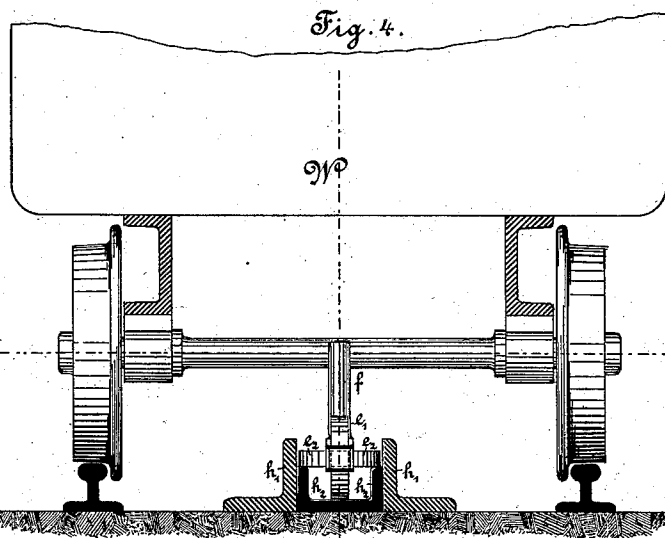
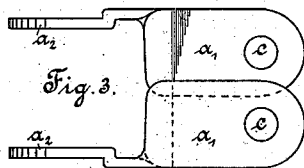
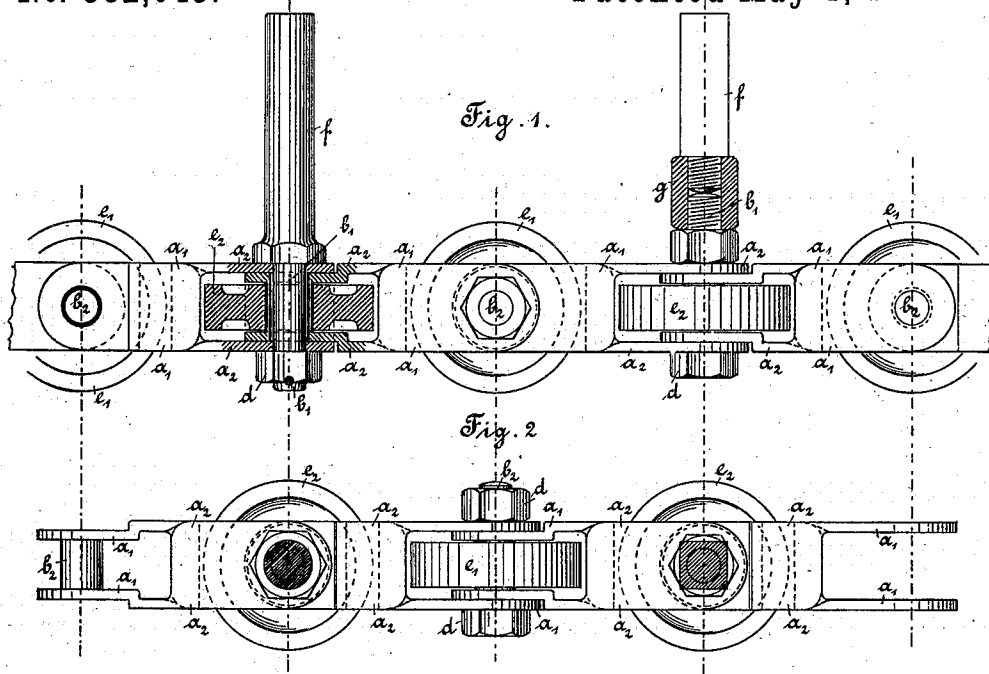


(No Model.)

C. C. KLINIK, F. PINKOWSKI & A. SOLLMANN.
DRAWING CHAIN.

No. 382,043.

Patented May 1, 1888.



Witnesses:

J. W. Rubin.
C. E. McDonald.

Inventors:

Constantin C. Klinik.
Friedrich Pinkowski.
Anton Sollmann.
By *Lingershoner*
Atty's

UNITED STATES PATENT OFFICE.

CONSTANTIN CARL KLINIK, FRIEDRICH PINKOWSKI, AND ANTON SOLLMANN,
OF KÖNIGSHÜTTE, PRUSSIA, GERMANY.

DRAWING-CHAIN.

SPECIFICATION forming part of Letters Patent No. 332,043, dated May 1, 1888.

Application filed July 2, 1887. Serial No. 243,261. (No model.) Patented in Germany March 9, 1886, No. 39,191.

To all whom it may concern:

Be it known that we, CONSTANTIN CARL KLINIK, FRIEDRICH PINKOWSKI, and ANTON SOLLMANN, subjects of the King of Prussia, residing at the town of Königshütte, in the Kingdom of Prussia and Empire of Germany, have invented a new and useful Improvement in Drawing-Chains, of which the following is a specification.

10 The invention consists in the combination, with a traction-chain having links constructed each with two opposite corresponding side pieces, so that each end of each side piece shall overlap the end of the next adjacent side piece, and, forming the joint of the chain, be also the bearing for the journal of a friction-wheel, of friction-wheels mounted in each link, with their axes alternately perpendicular to each other, and with the journals of their shafts running in the bearings formed by the overlapping ends of the said links, said journals being at the same time the pivots on which the said side pieces turn.

