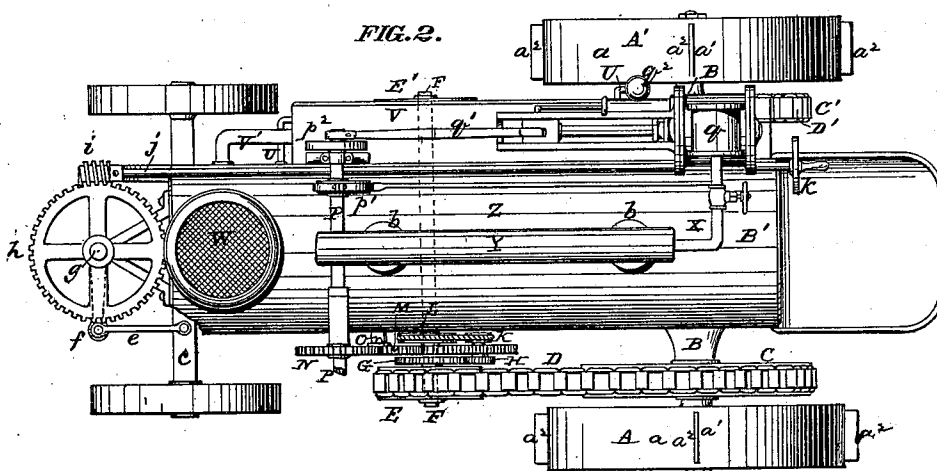
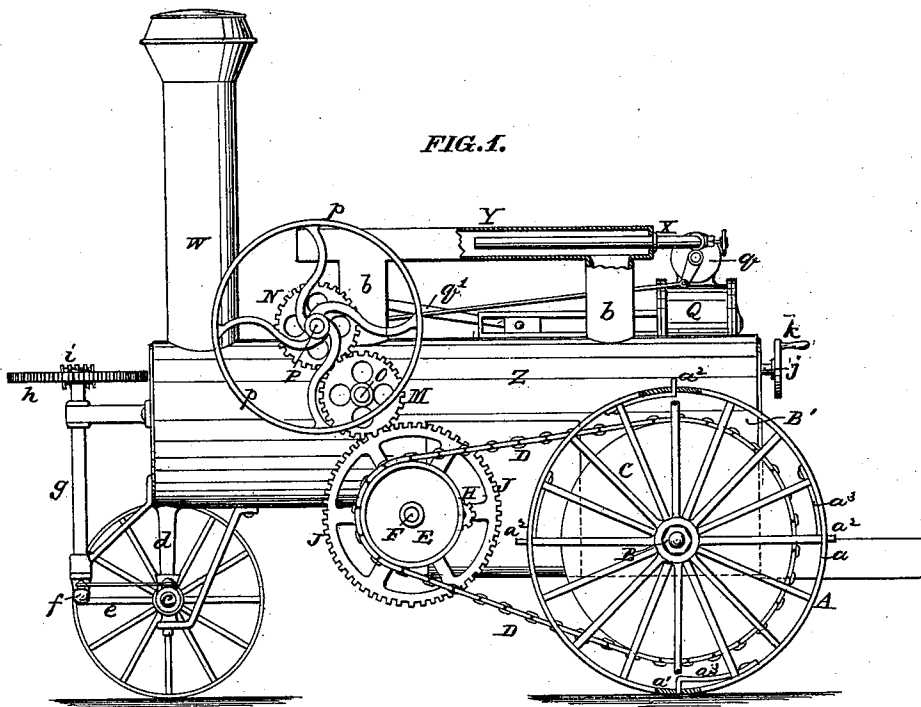


B. YOCH.

PORTABLE AND ROAD ENGINE.

No. 177,052.

Patented May 2, 1876.



ATTEST:

Robert Burns
Chas. Gooch

INVENTOR:

Bernhard Yoch
By Knight Bros.
Atty's

B. Y O C H .

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FIG. 3.

