

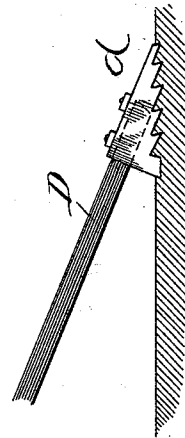
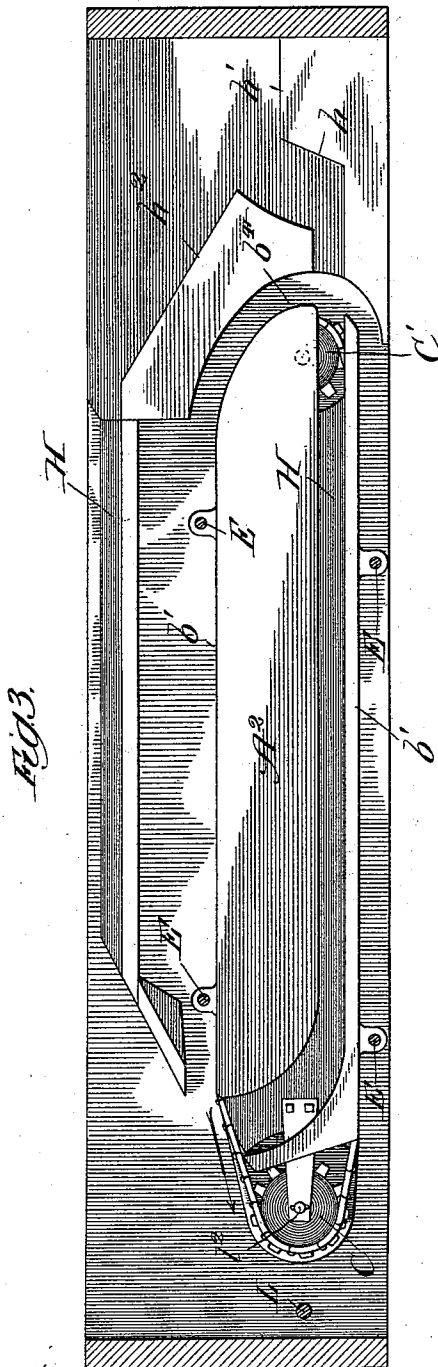
(No Model.)

3 Sheets—Sheet 2.

H. C. HICKS.
TRACTION ENGINE.

No. 557,329.

Patented Mar. 31, 1896.



Witnesses:
E. S. Gaylord.
Lute J. Allen.

