

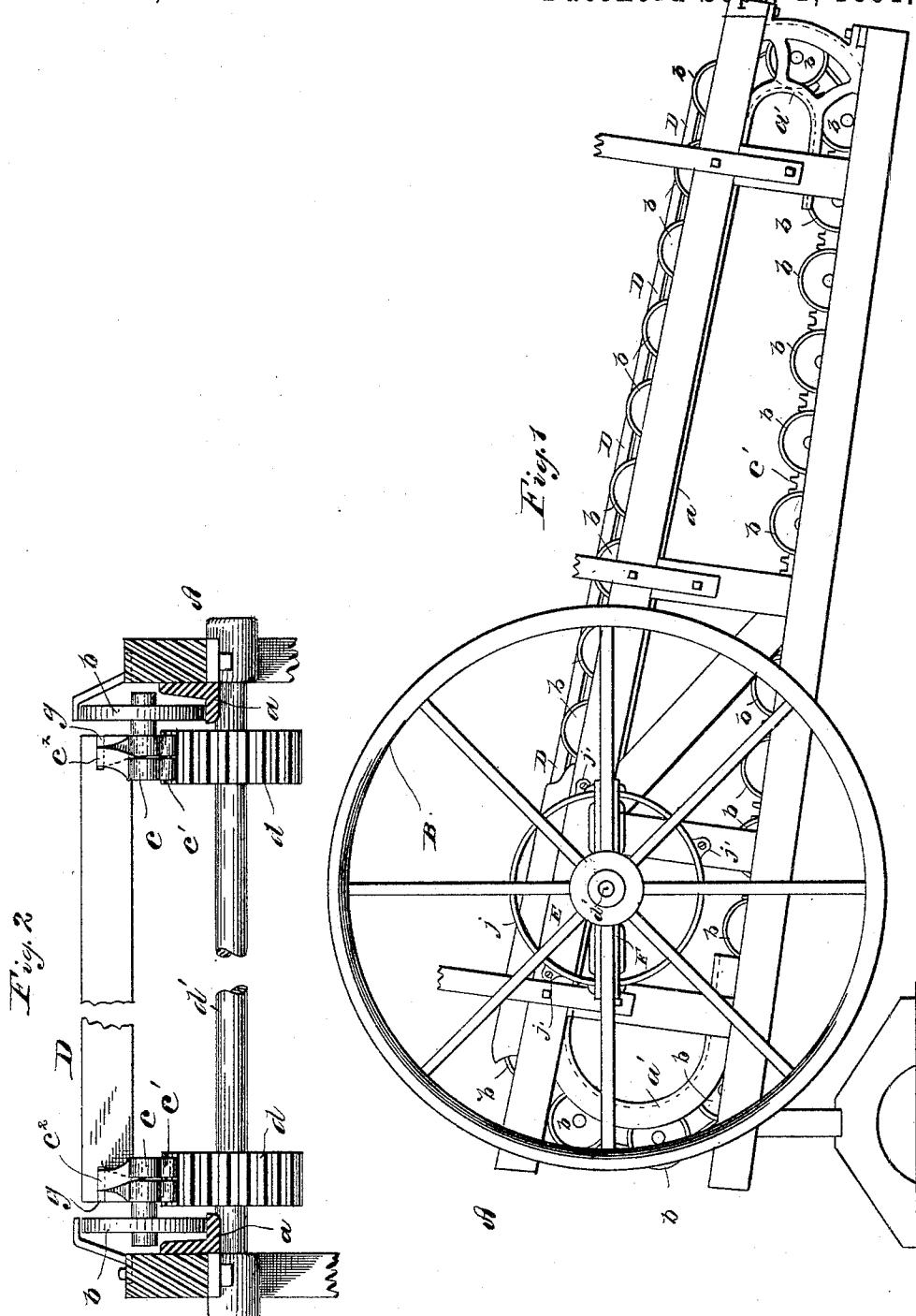
(No Model.)

3 Sheets—Sheet 1.

E. W. ROSS.
HORSE POWER.

No. 458,596.