25 The invention also consists in the combination, with a traction-chain having links constructed each with two corresponding opposite side pieces so formed that each link shall carry friction-wheels, with their axes set alternately perpendicular to each other vertically and horizontally, of shafts for the said friction-wheels having vertical axes projecting above the said chain far enough to reach and actuate the vehicle to be propelled by said chain.

35 The invention also consists in the combination, with a traction-chain having links constructed each with corresponding opposite side pieces, so formed that each link shall carry friction-wheels with their shafts set alternately perpendicular to each other and running in bearings in the said opposite side pieces of said links, of a conductor to direct said chain, composed of bars of right-angle iron placed with perpendicular sides facing each other, and having bars of right-angle U-iron interposed between them, substantially as hereinafter described.

45 The invention also consists in the details of construction, substantially as illustrated in the drawings, hereinafter described, and subsequently pointed out in the claims.

Figure 1 illustrates a side view of our newly-invented traction-chain, partly in section and partly in elevation. Fig. 2 illustrates a top view of the same. Fig. 3 illustrates the two side pieces of the link. Fig. 4 illustrates the working of our invention, as hereinafter described.

This traction-chain is constructed as follows: Two plates of metal, of the form illustrated, respectively, by $a' a' a' a'$ of Fig. 3, form the sides of each link. These in adjacent links overlapping each other, as at $a' a'$ of Fig. 2, form the connection between the two links, and are pivoted by the journals of the friction-wheels $e' e'$. Each of these pairs of plates is so constructed that the joint at one end works at right angles to the joint at the other end. Just at each joint between the two side pieces, with the journals of its shaft acting as the pivots for the links, are mounted the friction-wheels $e' e'$. There is one of these wheels at each joint, and by reason of the shape of the side pieces they stand in the chain alternately with their axes perpendicular one to the other. In practice these shafts of the friction-wheels are placed so that they stand alternately vertically and horizontally. As many as may be required of these vertical shafts may be made longer, so that they will extend upward above the chain far enough to reach and catch against the vehicle to be propelled by the chain, as illustrated in Fig. 4. This upwardly-projecting piece f may either be integral with the shaft b' of the friction-wheel e' , or it may be secured to the upper end of the shaft by means of a screw-threaded coupling, as illustrated in section by $b' f g$ of Fig. 1. We prefer the latter construction, because in case of breakage only the pieces f and g are lost, and no further damage being done the chain, they can be quickly and easily replaced.

On account of the weight of the chain it has been found necessary to provide it with a way or conductor for it to run in. This consists of angle-iron bars having their sides bent at right angles and being fastened to suitable supports at a proper distance apart, with their perpendicular sides facing each other, and having U-iron bars interposed, as illustrated by $h' h' h'$ of Fig. 4. In this way may roll the friction-wheels $e' e'$, with the upright extension f bear-

ing on the axle of the vehicle to be propelled, as illustrated in said Fig. 4.

This traction-chain may be made of any desired size and length, and may be driven by any sufficient power and used in the place of an ordinary wire cable for propelling vehicles upon tramways and the like tracks. It will, however, be found that on account of the alternate wheels and joints standing at right angles to each other this chain can be easily and lightly conducted around the bends of the track with comparative small loss of power on account of friction.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, with a traction-chain having links constructed each with two opposite corresponding side pieces, so that the end of each side piece shall overlap the end of the next adjacent side piece, and, forming the joint of the chain, be also the bearing for the journal of a friction-wheel, of friction-wheels mounted in each link, with their axes alternately perpendicular to each other, and with the journals of their shafts running in bearings formed by the overlapping ends of said links, said journals being at the same time the pivots on which said side pieces turn, substantially as and for the purpose set forth.

2. The combination, with a traction-chain having links constructed with two corresponding opposite side pieces so formed that each link shall carry friction-wheels with their axes alternately perpendicular to each other vertically and horizontally, of shafts for the said friction-wheels having vertical axes projecting above said chain far enough to reach and actuate the vehicle to be propelled by said chain, substantially as and for the purpose set forth.

3. The combination, with a traction-chain having links constructed each with opposite corresponding side pieces so formed that each link shall carry friction-wheels, with their shafts set alternately perpendicular to each other and running in bearings in the said opposite side pieces of said links, of a conductor to direct said chain, composed of bars of right-angle iron placed with perpendicular sides facing each other, and having bars of right-angle U-iron interposed between them, substantially as and for the purpose set forth.

4. In a traction-chain, the combination of the side plates, $a' a^2$, the friction-wheels $e' e^2$, and the shafts $b' b^2$, substantially as and for the purpose set forth.

5. In a traction-chain, the combination of the side pieces, $a' a^2$, the friction-wheels $e' e^2$, the shafts $b' b^2$, and the projection f , substantially as and for the purpose set forth.

6. In a traction-chain, the combination of the side pieces, $a' a^2$, the friction-wheels $e' e^2$, the shafts $b' b^2$, the threaded coupling g , and the projection f , substantially as and for the purpose set forth.

7. The combination of the traction-chain hereinbefore described, composed of the side pieces, $a' a^2$, the friction-wheels $e' e^2$, and the shafts $b' b^2$, with a conductor for said chain, composed of the angle-irons $h' h^2$ and the U-iron h^2 , constructed, arranged, and used substantially as and for the purpose set forth.

In witness whereof we hereunto set our hands in presence of two witnesses.

CONSTANTIN CARL KLINIK.
FRIEDRICH PINKOWSKI.
ANTON SOLLMANN.

Witnesses:

KARL ZÜTTNER,
RUDOLF PIETZUCH.