

(No Model.)

2 Sheets—Sheet 1.

G. L. JACQUES.
TRACTION ENGINE.

No. 506,695.

Patented Oct. 17, 1893.

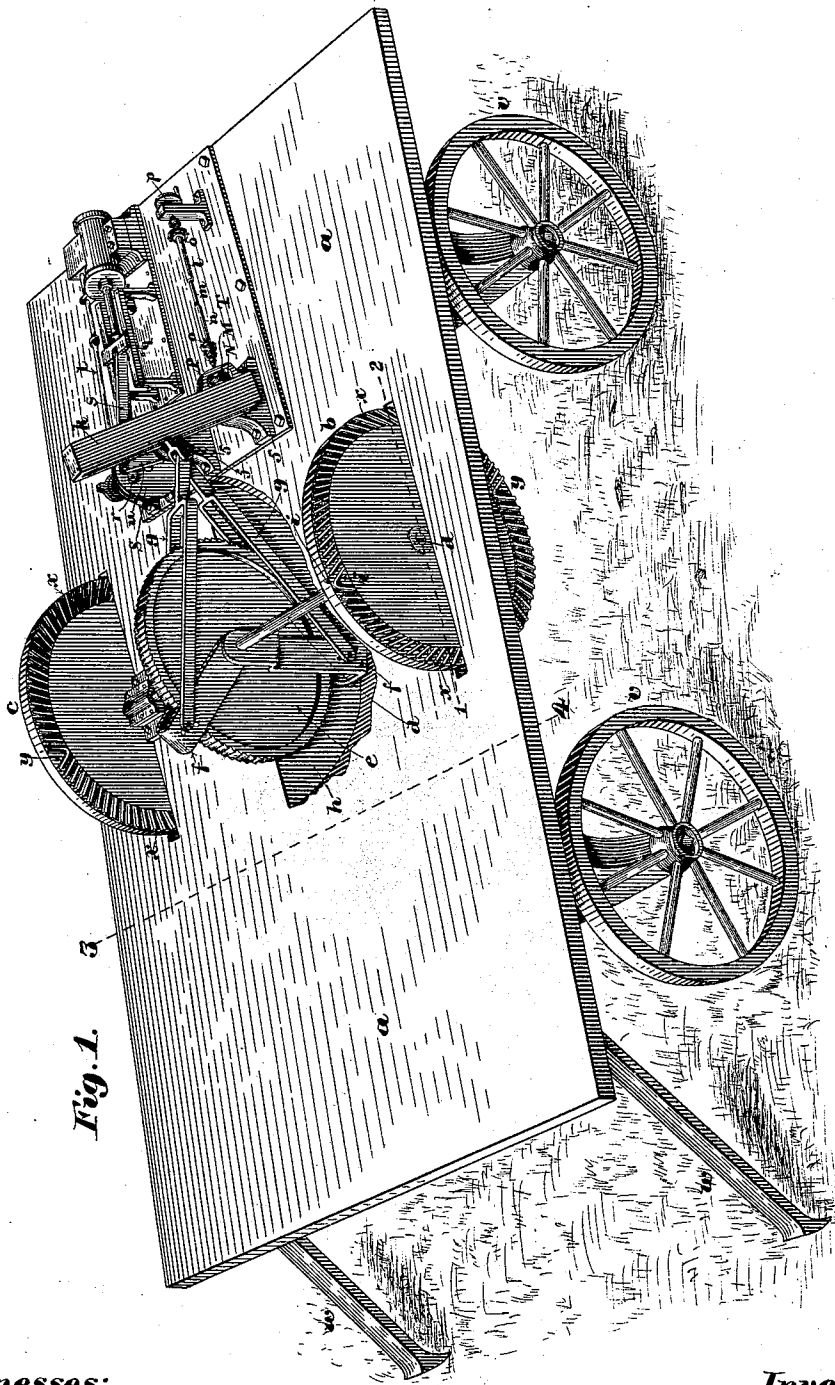


Fig. 1.

