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C. H. SAWYER.

TRACTION ENGINE.

No. 336,440. Patented Feb. 16, 1886.

Fig. 1.

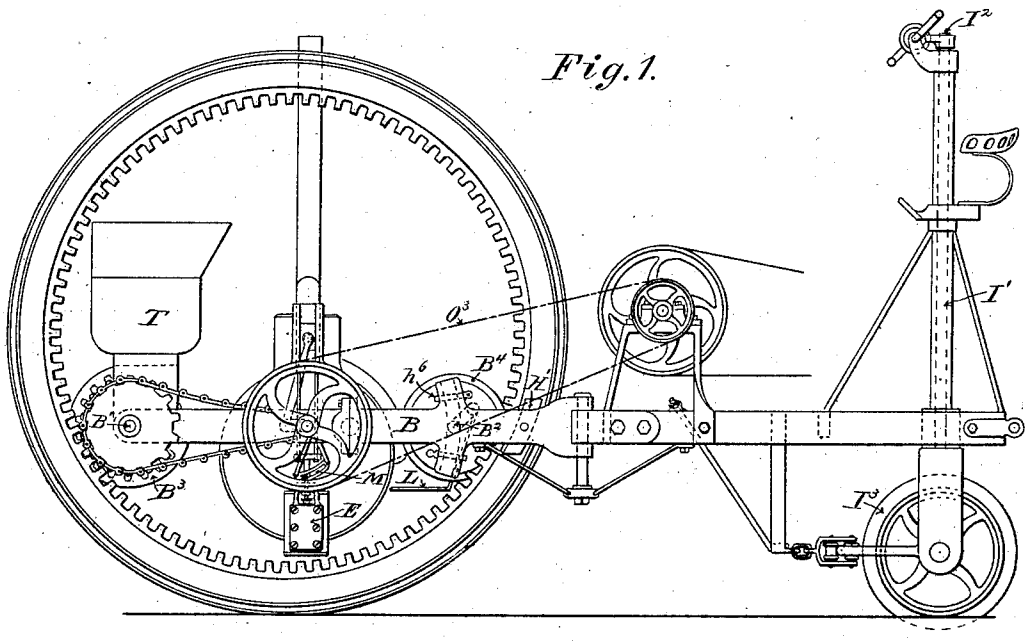
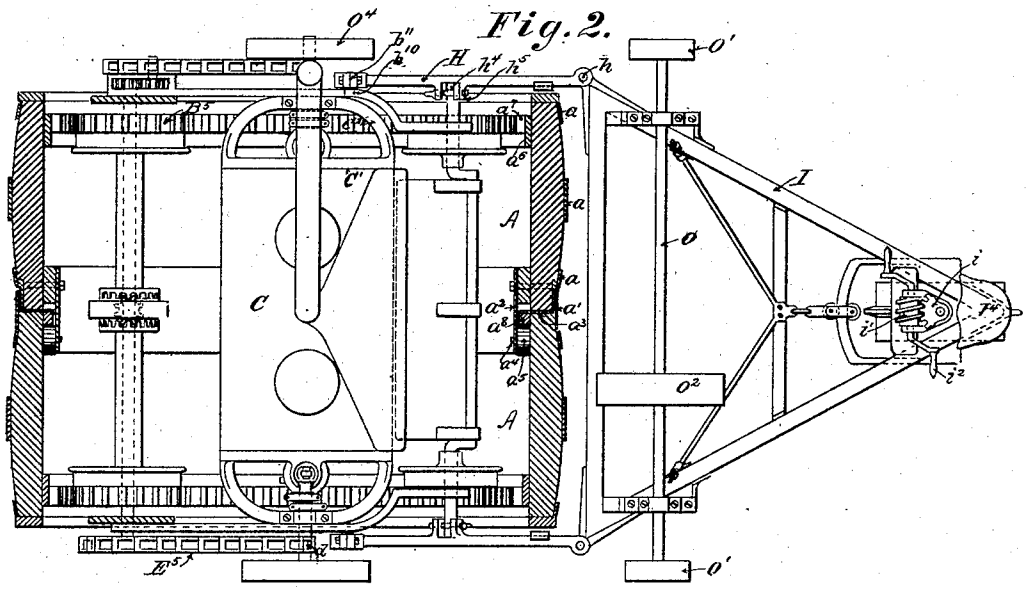


Fig. 2.