Inventor:
Henry Clinton Hicks.
By Banning & Banning & Sheridan
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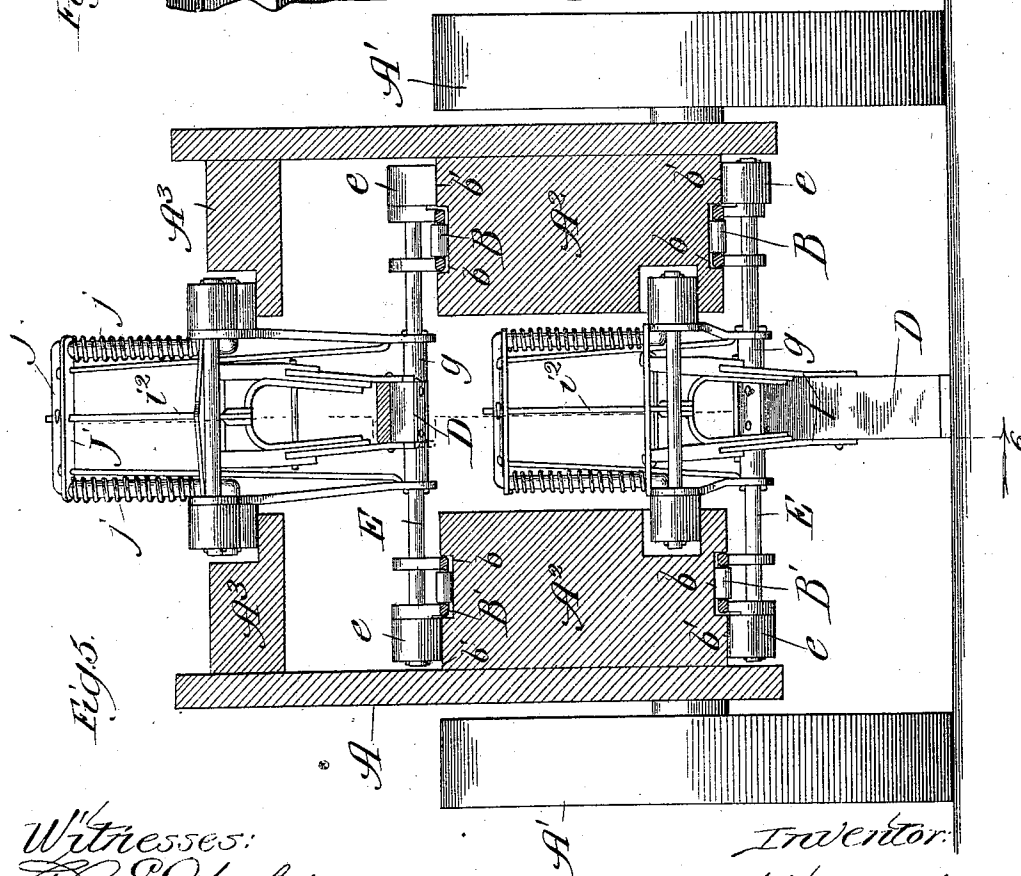
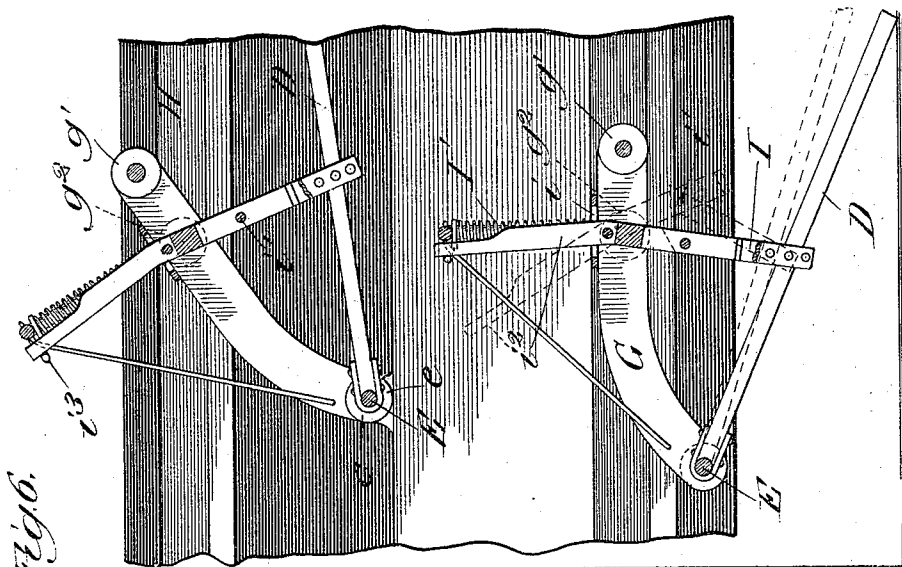
(No Model.)

3 Sheets—Sheet 3.

H. C. HICKS.
TRACTION ENGINE.

No. 557,329.

Patented Mar. 31, 1896.



Witnesses:
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Inventor:
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UNITED STATES PATENT OFFICE.

HENRY CLINTON HICKS, OF CHICAGO, ILLINOIS.

TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 557,329, dated March 31, 1896.

Application filed August 17, 1895. Serial No. 559,637. (No model.)

To all whom it may concern:

Be it known that I, HENRY CLINTON HICKS, a citizen of the United States, residing at Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Traction-Engines, of which the following is a specification.

The object of my invention is to construct a simple, economical, and efficient traction-engine adapted for various uses and which is intended to be an improvement upon the traction-engines described and claimed by me in Letters Patent of the United States No. 405,553, of June 18, 1889, and No. 493,267 of March 14, 1893.

The invention consists principally in providing a traction-engine with a pair of endless driving sprocket-chains or link belts having a series of pusher-arms for transmitting the force of the driving-chain to the ground and supporting guide-levers for automatically and alternately lowering and raising the pusher-arms into and away from contact with the ground and simultaneously changing the angle of such pusher-arms.

The invention consists, finally, in the features and combinations hereinafter described and claimed.

In the drawings, Figure 1 is a plan view of a traction-engine embodying my invention, looking at it from the top; Fig. 2, a side elevation thereof; Fig. 3, a central longitudinal sectional elevation taken on line 3 of Fig. 1, with the propelling mechanism removed; Fig. 4, an enlarged detail of one of the pusher-arms; Fig. 5, an enlarged transverse sectional elevation taken on line 5 of Fig. 2; and Fig. 6, a central sectional elevation of that portion of the mechanism shown in Fig. 5, taken on line 6 of such figure.

