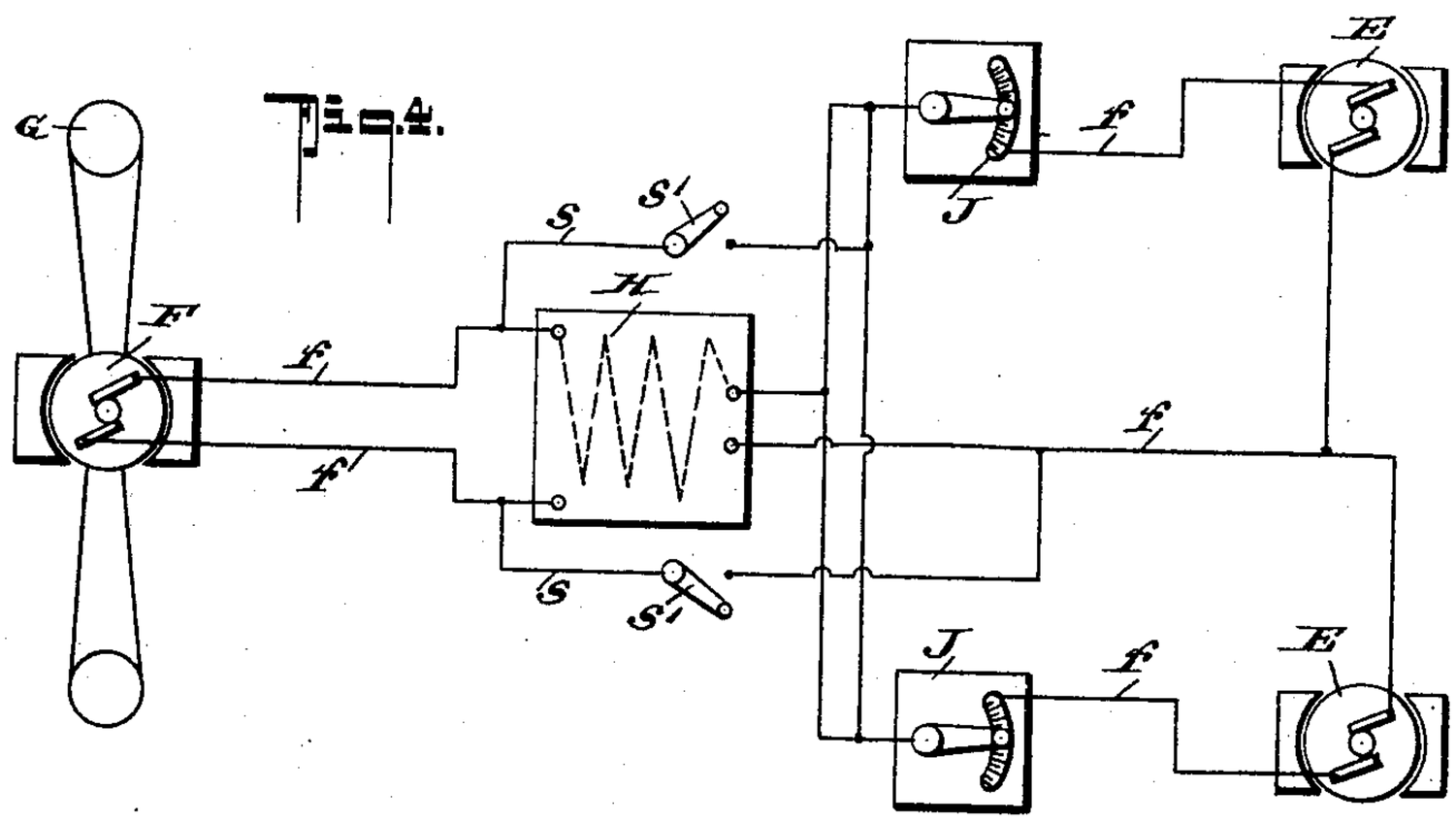


Fig. 4.



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ELECTRIC LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 615,592, dated December 6, 1898.

Application filed July 12, 1897. Serial No. 644,252. (No model.)

To all whom it may concern:

Be it known that I, MARTIN E. THOMAS, a citizen of the United States, residing at Cassaday, in the county of Warren and State of Kentucky, have invented certain new and useful Improvements in Electric Locomotives, of which the following is a specification.

This invention relates to an electric locomotive, and has for its object to provide suitable means carried by the locomotive for generating an electric current to propel the same.

The invention consists in certain novel features of construction and peculiar combination of parts, such as will be first described and then claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal section of one end of a motor-car with my improvements applied. Fig. 2 is a plan view of the same. Fig. 3 is a diagrammatic plan view of my improvements. Fig. 4 is a similar view of the modified arrangement thereof. Fig. 5 is an enlarged detail view of the means for actuating the dynamo from the axle, and Fig. 6 is a like view of a modification of the parts shown in Fig. 5.

Referring to the accompanying drawings, in which like letters indicate like parts in all the figures, A designates the car-body, and B the trucks, each of which may be of the form illustrated or of any well-known construction, the body A being supported upon the trucks through the medium of the spring C, whereby jar, &c., due to the unevenness of the tracks or road-bed is not transmitted to the car-body.

The car-wheel axle D is journaled in suitable bearings on the truck-frame, and mounted on a forward axle D and on a cross-sill *b* of the truck-frame is a motor E, the armature-axle of which carries a cog-pinion which meshes with a large cog-pinion *e'* on the axle, by which means the axle is revolved.

On the car-bottom is mounted a dynamo F, primarily operated by an engine G, also mounted on the car-bottom in close relation to the dynamo, it being also engaged by the axle through the medium of interposed mechanism, the arrangement of the several parts being such that the dynamo can be operated alternately by the engine and the axle, as will presently be more fully described.

f f indicate the conductor-leads, which connect the dynamo and the motor and which also join with a storage battery H and the controller J.