Patented Sept. 1, 1891.



Witnesses
J. D. Staley
Chas. S. Welch.

Inventor
Elmore W. Ross
By Paul A. Staley

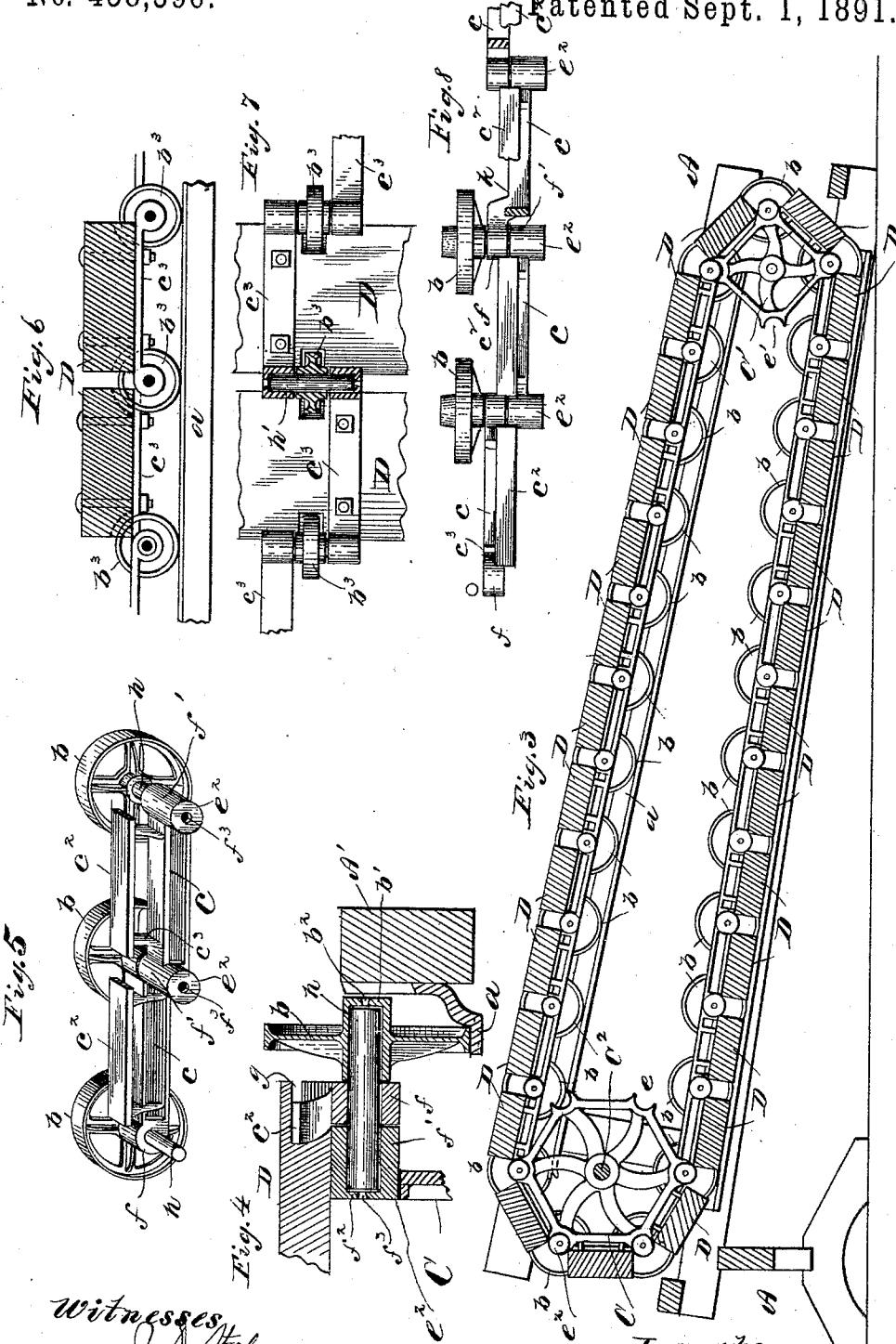
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