In constructing my improved traction-engine I make a body portion A of the desired size and shape to carry and support the necessary operating mechanism and provide it with wheels A', on which it is supported and moved. The engine-body is preferably made rectangular in shape, so as to form a rectangular central chamber a, and is also provided with inwardly-projecting side pieces A² A³, which form guides and supports for the propelling mechanism hereinafter described.

To propel the engine and transmit the power

from the prime mover to the other mechanism hereinafter more fully and specifically described, a pair of endless driving-chains B B', preferably link belts, are provided and mounted upon sprocket-wheels C C' within the body of the engine. The chains are placed one at each side of the rectangular chamber, substantially surrounding the inwardly-projecting pieces A², which are provided with recesses b to assist in guiding and retaining the chains in their path. The driving force of the chain is transmitted to the ground through a series of pusher-arms D, which are secured to the driving-chains by means of the shafts E, which also serve to connect the chains together laterally and insure a uniformity of speed and power. The pusher-arms are provided with metallic shoes d to insure a better grip with the ground, and the connecting-shaft with rollers e, one at each end, which run on the periphery of the projection A² to lessen the wearing-friction between the chains and the projection.

As the chains move in their paths the pusher-arms are held at the desired angle (see Fig. 6) to contact the ground and push the engine forward. During the returning movement of the chains the connecting-shafts are raised to the upper side of the projection and the pusher-arms also raised from contact with the ground, so as to avoid any retarding action. It is desirable, however, to change the angle or position of the arms and bring them into a substantially horizontal position, so as to practically remove all danger of any contact with the oppositely-moving parts. In order to accomplish this result, a pair of guide-levers G are provided for each pusher-arm, one on each side of the arm. These guide-levers are provided with sockets g, by which they are pivoted to the connecting-shafts, while their outer free ends are provided with a pair of rolls g' and g². The pivoted ends of the lever follow the same path as the driving-chains; but the free ends, by means of their rolls, travel in what might be termed a "continuous" groove or recess H, which is formed in the projections A² and A³. (See Fig. 3.) This second groove, as will be noticed from an inspection of the drawings, has its lower portion quite close to the path of the chain, while its upper portion is far-

ther removed, the effect being to bring both ends of the guide-levers nearer to a horizontal plane, (see Fig. 6,) and by means of the mechanism hereinafter described to force the
 5 pusher-arms in contact with the ground when the lower strand of the chain is moving forward, and during the rearward movement of the upper strand to bring the guide-levers on
 10 such portion into their greatest angle with a horizontal plane and the pusher-arms into practically a horizontal plane, thus avoiding any contact with the oppositely-moving mechanism. The forward portion of this second
 15 groove is brought inside the forward sprocket-wheel and consequently the path of the driving-chains, while the rear portion of the groove extends beyond or back of the rear sprocket-wheel and path of the chains. This arrangement
 20 enables the guide-levers to change their position very easily and readily.

Each set of guide-levers and pusher-arms are preferably connected together by means of a set of connecting-rods I, which are pivoted to the pusher-arms at their lower ends
 25 and rigidly connected at their upper ends with a yoke i, which rests against the upper edges of the guide-levers. An inverted-U-shaped frame or rod J connects each pair of guide-levers together adjacent to the rolls g²
 30 and forms a guide or support for a pair of helically-coiled springs that act to keep the yoke against the guide-levers. A plate J' is placed between the U-shaped frame and the springs to furnish a flat abutting surface for
 35 the springs. These springs should be of a sufficient tension to force the pusher-arms into the ground, but should permit of yielding when the shoes strike a hard substance, as rock, or when the engine is moving over
 40 uneven surfaces.

It is often desirable or necessary to draw the engine along or use its prime mover for other purposes without using the pusher-arms. In such cases it is necessary to raise
 45 the pusher-arms on the lower strand up from contact with the ground. To accomplish this result, the connecting-rods are formed of two portions pivoted together at i', and the upper portion provided with a handle i².
 50 The handle portion is held in its locked position by means of a hook i³ on the U-shaped frame and the parts in such position as to keep the pusher-arms on the lower strands of the driving-chains in contact with the ground,
 55 as shown in full lines in Fig. 6. When it is desired to lift the pusher-arms on such lower strands away from the ground, the handle is unhooked and pushed over into the position shown in dotted lines in Fig. 6, which movement raises the pusher-arms into the position
 60 shown in dotted lines, same figure. The chain can now be operated or the engine moved along by other means, and the pusher will not contact the ground.