By referring now more particularly to Figs. 1 and 5 it will be seen the shaft D also carries a large axle-gear K, which meshes with a pinion L, having an upwardly-extending hollow shank *l*, mounted in a suitable bearing *l'* in the car-floor. The shank *l* of the pinion L has longitudinal movement in the bearing *l'*; but the pinion L is at all times held in mesh with the cog-wheel K by the spring l^2, interposed between the bearing *l'* and the said pinion L.

N indicates a shaft journaled on the bearing M, and said shaft N has its lower end extended into the shank *l*, such lower end and the bore of the shank *l* being non-circular, whereby the two members N and L are held to rotate together. The upper end of the shaft N carries a pinion O, which meshes with a smaller pinion P on the shaft *p*, which carries on its opposite end a fast and a loose pulley *p' p*^{2}, respectively. By this arrangement of parts it is obvious that when the axle D is revolved motion will be imparted to the shaft *p* and pulley *p'*. The engine crank-shaft *g* also carries fast and loose pulleys *g' g*^{2}, as shown in Fig. 2.

Upon each end of the armature-shaft of the dynamo F are secured a fast and a loose pulley *f' f*^{2}, and connecting the same and the pulleys on the shafts *p* and the crank-shaft *g* are belts p^3 g^3, respectively, such belts in practice having a suitable shifter (not shown) adapted to be operated by the motorman to shift them in unison.

So far as described the operation of my improvement is as follows: In starting the car the engine is first put into operation, which, through the medium of the belt g^3, operates the dynamo and generates the electric current, which passes off from the conductors, and the controller propels the car, and as the conductors are in circuit with the storage batteries H it follows that surplus current will be stored up therein when the circuit is on the

motor, it being also understood that the said battery is being charged by the current generated when the motor is stopped, thereby providing for the continuous charging of the storage battery to a degree sufficient to run the car independent of the dynamo.

The engine may be operated by gas, oil, or air pressure contained within the tank Q, disposed adjacent the engine and connected therewith by a supply-pipe Q′, and such tank also has a pipe *q*, which leads to the exterior of the car, whereby the tank Q may be recharged when necessary.

The method thus far described for generating the current—that is, the utilization of the engine to operate the dynamo—is designed to be used only in the primary generation of the current and for storing surplus energy in the battery or batteries as the momentum of the car is utilized to generate a current to supply the storage batteries for the further propulsion of the car after the initial current has been generated by the engine, as heretofore stated. Thus by shifting the belts g^3 p^3, respectively, the engine *g* can be thrown out of operation or from connection with the dynamo, and by the action heretofore stated the armature of the dynamo, through the medium of the belt p^3, can be revolved by the momentum of the locomotive while going down grades and when the current is cut off from the motor, and thereby store up current in the batteries to use them sufficiently to permit the utilization of the stored-up current in the batteries for propelling the car on a level stretch.

In Fig. 6 I have illustrated a modified means of journaling the pinion L, the construction shown having the said pinion L provided with a pendent shaft portion L^3, formed with a head L^2, journaled in the bearing L′, mounted on the axle D. In this form the pinion L is at all times held in a predetermined position with relation to the axle, and consequently at all times in engagement with the cog-wheel *e*′.

While I have thus far described the means whereby the surplus current is stored up in the storage batteries and whereby the entire current must pass through the said storage batteries, as shown in Fig. 3, yet, if desired, the current may be short-circuited at *s*′ and thereby carried directly from the dynamo to the motor, or by the manipulation of the switch *s*′ the current may be caused to pass into the battery, as particularly shown in Fig. 4.

It will be readily understood that any well-known or preferred method of winding may be employed and that the usual form of lighting-arresters, cut-outs, fuse-boxes, and light-circuits may be interposed in the feed-circuit or conductors without departing from the spirit of my invention, as these features are well known and form no part of this invention and are not described in detail.

What I claim is—

1. In an electric locomotive, a truck, a body mounted thereon through the medium of interposed springs, wheels mounted upon an axle journaled in the truck, a motor carried by the truck in gear with the axle, a dynamo carried by the body in electrical connection with the motor, an engine, a gear upon the axle, a gear journaled in the floor of the body and normally held in mesh with the gear upon the axle by a spring interposed between the floor of the body and the gear, a gear meshing with the said gear mounted upon a horizontal shaft, pulleys upon the said shaft and a belt connecting the pulleys with the armature of the dynamo, substantially as described.

2. In an electric locomotive, the combination with the trucks and the car-body; a motor supported on one of the trucks and held in gear with the axle thereof; a dynamo on the car-body in electrical connection with the motor; mechanical means for imparting an initial motion to the dynamo; gear connections joining the dynamo and the car-axle, including a yieldingly-held power-transmitting gear, said gear connections and the mechanical means for imparting motion to the dynamo being arranged to be alternately set to an operative condition, as specified.

3. As an improvement in electric locomotives; the combination with the car-trucks and the car-body; of a motor mounted on one of the trucks geared with the truck-axle; a dynamo mounted on the car-body; a controller and a storage battery in the conductor-leads from the dynamo to the motor; an engine mounted on the car having shifting gear connections with one end of the dynamo-axle; drive-gearing held in mesh with the truck-axle; and shifting gear devices connecting such drive-gearing with the other end of the dynamo, all being arranged substantially as shown and for the purposes described.

In testimony that I claim the foregoing as my invention I have signed my name in the presence of two subscribing witnesses.

MARTIN E. THOMAS.

Witnesses:
T. W. BEARD,
G. L. BOWLES.