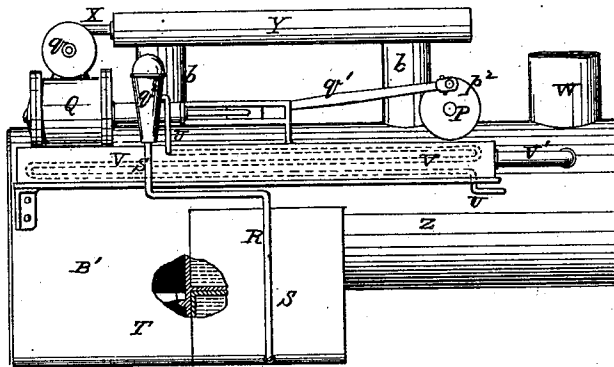


FIG. 4.

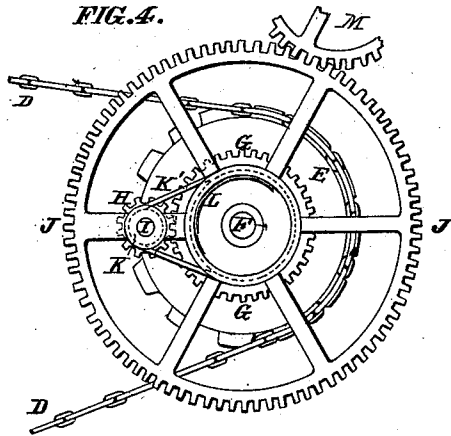
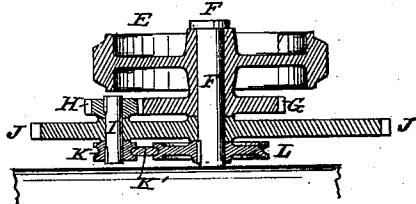


FIG. 5.



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UNITED STATES PATENT OFFICE.

BENHARD YOCH, OF WEST BELLEVILLE, ILLINOIS.

IMPROVEMENT IN PORTABLE AND ROAD ENGINES.

Specification forming part of Letters Patent No. **177,052**, dated May 2, 1876; application filed February 5, 1876.

To all whom it may concern:

Be it known that I, BENHARD YOCH, of West Belleville, in the county of St. Clair, State of Illinois, have invented a new and useful Improvement in Combined Portable and Road Engines, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

My improvement relates to an engine intended for use chiefly when at rest, but which is capable of being moved from place to place by its own machinery and of drawing wagons, &c., with it.

The first part of my improvement consists in forming the traction-wheels with spring-calks, which extend through the rim of the wheel, and which are formed upon the ends of plate-springs attached to the inside of such rims.

The second part of my improvement consists in the combination, with the traction-wheels, (each turning upon a separate axle,) of chain-gear connection with two wheels on a single shaft, one of said wheels being loose and the other tight upon the shaft. Attached to the hub of the loose chain-gear wheel is a spur-wheel engaging a spur-pinion on a shaft having bearing eccentrically in a spur-wheel also turning loosely on the main shaft and receiving rotation from the engine. The other end of the pinion-shaft carries a chain-gear wheel, connected by chain-gear with the main shaft, so as to cause the rotation of the shaft.

The result of this construction is that either of the traction-wheels may be turned separately by the engine, (the other remaining at rest,) or either of said wheels may be turned faster than the other, as is required in turning the engine on a curve.

The third part of my improvement applies to the steam-drum. This extends some distance above the boiler, and its ends are connected to two upright steam-vessels. The steam-pipe extending to the engine has its mouth at or near the middle of the longitudinal steam-drum, so that in ascending or descending a hill (where the boiler is much inclined) the water will at no time be in contact with the mouth of the steam-pipe.

The fourth part of my improvement consists

in the construction of steering apparatus. In this there is a vertical shaft, having at bottom cross-arms, whose ends are connected to the fore axle and whose upper end carries a screw-gear wheel, turned by a gear-screw on a shaft turned by a hand-wheel or crank at the furnace end of the machine.

Figure 1 is a side view of engine, part in section. Fig. 2 is a top view. Fig. 3 is a detail side view of feed-water apparatus. Fig. 4 is a detail, part in side elevation and part in section, illustrating part of the gear-connection between the engine and traction-wheels. Fig. 5 is a section at *xx*, Fig. 4.