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(No Model.) 3 Sheets—Sheet 2.

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Fig. 3

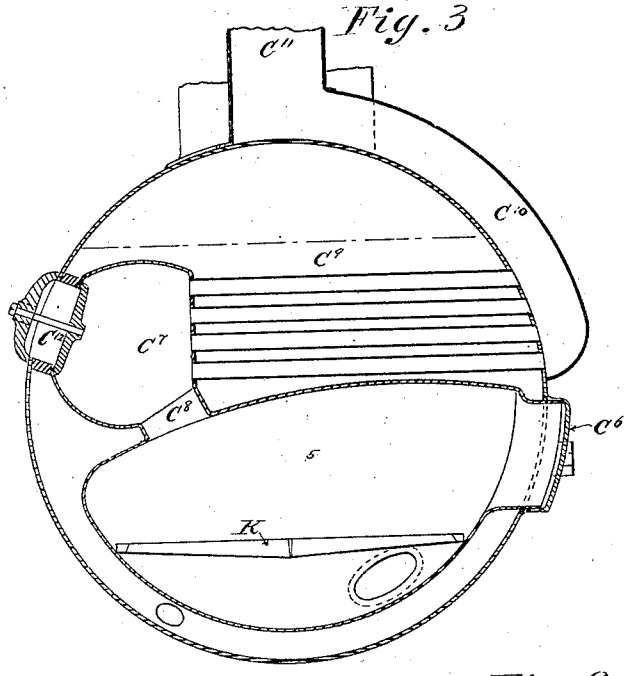


Fig. 4.

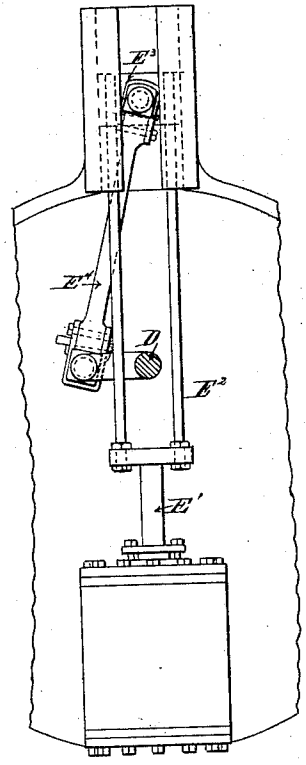


Fig. 6.

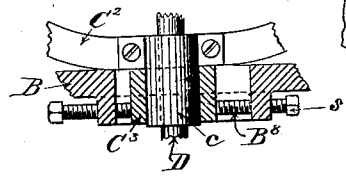


Fig. 5.

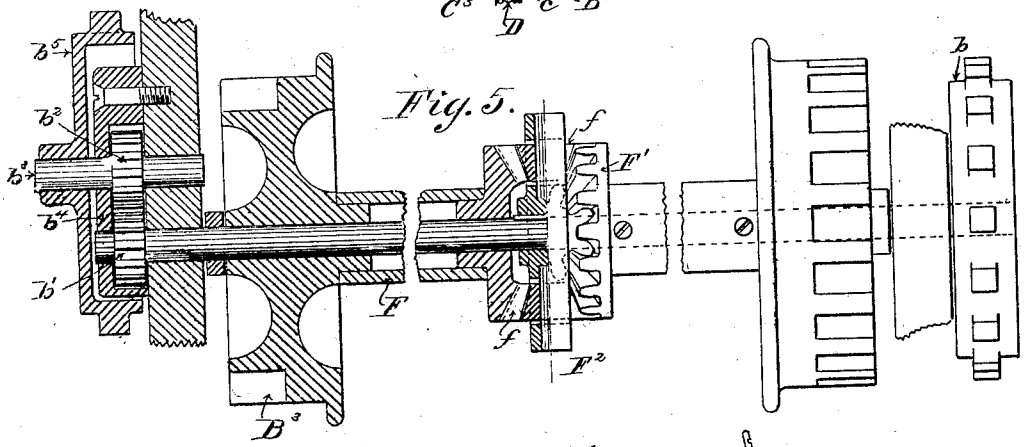
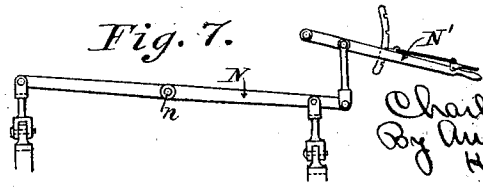


Fig. 7.