Witnesses:

Carl Stange
Joseph Morley

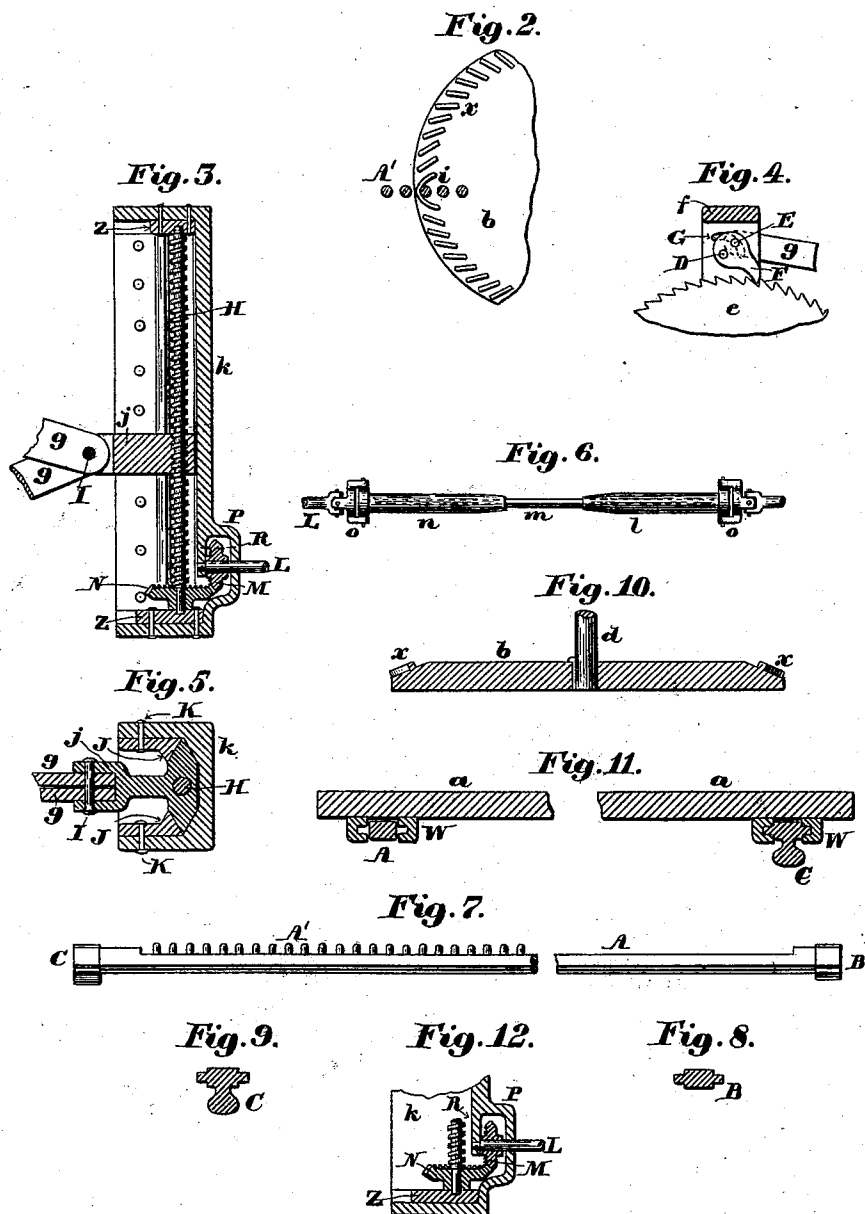
Inventor:

George L. Jacques

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UNITED STATES PATENT OFFICE.

GEORGE L. JACQUES, OF NEILLSVILLE, WISCONSIN.

TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 506,695, dated October 17, 1893.

Application filed April 9, 1892. Serial No. 423,552. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. JACQUES, a citizen of the United States, residing at the city of Neillsville, in the county of Clark and State of Wisconsin, have invented a new and useful Traction-Engine, of which the following is a specification.

My invention relates to traction engines for use upon ordinary wagon roads, sleigh roads and upon rail roads.