The two traction-wheels A A' are similarly constructed, having a sufficiently broad tread or rim, *a*, with transverse slots *a*¹, in which work the spring-calks *a*². These calks form the outwardly-bent ends of the plate-springs *a*³, whose other ends are attached to the insides of the rims *a*. The calks are to prevent the wheels from slipping in situation where this would otherwise take place, and the springing feature is for the purpose of allowing them to retire on coming in contact with a hard substance, so as to allow the wheel to roll smoothly over. Each wheel turns on its arbor or axle B, which projects from the side of the fire-box B'. To the traction-wheels A A' are attached chain-gear wheels C C', connected by gear-chains D D' to chain-wheels E E'. The chain-wheels E E' are on the opposite ends of a main shaft, F, running transversely near the middle of the machine. The wheel E' is keyed fast to the shaft F, but the wheel E turns loosely on said shaft. Attached to the hub of the loose chain-wheel E is a spur-wheel, G, gearing with a planet spur-pinion, H, keyed to the shaft I, having journal-bearings in a wheel, J, eccentric to the axis of the wheel J. The wheel J turns loosely on the shaft F, and has rotation by gear-connection with the engine. Upon the shaft I, at the opposite side of the wheel J from the pinion H, is a chain-gear wheel, K, connected by an endless chain, K', to a chain-gear wheel, L, on the shaft F. The spur-wheel J receives motion from the engine when the engine is moving from place to place, and the action of the rotation of the said wheel J is to cause the rotation of the traction-

wheels; and the above-described construction of parts is to allow either of the traction-wheels to turn faster than the other, as is required when traveling on a curve.

The wheel J (to cause its rotation) is engaged by a spur-wheel, M, which may be thrown out of gear with the spur-wheel J (and also that N) by sliding it endwise upon its arbor O. The spur-wheel N is upon the crank-shaft P of the engine, and this shaft carries the ordinary belt-wheel p , eccentric p^1 , and crank or crank wheel p^2 . No novelty is claimed in the engine Q, in which q is the steam-chest, q^1 the connecting-rod, and q^2 the feed-water pump. This pump has a supply-pipe, R, leading to the water-tank S, in close proximity to the ash-pau T. U is the education-pipe of the pump, which is coiled within the exhaust-steam box V, and extends to the boiler, to feed water thereto. The steam from the engine exhausts into one side of the box V, and the steam passes out at the other end of said box, through a pipe, V', whose end is turned upward in the smoke-stack W to increase the draft. X is the steam-pipe supplying the engine. This pipe X extends from the steam-chest or valve-box q to about the midlength of the long steam-drum Y, as shown in Fig. 1. The steam-drum extends longitudinally above the boiler Z, and near its ends is connected therewith by steam-boxes or vertical drums $b b$. The arrangement is such that where the boiler is considerably inclined fore and aft, dry steam will always pass to the engine, because the mouth of the steam-pipe, being at the midlength of the steam-drum, will always be clear of water, even if it should fill one of the ends of the steam-drum.

The fore axle c is capable of turning upon its

pivot-bar d , and is turned to guide the machine by the following mechanism: cc are rods connecting the opposite ends of the axle to the ends of the cross-arms ff of the vertical shaft g . At the top of the shaft g is a screw-gear wheel, h , engaged by a gear-screw, i , on a shaft, j , extending to the other end of the boiler and carrying a crank or hand wheel, k , by which the rod is turned.

I claim—

1. The traction-wheels supplied with spring-calks a^2 , working in their rims, and projected more or less by the plate-springs a^3 , substantially as set forth.

2. The combination of the shaft F, wheels G H J K L, and gear-chain K', to cause the rotation of one or both of the wheels E E' on shaft F, but allow different speeds of rotation in the said wheels, by power applied to the loose wheel J, as set forth.

3. The combination of traction-wheels A A', chain-gear wheels C C' and E E', gear-chains D D', shaft F, spur-wheels G H J, chain-wheels K L, and chain K, substantially as set forth.

4. The longitudinally-extended steam-drum Y connected to steam-boxes $b b$, at different parts of the boiler-top, substantially as set forth, and combined with the steam-pipe X opening into the steam-drum at or near the midlength of the latter, substantially as and for the purpose set forth.

5. The guiding mechanism, consisting of horizontal shaft j , provided with worm i , gear-wheel h , vertical shaft g , cross-bar f , rods cc , and axle c , as set forth.

BENHARD YOCH.

Witnesses:

SAML. KNIGHT,
ROBERT BURNS.