Witnesses
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(No Model.) 3 Sheets—Sheet 3.

C. H. SAWYER.

TRACTION ENGINE.

No. 336,440. Patented Feb. 16, 1886.

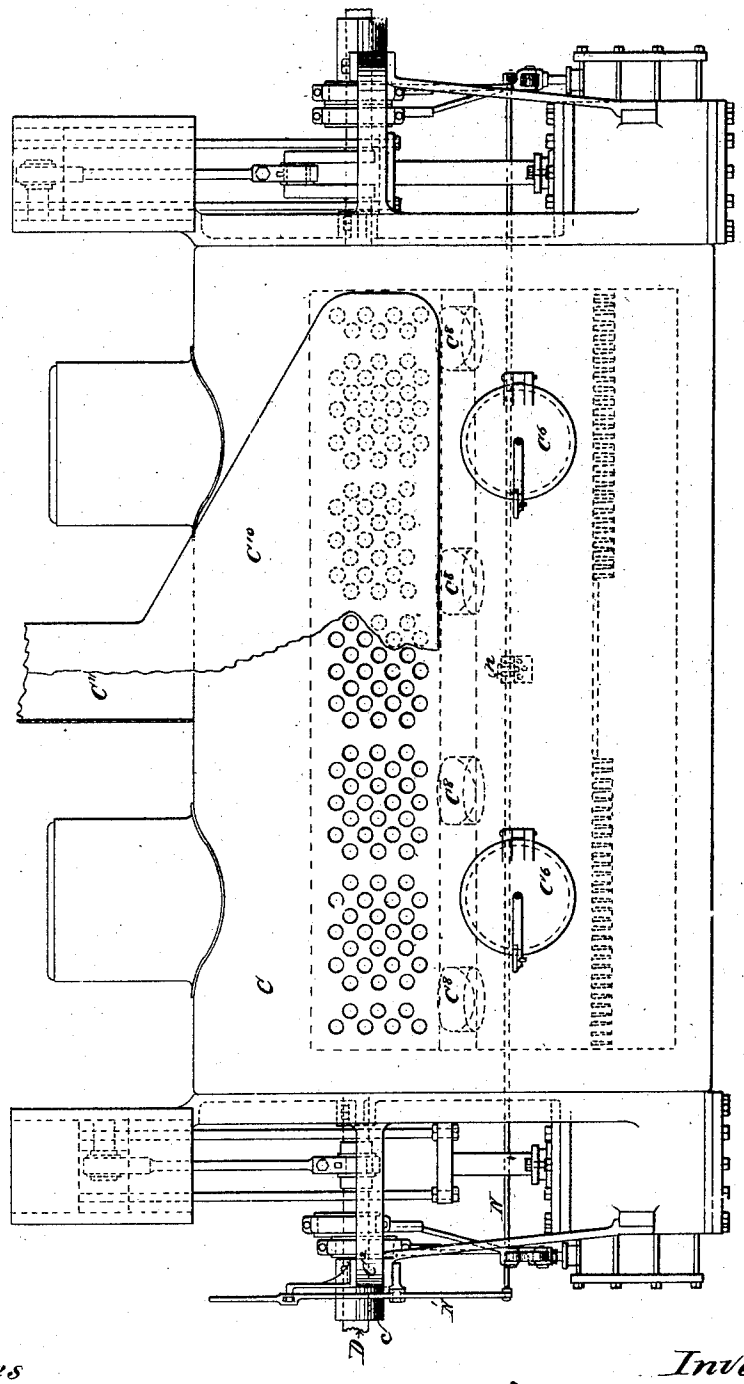


Fig 8

Witnesses
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H. A. Tees

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His Atty.

UNITED STATES PATENT OFFICE.

CHARLES H. SAWYER, OF MAPLETON, DAKOTA TERRITORY, ASSIGNOR TO THE SAWYER STEAM PLOW COMPANY, OF SAME PLACE.

TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 336,440, dated February 16, 1886.

Application filed June 11, 1885. Serial No. 168,438. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. SAWYER, a citizen of the United States, residing at Mapleton, in the county of Cass and Territory of Dakota, have invented certain Improvements in Traction-Engines, of which the following is a specification.