The objects of my improvements, are, first, to provide alternating reciprocating bars striking the ground and thus propelling the engine which (said reciprocating bars) will at all times strike the ground at a certain angle, with the surface thereof, best suited to enable them to take a firm hold on the road bed; and which (said reciprocating bars) will (at all times and rates of speed) take a full length stroke of even velocity at all parts of the stroke; second, to provide a means whereby the speed of the traction engine in traveling over the ground may be increased or decreased at will while the machinery of the traction engine is in motion or at rest without changing the speed of the steam engine or other motive power used to propel the machinery of the traction engine, thereby enabling the operator to increase or decrease the pulling power of the traction engine at will, by decreasing or increasing, respectively, the speed at which the said traction engine moves over the ground, while the motive power aforesaid maintains the same speed, developing the same power; third, to provide a means whereby the reciprocating motion of the piston head and piston rod in a steam engine may be converted into a circular or rotary motion and avoid a dead center or dead pull against the crank shaft, at any part of the stroke of the piston head and use only one cylinder and one piston head, and the adaptation of such arrangement to a traction engine. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a detail view in perspective of the whole machine as it appears in operation with a portion of the platform *a* removed to give a clear view of the wheel *e* and the bars *f* and *g*. Fig. 2 is a view of a portion of the wheel *b* showing more clearly the manner of

contact of the cogs *x* and *i* on the wheels *b* and *c* with the cogs *A'* on the bar *A*. Fig. 3 is a sectional view of a vertical section of the beam *k* and the machinery inclosed therein. Fig. 4 is a vertical section of the bar or beam *f* showing the action of the ratchet *F* with the wheel *e* and the bar *g*. Fig. 5 is a horizontal sectional view of the beam *k* and the crosshead *j*. Fig. 6 is a view in perspective of the parts *o*, *m*, *n* and *l* of the bar or rod connecting the crank *p* and the cog wheel *M*. Fig. 7 is a view in perspective of the bar *A* as it appears detached from the machine. Fig. 8 is a vertical section of the crosshead *B*. Fig. 9 is a vertical section of the crosshead *C* to which the beam *w* is attached. Fig. 10 is a horizontal section of the wheel *b* and a portion of the shaft *d* on the line 1—2 showing the bevel on the edge of the wheel *b* where the cogs are placed. Fig. 11 is a vertical section of the platform *a* on the line 3—4 showing the ways *W* and the bar *A* and the crosshead *C* said crosshead *C* as it appears with the beam *w* removed. Fig. 12 is a vertical section of the lower part of the beam *k* showing more clearly the cog wheels *N* and *M* and the manner of their arrangement.

Similar letters and figures refer to similar parts throughout the several parts or views.

The table or platform *a* resting upon and supported by the wheels *b* constitutes the framework of the machine. On the under side of the platform *a* on each side so as to come in contact with the cogs on the wheels *b* and *c* and running lengthwise parallel with the edges of the platform *a*, are attached two bars *A*, exact counterparts of each other, and attached to the platform *a* by the ways *W* in which the crossheads *B* and *C* work; and to the crossheads *C* are attached the bars *w* by a ball and socket joint. The wheels *b* and *c* are exact counterparts of each other and on the edges of the face where the cogs are attached are beveled as shown in the sectional view in Fig. 10 and the shaft *d* is inclined slightly from a right angle with the edge of the platform *a* so as to bring said bevel on the edge of the wheels *b* and *c* exactly parallel with the bars *A* so that the round cogs *A'* will come in contact with the cogs on the wheels *b* and *c* on one side of said wheels

only. When the wheels *b* and *c* revolve the straight cogs on the sides of the wheels *b* and *c* will by coming in mesh with the round cogs *A'* on the two bars *A* propel one bar forward 5 and at the same time propel the other bar backward until the curved cog *i* and the curved cog *y* in the wheels *c* and *b* respectively come in contact with the round cogs *A'* on the bars *A*, when each bar will have its 10 motion reversed and be propelled in an opposite direction until the round cogs on the bars *A* again encounter the curved cogs on the opposite sides of the wheels *b* and *c*; thus by constant rotation of the wheels *b* and *c*, the 15 bars *A* and the bars *w* attached thereto, will have a reciprocal backward and forward motion of equal velocity at all parts of the stroke; and the two bars *w* alternately coming in contact with the road bed will propel the traction engine forward. 20