65 In order to provide motive force to drive the endless chain or chains, a steam or petroleum motor K is provided and secured pref-

erably to the front portion of the engine. This engine is provided with the usual reciprocating piston, piston-rod, and crank-shaft
 70 k, which is provided at its outer end with a sprocket-wheel K', said sprocket-wheel being provided with a sprocket-chain k', that communicates motion to a shaft L by means of
 75 a second sprocket-wheel l. Secured to this driving-shaft L, at each end thereof, are toothed pinions l', that mesh with gear-wheels L'. These gear-wheels are connected with
 80 the sprocket-wheels C by means of the shaft l², to which both gear-wheels and sprocket-wheels are rigidly secured, so that the movements of the reciprocating piston are converted into a rotary motion of the crank-shaft and the mechanism above described
 85 used to propel the engine over the ground as desired.

In operation the primary motor is started, and by the mechanism above described motion and power are transmitted to the driving-chains. The pusher-arms being in contact
 90 with the ground, the motion of the chains is arrested and the entire engine pushed ahead. The comparative motion of the chain continuing, a pusher-arm reaches the rear of the engine-body and is lifted away
 95 from contact with the ground, and by the means above described is simultaneously brought into a practically horizontal plane, so as to be free from contact with the oppositely-moving parts. The succeeding pusher-arms
 100 partake of a similar operation, and so with the next, thus propelling the entire engine as long as the prime motor is operated and the pusher-arms permitted to impact against the ground.
 105

While I have described my invention with more or less minuteness as regards details and as being embodied in more or less precise forms, I do not desire to be limited thereto unduly any more than is pointed
 110 out in the claims. On the contrary, I contemplate all proper changes in form, construction, and arrangement, the omission of parts and substitution of equivalents, as circumstances may suggest or necessity render expedient.
 115

I claim—

1. In a traction-engine, the combination of a pair of endless driving-chains, means for imparting motion and power thereto, a series
 120 of pusher-arms secured to such chains for transmitting the force therefrom to the ground and pushing the engine ahead, and guide-levers connected with the pusher-arms for alternately lowering and raising the free
 125 ends of the pusher-arms into and away from contact with the ground and simultaneously changing the pusher-arms from a substantially horizontal plane to an angle with the ground and vice versa, substantially as described.
 130

2. In a traction-engine, the combination of a pair of endless driving-chains, means for imparting motion and power thereto, a series

of cross - shafts connecting such driving-chains together and provided with a roll at each end thereof, a track or tracks on the body portion for supporting and guiding such rolls, a pusher-arm on each cross-shaft for transmitting the force of the driving-chains to the ground and thereby propelling the engine, and means for alternately lowering and raising the free ends of the pusher-arms into and away from contact with the ground and simultaneously changing the position of the pusher-arms from a substantially horizontal plane to an angle with the ground and vice versa, substantially as described.

3. In a traction-engine, the combination of a pair of endless driving-chains, means for imparting motion and power thereto, a series of cross - shafts connecting such driving-chains together and provided with a roll at each end, a track or tracks on the body portion for supporting and guiding such rolls, a pusher-arm on each connecting-shaft for transmitting the force of the driving-chain to the ground and propelling the engine, a pair of guide-levers connected with each pusher-arm and provided with rolls at their free ends for alternately lowering and raising the pusher-arms into and away from contact with the ground and simultaneously changing the position of the pusher-arms from a substantially horizontal plane to an angle with the ground and vice versa, and a second track or tracks on the body portion for supporting and guiding the rolls on the guide-levers and thereby changing the angle of such levers, substantially as described.

4. In a traction-engine, the combination of a pair of endless driving-chains, means for imparting motion and power thereto, a series of cross - shafts connecting such driving-chains together and provided with a roll at

each end, a pusher-arm on each connecting-shaft for transmitting the force or power of the driving-chain to the ground to propel the engine, a pair of guide-levers connected with each pusher-arm and provided with rolls at their outer free ends, and a body portion provided with a primary and secondary track or tracks for guiding and supporting the chains and guide-arms, respectively, and bringing the pusher-arms into and out of operative engagement with the ground, substantially as described.

5. In a traction-engine, the combination of a pair of endless driving-chains, means for imparting motion and power thereto, a series of cross - shafts connecting such driving-chains together and provided with a roll at each end, a pusher-arm on each connecting-shaft for transmitting the force or power of the driving-chain to the ground to propel the engine, a pair of guide-levers pivoted on each cross-shaft and connected with each pusher-arm, each provided with a pair of rolls at their outer free ends, and a body portion provided with primary and secondary tracks having their lower portions adjacent to each other and their upper portions comparatively farther removed from each other for guiding and supporting the rolls on the cross-shaft and guide-levers, respectively, to lower and raise the free ends of the pusher-arms into and away from operative engagement with the ground and simultaneously change the position of the pusher-arms from a substantially horizontal plane to an angle with the ground and vice versa, substantially as described.

HENRY CLINTON HICKS.

Witnesses:

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