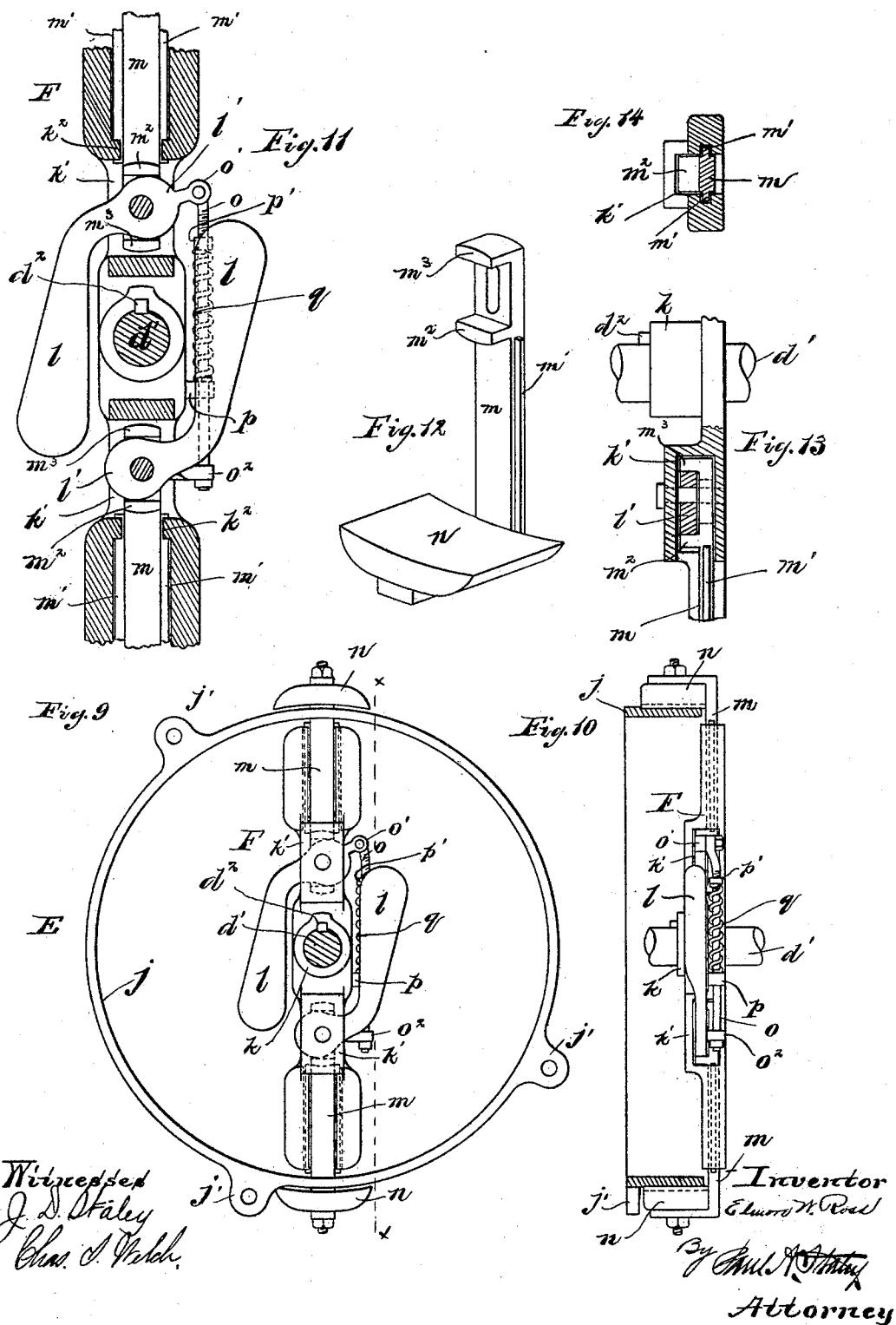
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UNITED STATES PATENT OFFICE.

ELMORE W. ROSS, OF SPRINGFIELD, OHIO.