If it is desired to propel the traction engine backward it can be done by raising each of the bars *w* and carrying it around so that it will incline or point to the front of the machine, the ball and socket joint by which it is 25 attached to the bar *A* facilitating this change. As each of the bars *w* has a motion of equal velocity and equal at all parts of the stroke the motion of the traction engine over the ground will be steady and devoid of jerking. 30 If it is desired to run the said traction engine on snow or a sleigh road the wheels *b* can be removed and sleigh runners with a nose on either end substituted therefor. The wheels *b* and *c* are all keyed to the shaft *d* as 35 is also the wheel *e* so that by revolving the wheel *e* the wheels *b* and *c* are revolved. The shaft *d* revolves in boxes attached to the platform *a*. The ratchet cases *f f* appear from the opposite sides exactly as they do from the 40 sides exposed to view in Fig. 1. In either side of each ratchet case *f* is a slot *G* through which passes the pin *E* passing through the ratchet *F* with the split bar *g* attached thereto on either side of the ratchet case *f*. 45 The slot *G* allows a slight backward and forward motion to the bars *g* and the pins *E* without moving the ratchet cases *f f*. The pin *D* passes through and is fastened to either side of the ratchet case *f* and passes through the ratchet *F* so as to allow the ratchet *F* to turn thereon. Thus the forward and backward 50 movement of the bars *g* and *g* will alternately engage and disengage the two ratchets *F* with the ratchet wheel *e*. Therefore if the bars *g* and *g* are constantly oscillated or moved backward and forward one of the two ratchets *F* will be constantly engaged with the ratchet wheel *e* and thus by the alternate action of said ratchets give said wheel *e* a constant rotary motion in one direction; and by 60 limiting the length of the strokes of the bars *g g* by the means hereinafter described the ratchets *F* and *F* will not reach at either end of the stroke a position in line with the shaft *d*, thus at all times avoiding a dead center or dead pull against the shaft *d*. 65

The cross head *q* connecting with the piston rod and piston head of the steam engine is constructed to have attached to it the bars 70 *s* and the crank shaft *r*. The crank shaft *r* is attached to the wheel *S* by a crank pin which is hidden in the drawings by the beams *k* and *u*. The wheel *S* is keyed to a shaft to the farther end of which is keyed an ordinary 75 eccentric wheel of a steam engine. The shaft to which the said eccentric wheel and the wheel *S* are attached, as aforesaid, revolves in boxes placed between said wheels and bolted to the plate *T*. The eccentric afore- 80 mentioned connects with the steam chest of the engine by the eccentric rod *t* as in an ordinary steam engine, the steam valves being operated by said eccentric and eccentric rod as in any common slide valve steam engine. 85 The bar *s* connecting with the crosshead *q* is attached to the bar or beam *u* at its upper end by a crank pin. The beam *u* and the beam *k* are each keyed to opposite ends of a shaft connecting them which said shaft turns 90 in the boxes 5 and 5 placed on said shaft between said beams and bolted to the plate *T*. The length of the beam *u* from said shaft to the crank pin connecting it with the bar *s* is larger than the radius of the wheel *S*; there- 95 fore when steam is turned on in the steam engine the alternate backward and forward movement of the piston rod and the cross head *q* will cause the wheel *S* to revolve and the eccentric wheel connected therewith acting through the eccentric rod *t* will move the 100 steam valves in the steam chest as in an ordinary steam engine while the diameter of the wheel *S* will measure the length of the stroke of the piston head and keep it from 105 pounding on the ends of the steam cylinder as in an ordinary steam engine; but (the beam *u* being longer than the radius of the wheel *S*) the said cross head *q* (connecting with the beam *u* by the bar *s*) will, in its backward 110 and forward movement, cause the beam *u* to oscillate backward and forward, thereby giving the beam *k* an oscillating movement backward and forward the same as the beam *u*; 115 and the split bars *g* and *g* being connected to the beam *k* by the cross head *j* will move backward and forward and thus by the alternate action of the two ratchets *F* on the ratchet wheel *e* cause the wheels *b*, *e* and *c* to revolve as hereinbefore described. 120