My invention relates to improvements in engines designed for farm and road purposes; and the objects I have in view are to provide an engine that may be used upon farms or roads where the ground is more or less soft without sinking or becoming embedded therein to any extent.

My invention consists, generally, in an engine of the class described, having a traction-drum within which the engine proper is located and supported.

My invention consists, further, in the construction and in the combination of devices hereinafter described, and particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation of an engine embodying my invention. Fig. 2 is a plan view of the same with the drum in section. Fig. 3 is a vertical cross-section of the boiler on line *x x* of Fig. 8. Fig. 4 is a detail of one of the engines. Fig. 5 is a partial elevation and partial section of the forward axle or shaft of the carriage and the mechanism connected thereby. Figs. 6 and 7 are details. Fig. 8 is a side elevation of the boiler.

A A represent the drum, which preferably consists of two similar sections joined together at their edges, so that each may turn independently of the other. The drum may be composed of wood, having metal bands or hoops *a a* extending around it, or it may be composed of iron or steel. A band, a', is secured to one of the sections, and forms a flange projecting over the joint between the sections. A plate, a^2, is secured under this flange to the opposite section, to take the wear between the parts when the drum is composed of wood, and another plate, a^3, is secured to the edge of one of the sections for a similar purpose. A rail, a^8, is secured to the inner side of one section, and a band, a^4, secured to the opposite section, projects over this rail and carries friction-rollers a^5, that bear against the rail a^8. The sections are thus held together, while each is in its movement independent of the other. Other suitable means may be used, however, for holding the sections together. Within each section of the drum is a track-rail, a^6, and a rack, a^7. The parts a^6 a^7 may be formed integrally, or they may be formed separately and secured within the drum by any suitable means. Arranged within the drum and resting on the rails a^6 is a carriage formed of the two side bars, B B, a front axle, B′, a rear axle, B^2, two front wheels, B^3, and two rear wheels, B^4. The forward wheels, B^3, have a gear, B^5, preferably formed integrally with them and meshing with the rack a^7. The boiler, engines, tank, and other parts of the machine are mounted on and supported by this carriage, which is supported within and brings all of the weight of these parts upon the drum itself.

C represents the boiler, which is preferably of the construction hereinafter described. It is secured to heads C′, carried by frames C^2, which are supported on the side bars of the carriage, as hereinafter described. The frames C^2 have each a hollow trunnion, *c*, formed thereon, and these trunnions are mounted in boxes in the side bars, B, of the carriage. The engines E are mounted on the heads C′, and hence the boiler and engines are by means of the frame and trunnions hung pivotally on the carriage.

D are the crank-shafts of the engines. These shafts pass through the trunnions *c* and have the pinions *d* on their outer ends. The piston-rod E′ (see Fig. 4) is connected by four rods, E^2, with a slide, E^3, that moves in ways on the head of the boiler. The crank-shaft D passes between the rods E^2, and the crank is located between said rods. A pitman, E^4, arranged between the rods, connects the crank D and slide E^3. By this construction and arrangement I am enabled to bring the parts of the engine into small space, and to centrally locate the crank-shaft, for a purpose hereinafter stated. The forward axle, B′, carries at one end the gear-wheel *b* and at the opposite end the pinion *b′*. (See Fig. 5.) A pinion, b^2, carried by a stud, b^3, meshes with the pinion *b′*. A cap, b^4, covers the pinions *b′* and b^2 and affords an outer bearing for the stud b^3. A gear, b^5, is secured to the stud b^3, and it is preferably of the cap shape shown, thereby

covering the cap b^4. The pinions on the crank-shafts are connected by the link-belts E^5 with the gears b and b^5, and through this means the forward axle is rotated from said engines. By using the intermediate pinions on one side I am enabled to run one engine in one direction and the other in the other, and thereby to neutralize the strain that would otherwise come on the boiler and carriage. The front wheels, B^3, are mounted loosely upon the axle B', and are secured each to a sleeve, F, carrying a face-gear, F'. The axle B' has a collar or hub, F^2, rigidly secured thereto and projecting between the gears F' F'. Mounted radially in the hub F^2 are one or more, preferably four, pinions, f, meshing with the gears F'.