HORSE-POWER.

SPECIFICATION forming part of Letters Patent No. 458,596, dated September 1, 1891.

Application filed August 30, 1889. Serial No. 322,455. (No model.)

To all whom it may concern:

Be it known that I, ELMORE W. ROSS, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Horse-Powers, of which the following is a specification.

My invention relates to that class of animal-power devices in which an endless bed is caused to revolve upon a suitable track or ways by the operation of the animal thereon, known as "railway" or "tread" powers.

My invention consists in the various constructions and combinations of parts herein-after described, and set forth in the claims.

In the accompanying drawings, Figure 1 is a side elevation view of one form of power to which my invention has been applied. Fig. 2 is a transverse sectional view of a portion 20 of the same. Fig. 3 is a longitudinal sectional view of a slightly-modified form of device also embodying my invention. Fig. 4 is a transverse sectional view of some of the parts in detail, showing the arrangement of 25 the connecting-links and the supporting-wheels attached thereto. Fig. 5 is a detailed view in perspective of a portion of the same. Figs. 6, 7, and 8 are respectively detailed 30 views of some of the parts hereinafter referred to. Fig. 9 is an elevation of the governing device. Fig. 10 is a sectional view of the same on the line $x-x$ in Fig. 9. Figs. 11 to 14 are detailed views of the same.

Like parts are represented by similar letters of reference throughout the several views.

In the device shown in Fig. 1 I employ a suitable frame A A, having on either side thereof suitable tracks $a a$, over which pass 40 traveling supporting-wheels $b b$, attached to connecting-links c , on which is formed an endless rack c' , which rack passes into engagement with suitable pinions d on a transverse shaft d' , from which the power derived 45 is conveyed by means of a suitable wheel B or in any other well-known and suitable manner, all of these parts being well known in the construction of powers of this kind. In this construction the tracks $a a$ are provided 50 with circular portions $a' a'$ at each end of the frame A A, around which the endless belt or chain formed by the links c and the traveling supporting-wheels b are adapted to pass.

In Fig. 3 another form of device is shown, in which the rack c' and the pinions d are dispensed with, as are also the circular portions a' of the track a . In this case the endless belts formed by the links c and their traveling supporting-wheels b are adapted to pass around the ends of the frame A A over suitable revolving reels C C', placed one at each end of said frame and provided on their peripheries with suitable depressions $e e'$, adapted to engage with trunnions e^2 on the respective connecting-links c , and thus permit the endless belts to travel around over the frame A and at the same time furnish means for taking off the power therefrom through the supporting-shaft C², on which the reels C are secured.

In either of the constructions above described the endless belts, formed of the links c on each side of the frame A A is connected together to form an endless bed by connecting-pieces or lags D.

In order to simplify the construction of the device, I form the links c at either end with connecting-bosses ff' , lying in the same plane with each other, so that each link is straight in the plane in which it moves. The connecting-boss f of one link is placed at the side of the connecting-boss of the next succeeding link and the said links connected together in this position, this form of construction making practically two rows of links to the 80 belt, each alternate link being in the opposite row. A traveling supporting-wheel b is connected to the endless belt thus formed at each point of connection between the said links.

In order to insure perfect freedom in the 90 working of the parts, I form a connection between the respective links and the traveling supporting-wheels at one side of the endless bed entirely separate from and independent 95 of the links and traveling supporting-wheels at the opposite side of said traveling bed. This I accomplish as follows: The connecting-boss f of one link, which, we will say, belongs to the outer row of the series forming the endless belt, is bored out, so that a pin h 100 passes entirely through the same, while the connecting-boss f' of the next link, which, we will say, belongs to the inner row forming said endless belt, is bored out for only a portion of its length, so as to form a shoulder f^2 105 at the end thereof, against which the end of

the pin h is adapted to rest, a small opening f^3 being preferably left at the center of said connecting-boss for the purpose of oiling the parts. The supporting-wheel b is correspondingly bored out, so as to leave a shoulder b' and an opening b^2 at the opposite end of the pin h . Now it will be understood that the connecting-boss f' is placed over one end of the pin h , while the traveling supporting-wheel b is passed over the other end of the pin h with the connecting-boss f of the other link between the two, as shown in Fig. 4. By this construction the parts are firmly connected together, while the bearing-pin h is left perfectly loose in each of the bearings and is free to turn with either of the parts or to permit either of the parts to turn thereon. By this construction a perfectly free and independent bearing and connection is provided for each of the traveling supporting-wheels b and the respective links forming the endless belts at either side of the endless bed.