The beam *k* is hollow and open on the side next to the wheel *e* as shown in Fig. 5, and is provided with ways for the cross head *j* to work up and down in by bolting the strips *J* 125 *J* to its inner surface as shown in the sectional view in Fig. 5, and said beam *k* is provided with boxes on the inside of either end for the screw *H* as shown in the sectional view in Fig. 3. The crosshead *j*, to which are attached the bars *g* and *g* by the bolt *I*, works up and 130 down in said ways upon the screw *H*. The screw *H* revolves in boxes provided in each end of the interior of the beam *k* as aforesaid. Keyed to the screw *H* near its lower end is

the cog wheel N which is in mesh with the cog wheel M. The cog wheel M is keyed to the shaft L which revolves in boxes provided in the portion of the shell of the beam *k* more particularly designated as P and R. The shaft L connects with the crank *p* by the sliding tumbling rod *o, m, n, l, o* more particularly shown in Fig. 6. The joints *o o* are ordinary tumbling rod joints. The portion of the shaft *n, m, l* marked *m* is a portion of the part *n* squared and fits loosely in a square hole or mortise in the portion of said shaft designated *l* so as to allow the whole shaft *m n l* shown in Fig. 6 to lengthen and shorten while revolving. Thus when the machine is in motion and the beam *k* is oscillating backward and forward the tumbling rod joints at *o o* and the slide at *m* permit the operator (by turning the crank *p*) to revolve the screw H and thereby shift the position of the cross-head *j* up or down in the beam *k*, thereby giving to the bars *g g* a long or short stroke as desired, accomplishing this object gradually and while the machine is in motion or at rest with equal facility.

By running the crosshead *j* to the upper end of the beam *k* the stroke of the bars *g g* will be lengthened and the speed of the wheels *b, e, c* increased and by running the cross head *j* to the lower end of the beam *k* the stroke of the bars *g g* will be shortened and thereby the speed of the wheels *b, e, c* decreased. Therefore the operator can by turning the crank *p* increase or decrease the speed at which the traction engine passes over the ground at will without altering the speed or power developed by the steam engine, thereby increasing or decreasing the pulling power of the traction engine as the piston head will continue to move at the same speed and developing the same amount of power; and these changes (being made gradually while the machine is in motion) will enable it to pull large loads up steep hills and through bad places in the road and start heavy loads in bad places without jerking.

The objects sought to be attained in my invention may be secured by conveying the power from said beam *k* to the road bed in the manner indicated in said drawings or by transmitting by any suitable means the rotary motion of the wheels *b c* to the wheels *v*, in which latter case said traction engine would be equally adapted to use upon rail roads or ordinary wagon or sleigh roads.

I prefer to carry out my invention in the manner indicated in said drawings.

I am aware that others have invented traction engines propelled by bars or feet coming alternately in contact with the ground or road bed. Therefore I do not claim such a combination broadly.

I am aware that in a previous application I have applied for a patent upon a road machine or traction engine propelled by two or more bars coming alternately in contact with the road bed and attached at the upper end to

cross heads arranged to move backward and forward in ways provided in the platform of the engine. Therefore I do not claim such a combination broadly in this application.

I am aware that sliding tumbling rods similar to that shown in Fig. 6 have before been used in other machines for other purposes. Therefore I do not claim broadly the invention of the sliding tumbling rod itself in all machines as a new means of transmitting a rotary motion to a moving object.

I am aware that in other machines for other purposes a reciprocating motion has been converted into a rotary motion by means of a ratchet or ratchets applied to one side only of a ratchet wheel so as to use the power of the reciprocating bar in the stroke in one direction only. Therefore I do not claim broadly such invention; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The beam *k* having inclosed therein the cross head *j* and the screw H connected with the crank *p* by the wheels N and M and the sliding tumbling rod *o m n l o* substantially as shown and for the purpose specified.

2. The combination in a traction engine of the beam *k* and the crosshead *j* and the ways J J; and the screw H and the boxes *z z* and the cog wheels N and M and the sliding tumbling rod *o n m l o* and the shaft L and the crank *p* enabling the operator to raise or lower the position of the crosshead *j* in the beam *k* at will while said beam *k* is in motion oscillating backward and forward; all substantially as set forth and described.