Projecting outwardly from the side bars, B, of the carriage are the studs b^{10}, having balls b^{11} upon their ends.

H are bars secured by sockets to the balls b^{11}. The sockets are preferably formed by making a half-socket in the end of the bar and a half-socket in a cap that is secured to the end of the bar by suitable screws or bolts. A triangular frame, I, arranged back of the drum, is secured to the bars H by hinge-joints h. At the rear angle of the frame I a verticle tube, I', is secured by suitable braces. A rod, I^2, having a crotch at its lower end in which is journaled a wheel, I^3, passes through the tube I' and supports the rear end of the frame I. A gear-segment, i, is arranged on the upper end of the rod I^2, and a worm-shaft, i', mounted on the tube and supplied with handles i^2, meshes with this segment. A seat, I^4, is arranged on the tube I', so that a person seated thereon may operate the worm-shaft and guide the engine. The wheel I^3 is provided with a flange that cuts into the ground, and thereby aids in directing the engine. A brake-shoe, H', is secured to the bar H upon each side of the drum, so that by turning the guide-wheel in one direction the frame I will be moved in that direction, and the shoe upon the other side of the drum brought against the edge of the drum. The rear axle, B^2, projects beyond the side bars, B B, of the carriage, as shown in Fig. 2, and the inner sides of the bars H are formed with curved grooves h^4, formed by projecting lugs h^5, into which the ends of the axle B^2 extend. A series of holes extend laterally through the lugs h^5, and are adapted to receive the cross-pins h^6. When these pins are not in position, the carriage is held to the track inside the drum only by its own gravity, and its forward end tends to be raised by the action of the gears on the rack-bar of the drum. The weight of the tank and carriage will ordinarily be sufficient to hold down the forward end of the carriage; but should there be any obstruction in the path of the drum the pins h^6 may be inserted and the carriage and frame I will be rigidly connected, and the whole will then act as a three-wheeled carriage, and the rear support, formed by the wheel at the rear end of the triangular frame, prevents the forward end of the carriage from rising.

The construction of the boiler is shown in Figs. 2, 3, and 8. This boiler consists of a cylindrical shell, C, supported by the heads C' and frames C^2, as described. Within the shell C is a substantially semi-cylindrical drum, C^5, extending substantially the full length of the boiler-shell, and provided with two doors, C^6, opening through the boiler-shell. A second drum, C^7, extends through the boiler-shell above the back side of the drum C^5, to which it is connected by several flues, C^8. A man-hole, C^{12}, through the boiler-shell opens into the upper drum for convenience in putting in or getting to the tubes. The upper drum has one vertical side, which forms the rear tube-sheet, receiving the ends of a series of tubes, C^9, that extend across the lower drum transversely in the boiler-shell, and have their opposite ends seated in the shell of the boiler. A breeching, C^{10}, covers the ends of the flues and communicates with the smoke-stack C^{11}, that extends horizontally over the top of the boiler, and then vertically above the top of the drum, as shown in Fig. 1.

K is the fire-grate in the lower part of drum C^5, extending nearly the full length thereof, and having a dead-plate in the center, as indicated in Fig. 8.

A platform, L, Figs. 1 and 2, is supported on the rear axle of the carriage, below the doors of the furnace, to form a support in feeding the furnace.

The engines are each provided with a link-movement, M, in connection with its slide-valve, for reversing the engine. These reversing devices are each connected to a walking-beam, N, Figs. 7 and 8, that is pivoted at its center n, and provided with a suitable handle, N'. By operating the handle N' and rod or walking-beam N each engine is reversed, and each will run in a direction opposite to the other, as before.

In order that the drive-chains or link-belts E^5 may not have any slack in them when the engines are in operation, I mount the boxes C^3, (see Fig. 6,) in which the trunnions c of frame C^2 and the crank-shafts are supported, in slots B^8 in the side bars of the carriage, and provide adjusting-screws S S for such boxes. When the drive-chains are to be put on, the boxes may be moved toward the forward axle of the carriage, and moved back again to take up the slack in the chains after they are in position.