As before stated, the respective links forming the belt occupy two parallel rows. Now in order that the lags or connecting-pieces D may be securely attached to said links and at the same time bring the belts supporting said lags into proper alignment I provide each of the links c with a connecting-strip c^2 , these connecting-strips c^2 on the links of the respective rows being offset in opposite directions, as shown in Fig. 8, so that when the links are connected together in an endless belt the said connecting-pieces on the respective links are in perfect alignment one with the other. These connecting-strips c^2 project upwardly from the main body of the link c , to which they are attached at each end by lugs or brackets c^3 , and are adapted to engage in slotted openings g in the ends of the connecting-pieces or lags D . These slotted openings g in each end of the lags D are formed of a uniform depth, so that when the connecting-pieces c^2 are driven into the same the endless belts at either side of the endless bed thus formed are securely connected together and the links brought into perfect alignment one with the other. The tracks a are preferably formed of angle-iron attached to the inner side of frame-pieces A' , forming a part of the frame A , so that when the supporting-wheels b are resting on the said tracks the endless bed is held against lateral movement in said frame and the respective parts held securely and firmly together without other connections than those described.

When an endless bed of considerable width is used and the connecting-pieces or lags D are of an unusual length, it is desirable to have a supporting-track with traveling supporting-wheels at the center of said endless bed. For this purpose I employ a loose connecting-pin h' , as shown in Fig. 7, adapted to connect links c^2 c^3 , placed at each side of supporting-wheels b^3 , as shown in Figs. 6 and 7.

When the carrying-reels C and C' are employed at the end of the frame A , as shown

in Fig. 3, the inner row of links of each of the endless belts on either side of the endless bed are provided with projecting bosses e^2 to engage with said carrying-reels, as above described. When the endless racks are used to transmit the power to a shaft d' , as shown in Figs. 1 and 2, these bosses are dispensed with. In either case, however, the loose pin connection between the respective links and the traveling supporting-wheels on each side of the endless bed is the same.

It is desirable that an odd number of connecting-links be used to form each of the endless belts, a corresponding number of connecting-pieces, of course, being used to form the bed, so that two links will not be passing centers at the opposite ends of the frame at the same time, which would result in producing alternately a tension and a slack in the endless belt as the successive links passed the centers of the carrying-wheels. In order to accomplish this and still have the links arranged, as hereinbefore described, in two series or rows to form each belt, I provide one link with an offset, as shown at k in Fig. 8, in order that its connecting-boss f may be joined to the boss of the next link, which will be in the same row. By this construction an odd number of links is employed, so that one link is passing the center at one end of the frame while the connecting-pin between two links is passing the center at the opposite end, thus securing a uniform tension upon the said belts.

In Fig. 1, E is the governor device, by which the speed of the power is kept uniform. (See Figs. 9 to 14 for details.) An annular open brake-flange j , provided with suitable fastening-ears j' , is secured by bolting or otherwise to the frame A concentric with the revolving shaft d' . Secured rigidly to the shaft d' , preferably by a key d^2 , is a cross arm or frame F , provided at its middle with a suitable hub k , through which the shaft extends, and at either side of said hub with pockets or housings k' , in which are pivoted the ends of curved arms or levers l , which project inwardly or toward the shaft d' from said pockets or housings and lie normally on either side of the said shaft. These levers l are weighted at their outer extremity and are adapted by the centrifugal force acquired by a revolution of the shaft d' and arm F to be thrown outwardly from said shaft.