3. The combination, (as a means of increasing or decreasing the power by decreasing or increasing the speed respectively) of the beam *k* the screw H, inclosed therein; the ways J J; the crosshead *j*; the split connecting rods *g g*; the ratchet cases *f f*; the ratchets F; and the ratchet wheel *e*; together with the cog wheels N and M and the shaft L and the sliding tumbling rod *o n m l o* and crank *p* all arranged substantially as set forth and described.

4. The combination, for the purpose of converting a reciprocating motion into a rotary motion, of the ratchet wheel *e*; the ratchet cases *f f*, one on each of two opposite sides of said ratchet wheel *e*; the two ratchets F, one in each of said ratchet cases *f f*; the split bars *g g*; and the cross head *j*; all substantially as set forth and described.

5. The wheels *b* and *c* with the straight cogs *x* thereon and the curved cogs *i* and *y* thereon all for the purpose specified and substantially as set forth and described.

6. The combination of the wheel *b* having on the outer edge of its face, or on the face of its circumference (in which latter case the wheel would be placed at right angles with the bar A) the straight cogs *x* and on opposite edges thereof the curved cogs *i* and *y*; and the bar A with the round cogs A' thereon all substantially as set forth and described.

for the purpose of converting a rotary motion into a reciprocating motion or for the purpose of converting a reciprocating motion into a rotary motion.

- 5 7. The combination in a steam engine of the double crosshead *q*; the bar *r*; the wheel S to measure the stroke of the piston head; and the eccentric; the eccentric rod *t* to regulate the flow of steam; the bar *s*; the beam
10 *u*; the beam *k*; the crosshead *j*; the screw H; the cog wheels N and M; the sliding tumbling rod *o, n, m, l, o*; the crank *p*; the split bars *g g*; the ratchets F; the ratchet cases *f f*; and the ratchet wheel *e*; all as described herein-
15 before and substantially as set forth.

8. The bar A with the crossheads B and C and the round cogs A' thereon substantially as described and set forth.

9. The combination in a traction engine of
20 the cog wheels *b* and *c*; and the bars A with the round cogs A' thereon, and the crossheads B and C thereon, and the bars *w w* attached thereto, for the purpose of propelling said traction engine; all substantially as set
25 forth and described.

10. The combination in a steam engine of the double crosshead *q*; the bar or crank arm *r*; the wheel S; the eccentric concealed from view, in the drawing, by the wheel S; the eccentric rod *t*; the split connecting rods *g g*;
30 the ratchet cases *f f*; the ratchets F; and the ratchet wheel *e*; the connecting bars *g g* to be attached directly to the crosshead *q* by a

pin passing through said crosshead *q* and the end of each of said connecting rods *g g*; all
35 for the purpose of converting the reciprocating motion of the piston head to a rotary motion without having at any part of the stroke of the piston head a direct pull or push against the crank shaft, all substantially as
40 set forth and described.

11. The combination in a traction engine of the platform *a* having slides or ways W W for the crossheads B and C attached thereto; the bars A having the round cogs A' thereon, 45 and one of the bars W attached to the crosshead C on each bar A by a ball and socket joint; the cog wheels *b* and *c* having the straight cogs *x* and the curved cogs *i* and *y* thereon; the ratchet wheel *e*; the ratchets F, 50 and the ratchet cases *f f*; the split connecting rods *g g*; the beam *k*, having the screw H, and the crosshead *j*, and the ways J J and the boxes *z z* therein; the cog wheels N and M in said beam *k*; the shaft L and sliding tum- 55 bling rod *o, n, m, l, o* and the crank *p* to operate said screw H and crosshead *j*; the beam *u*; the bar *s*; and the double crosshead *q*; the bar *r*; the wheel S the eccentric; the eccentric rod *t*; and the plate T bolted to said platform *a*; all for the purposes specified and substantially as set forth and described. 60

GEORGE L. JACQUES.

Witnesses:

JOSEPH MORLEY,
CARL STANGE.