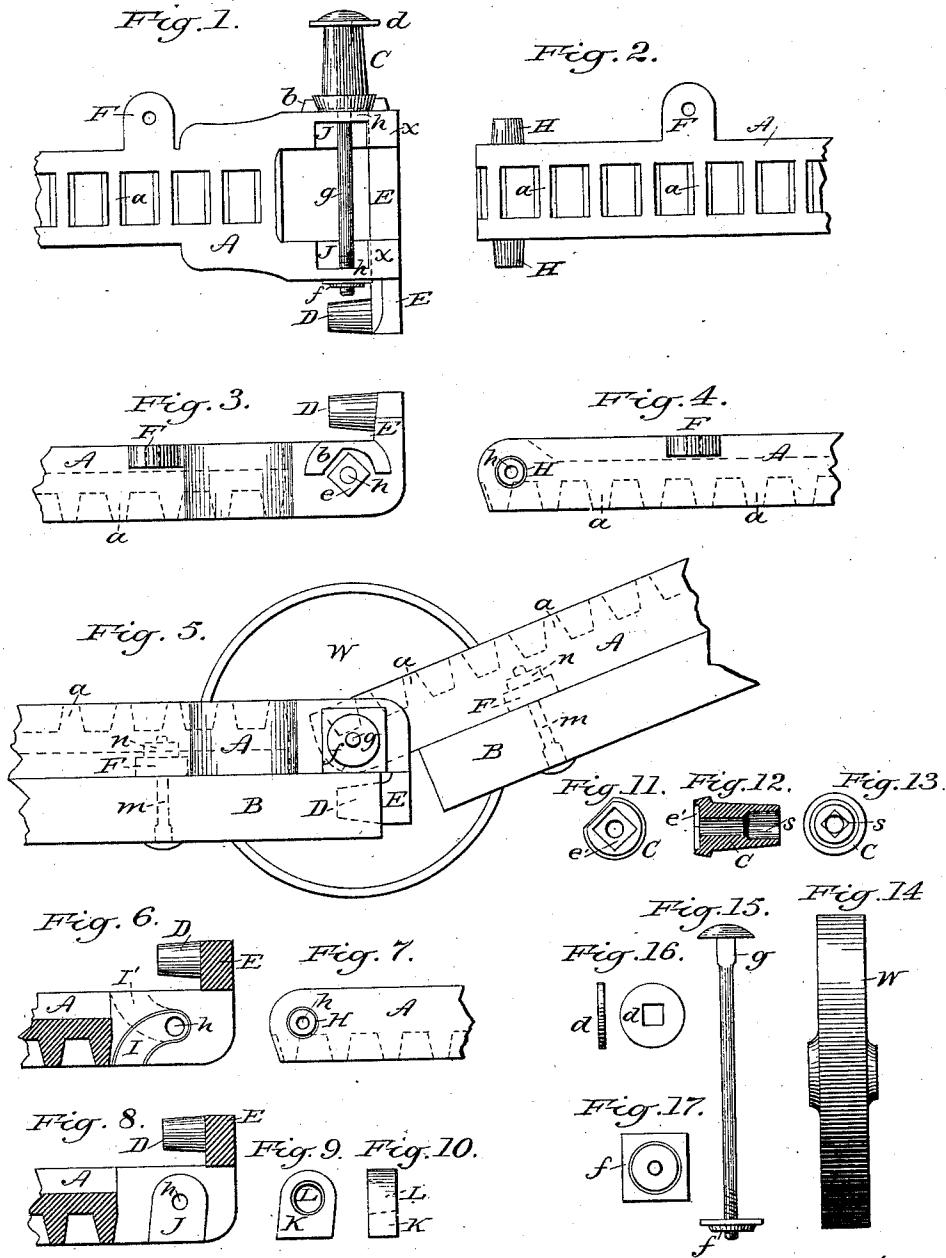


G. E. BURT.  
Endless Chain Horse Power Link.

No. 108,564.

Patented Oct. 25, 1870.



Witnesses:

J. B. Hildreth  
Edwin A. Hildreth.

Inventor:

George E. Burt.

# United States Patent Office.

GEORGE E. BURT, OF HARVARD, MASSACHUSETTS.

Letters Patent No. 108,564, dated October 25, 1870.

## IMPROVEMENT IN LINKS FOR ENDLESS-CHAIN HORSE-POWERS.

The Schedule referred to in these Letters Patent and making part of the same.