In using this as a road or farm engine both of the driving-engines may be continuously operated at the same rate of speed, and the movement of each continuously applied to the forward axle of the carriage. As long as the traction on each section of the drum is the same, both of the face-gears will be rotated by the small gears f in the hub on the axle at the same rate of speed and the same speed will be given to the sections of the drum. When, however, there is a greater traction or resistance to the movement of one section of the drum, the face-gear of that section will be rotated at a slower rate. the small gear rolling

over said face-gear, and that section of the drum will consequently move at a slower speed. This principle in the operation of the described gearing is taken advantage of in the application of the brake mechanism. Applying the brake to either drum-section, even while the engines are both rotating at full speed, brings a greater resistance on such section, and consequently causes, through the operation of the gearing above described, such section to move at a slower speed, and thereby guides the drum to the right or left, as desired.

It will be seen that while I use two engines I do not use one engine for operating each section, but that both engines together operate to revolve the axle or shaft B', and that by the hub and face-gears the movement of said shaft is communicated to the drum-sections. It will therefore be seen that a single engine operating the axle B' may be employed without departing from my invention. I prefer, however, to use the two engines, as described.

When this engine is used as a traction or road engine, the plows, vehicle, or whatever it is desired to draw, may be attached to the frame I by any suitable means.

A shaft, O, may be secured to the frame I and provided with belt-pulleys O' O^2, when it is desired to use the engine as a stationary engine for operating thrashing or other machines. The drive-chains will then be disconnected and the crank-shafts connected with the shaft O by suitable belts, as O^2, Fig. 1.

T represents a suitable tank supported upon the carriage within the drum.

I have shown in Figs. 1 and 2 suitable truss-rods connecting the guide-wheel with the frame I, and the frame I with the bars H.

I do not limit myself to the exact details of construction herein shown and described, as the same may be varied in many particulars without departing from my invention.

I do not in this application claim the construction of the boiler or the described improvements in the steam-engines, but reserve the right to claim the same in separate applications to be filed as divisions hereof; but

What I claim as my invention is—

1. The combination of the traction-drum, the carriage arranged therein, the engines, drive-gearing connecting said engines with the drum, a frame, I, arranged in the rear of said drum, bars H, loosely connecting said frame with the carriage, and guiding means arranged on said frame, as and for the purpose set forth.

2. The combination of the sectional drum A A, the carriage arranged therein, the engines mounted on said carriage, driving means connecting said engines with the drum, the frame I, connecting-bars H, carrying the brake-shoes, the flanged guiding-wheel, and means for operating said wheel, as and for the purpose set forth.

3. The combination of the drum, the engines, the carriage having its rear axle provided with projecting ends, the frame I, having the guiding-wheel, the connecting-bars H, having grooves into which the ends of the axle extend, and the pins h^6, as and for the purpose set forth.

4. The combination, with the drum and means for driving the same, of the frame I, tube I', rod I^2, wheel I^3, gear-segment i, worm-shaft i', and handles i^2, as and for the purpose set forth.

5. The combination, with the sectional drum A A, having racks a', of the shaft or axle B', having hub F^2, with pinions f, mounted therein, the sleeves F, having gears F', the gears B^5, meshing with racks a', and means for driving the shaft B', as and for the purpose set forth.

6. The combination, with the drum and carriage arranged therein, of the boiler having heads C' and frame C^3, mounted on trunnions in said carriage, and the driving-engines mounted on said heads C', and means connecting said engines with the drum, substantially as described.

7. The combination, with the carriage, of the boiler having heads C' and frame C^3, mounted by hollow trunnions on the carriage, of the engines supported on said heads and having their crank-shafts passing through said trunnions, as and for the purpose set forth.

8. The combination, with the carriage having slots B^8, of the boiler having trunnions c, boxes C^3, and adjusting-screws S S, as and for the purpose set forth.

9. The combination, with the drum and carriage, of the bars H, connected to the carriage by the ball-and-socket joints, the frame I, joined to said bars H, and the guide-wheel, and means for operating the same, as and for the purpose set forth.

10. The combination, with the sectional traction-drum, of a carriage mounted therein, engines pivotally mounted on said carriage, and means connecting said engine with said drum for driving the latter, as and for the purpose set forth.

11. The sectional drum having its sections united at the edges, with each section free to revolve independently of the other, in combination with the carriage resting on the interior of said drum, the engines mounted on said carriage, and driving means connecting said engines with said drum, as and for the purpose set forth.

CHARLES H. SAWYER.

In presence of—
GEO. MCNEIR,
AMASA C. PAUL.