Be it known that I, GEORGE E. BURT, of Harvard, in the county of Worcester, in the State of Massachusetts, have invented a new and improved Link for Endless-Chain Horse-Powers; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon.

Like letters represent like parts in all the figures.

### *Description of the Accompanying Drawing.*

Figure 1 is a top view of the face of the link, showing the end of the link upon which the supporting-wheel is placed.

In this and the other figures one end of the link is broken away to allow a large scale to be used to show the parts clearly.

Figure 2 represents the connecting end of the link, the wheel end of which is shown in fig. 1.

Figure 3 is a side view of the same end of the link as shown in fig. 1.

Figure 4 is a side view of the same end of the link as shown in fig. 2.

Figure 5 is a side view of two links connected together, with treads and wheel attached.

Figure 6 is a longitudinal section of the wheel end of the link, showing the form of the recess I when the stud H, in fig. 7, is made to fill the recess without any removable box.

Figure 7 is a side view of the connecting end of the link shown in fig. 6.

Figure 8 is a longitudinal section, showing same parts as fig. 6 when the link is formed with a recess to receive an auxiliary pivot-seat, K, in the recess J.

Figures 9 and 10 are face and side views of the removable box or pivot-seat K.

Figure 11 is an end view of the base of the wheel-axle.

Figure 12 is a longitudinal section through the center of the wheel-axle.

Figure 13 is a view of the outer end of the wheel-axle.

Figure 14 is a view of the supporting-wheel.

Figure 15 is a view of the pivot-connecting bolt.

Figure 16 is washer used under the head of pivot-bolt.

Figure 17 is a safety-nut which holds all the pivoted connections securely together.

It is well known to manufacturers and users of endless-chain horse-powers that the supporting-wheels of the moving platform or chain are very liable to come off and cause breakage.

Nuts and set-screws have been employed, but the continued vibration caused by the heavy jar and the continued reversion of motion of the trucks in passing

from the upper to the lower track in a short time causes the nuts or screws to unscrew and work off.

Stationary guides have been used to avoid this difficulty, but such guides soon become worn, and the friction caused by them makes quite a loss in the per cent. of power.

There is also a difficulty in chain powers caused by the wearing away of the connections of the links, particularly when a rack and pinion are employed to transmit the power to the driving-wheel. It will readily be seen that by the wearing away of the connecting-pivots and the enlargement of their seats the pitch of the end cogs is increased, thus causing more friction on the pinion as these joints of the chain pass it, and in a short time the difference of pitch would be so great that the cogs would not mesh into each other at this point, thus causing a breakage in the gearing.

To entirely overcome this first difficulty, and in a great measure obviate the second, are the objects of my invention.

The nature of my invention consists in so constructing and arranging the parts of the moving platform that, when complete, the attachment of the supporting-trucks is so secured that neither the bolt or nut or their equivalent can be acted upon by the jar or vibration of the chain so as to allow the truck to come off.

Also, in so constructing and arranging the connections of the flexible joints to horse-power chains as to greatly increase their durability.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

This improvement is applicable to endless-chain powers of common construction, either employing reels, spiders, or rack and pinion.

A is a link provided with cogs.

C is an axle which may be cast directly onto the link or made separate, and is constructed with a hole extending entirely through its length.

The outer end of this hollow tube or axle should be made square to fit the bolt *g*, which should also be square under its head, but any irregular form will answer that will hold the bolt from turning in the axle.

The base of the axle should be enlarged, as shown in fig. 1, forming a flange in which is the square or an irregular formed seat, *e'*.

This seat *e'* should fit a projection or boss, *e*, on the link A, (see fig. 3,) of any desirable form to hold the axle from turning on the link A, or the axle C may be cast rigidly onto the link.

The link A is constructed at this end with two ears, *x x*, upon which is projected the brace E.

At right angles with this brace E I project the boss D.

The bolt *g* is threaded and provided with a substantial nut, *f*, which is of sufficient size so that when in its place on the link its upper edge should be even or form a plane with the top of the link.

The outer or square end of the bolt *g* should be provided with a washer, *d*, fitted against its head.

The wheel W should be placed upon the axle C, the links A A placed in position to connect with each other, and the round part of the bolt passed into the holes *h h*, made to receive it, (see figs. 1 and 3.)

The nut *f* is then screwed down onto the link A and turned square with the link.

The wood-tread B is provided with holes for the boss D and bolt *m*.

The tread B is placed in position on the link, the boss D in its seat, the hole in the tread directly over the hole in the ear F, and the bolt *m* is passed into position, the thread-nut *n* screwed down, and, by means of the boss D and its seat in the tread, in connection with the bolt *m*, the link and tread are firmly held together.

It will be seen that the nut *f* cannot be turned at all without first removing the tread from the link, and the vibration and jar caused by running the chain can have no effect to turn off the nut *f*.

I construct the chain-links with the end forming the central section to fit between the ears *x*, which are constructed with seats J J, opening from the lower side, (see fig. 8.)

The central section I construct with bosses H H.

These bosses are provided with boxes K K, (see figs. 9 and 10,) and fit into seats J, (see fig. 8;) or they may be constructed without the use of the boxes K K; but in this case the bearings would not be as perfect, and in this case the recess would be made of the same size as the boss H, as shown in figs. 6 and 7.

When the links are connected the bolts *g* pass through the boxes and all the sections connecting the links, and hold the axle and wheel all in position, as shown.

The boxes and seats, axle and wheel are cast on chills, making a cheap but very durable wearing-surface.

The wrought-iron bolt and nut (which pass through the axle and link connections) should be case-hardened.

The tread B is held in position by the bolt *m*.

The ears *x x* project beyond the connecting-bolt *g*, and the brace E connecting them thus, makes a stiff joint on the upper side of the chain, but perfectly flexible, to bend in the opposite direction. This is desirable, as it makes it easy to handle when making or repairing.

*b*, fig. 3, shows the flange which forms a rest for the axle, to hold it firmly in place when it is cast separate from the link.

The seat I', fig. 6, may be constructed on the upper side of the ears *x x*, or in the manner shown by I in fig. 6, the open portion of the seat being curved by the form of the chill used in casting the seat.

The seats or rests for the projections H H are of a half-circle and fit the projections H on the working side, thus making a good working-bearing for the connections.

### Operation.

The wheel W is placed on the axle C, the connecting end of the link A is placed in position between the flanges *x x*, the bolt *g* is passed through its seat in the axle and through both links, the nut *f* is screwed down firmly, and the nut and bolt hold the wheel on, and the axle and wheel firmly together.

The nut *f* is of sufficient size to form an even plane with the top of the link, the tread B is placed in position with the boss D in its seat, and all the parts are held firmly together by the bolt *g*, as the tread B rests directly on the edge of the nut *f*, so that it cannot be turned either on or off without first removing the tread. The bolt and axle also are held by the form of the bolt and the form of the axle, the seat in the base of the axle preventing it from turning either forward or back, and the square under the head of the bolt preventing that also from turning. Thus the vibration or jar caused by running the machine cannot have any effect to turn either the bolt or nut, and the axle and wheel remain always firmly attached to the chain.

The bosses H H extend into the ears *x x*. This device lengthens the wearing surface of the connecting or central part of the link, and as the bolt *g*, which connects the links, is fixed stationary in the ears *x x*, the link turns on the central portion of the bosses H H, and also takes a bearing on their outer surface in the boxes K K, making a double and a three-fold wearing surface. Thus a three-fold wearing surface is obtained having all the advantages of chilled cast-iron surface for wear, with all the strength of a case-hardened wrought-iron for connections. By this arrangement the durability of the joints will be greatly increased.

Having thus described the construction and operation of my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The wheel W, in an endless-chain horse-power when held in position on the link A by means of a bolt so arranged that it cannot be unscrewed without first removing the tread from the link, substantially as described, and for the purpose set forth.

2. The brace E, provided with a boss, D, in combination with a horse-power tread and link, constructed and arranged substantially as described.

3. The seat *c*, in combination with the axle C, the bolt *g*, and wheel W, arranged substantially as described, for the purpose set forth.

4. The flange *b*, in combination with axle C and link A, to hold the axle in position, substantially as set forth.

5. The nut *f* and bolt *g*, or their mechanical equivalents, when arranged and held in position by the tread B, substantially as described, for the purpose set forth.

6. The double pivoted connection for the links, a hollow axle having a square or irregular chamber, and bosses, all held in position by a wrought-iron or steel bolt, so constructed and arranged that the tread, when fixed to the link, will hold the nut of said bolt positively in place.

Witnesses:

E. E. BURT,  
A. C. BURT.

GEORGE E. BURT.