Extending into the housings or pockets k' and adapted to move longitudinally in suitable bearings k^2 in the arm or frame F are brake arms or links m , each provided on each side with a tongue or way m' , adapted to slide in a similarly-shaped notch or opening in the bearing k^2 . These brake arms or links m carry at their outer extremity brake-blocks n , which normally rest in close proximity to the periphery of the annular brake-flange j . Each of the brake arms or links m is provided on the inner extremity with engaging projections m^2 m^3 , which project at right angles from

the main portion of said link and rest on each side of the respective levers *l*, opposite their pivotal connection to the arm or frame *F*. These levers *l* are each provided at this point with 5 a cam portion *l'*, adapted, as the levers are moved about their pivotal center, to engage with the projections *m²* *m³* and move the brake-blocks *g* to or from the annular flange *J*. A connecting link or bar *o*, attached to the 10 respective arms *l* at *o'* and *o²*, respectively, serves to connect said arms together, so that they will move uniformly. Located about said link *o* and resting between a stationary projection *p* on the arm or frame *F* and a 15 variable shoulder *p'*, on the link *o* is a spring *q*, adapted to act against the outward movement of the arms *l*. The shoulder or stop *p'* on the link *o* is preferably made in the form of a screw-threaded nut, by means of which 20 the tension of the spring *q* may be varied, as desired. As the shaft *d'* and the arm *F* are revolved the weighted levers *l*, by the centrifugal force, will be thrown outwardly against the tension of the spring *q*. As these 25 levers move outwardly the cam portions thereof are brought in contact with the links on the brake-shoes, which forces said shoes against the annular brake-flange *J*, the pressure of said shoes against said flange being determined by the speed of said shaft. Any increase or decrease of the load on the 30 power will therefore be compensated for by a correspondingly releasing or impinging action of the brake-shoes on said brake-flange, thus keeping the speed of said power uniform. By 35 changing the tension of the spring *q* the speed at which the brakes will impinge will be varied. It is obvious that the brake-shoes might be made to impinge the inside of said brake-flange, instead of the outside, with slight modifications.

By the construction above described it will be seen that an endless-bed railway-power is provided in which the joints are all loose and 45 independent. The endless belts forming the support for the lags or endless bed are independent of each other, except as they are connected by the connecting-pieces or lags which form the top of said bed. By having the loose 50 connecting-pins between the links and as journals or bearings for the supporting-wheels a construction is provided by which the friction is reduced to the minimum, since any binding of one part will permit the other part 55 to still turn thereon. The construction of the governor device is such as to keep the speed of the power at all times uniform.

Having thus described my invention, I claim—

60 1. The combination, with the links and supporting-wheels connected together by loose pins, as described, to form two or more independent endless belts or chains, of the lags or connecting-pieces attached to the links of the 65 respective belts or chains to form an endless bed, substantially as specified.

2. The combination, with the main frame and the tracks therein, of an endless traveling bed composed of two endless link belts or chains and connecting-pieces or lags extending between the same, each of said belts being provided with traveling supporting-wheels connected to said belt by independent loose connecting-pins which also form the connection between the respective links of the said belt, substantially as specified. 75

3. The combination, with the lags or connecting-pieces forming an endless bed, of two or more series of links connected to said lags and forming two or more separate endless chains, the links of each of said chains being connected by loose rods or pins and provided with a traveling supporting-wheel on each of said rods or pins, and means on said links and wheels to prevent the escape of said rods or pins, substantially as specified. 80

4. In an endless bed having two or more endless chains, the combination, with the links forming each of said chains, of a short rod or pin extending through one of the links of said chain into another link on one side and into a supporting-wheel on the opposite side, said rods being independent of the endless chain on the other side of said endless bed and held in position by means of said links and wheels, 90 substantially as specified. 95

5. In an endless bed, the endless chain formed of the links arranged alternately in two rows in different parallel planes, in combination with traveling supporting-wheels 100 for supporting said endless bed, loose connecting pins or rods inserted in and connecting the said links of the different rows and each of said wheels, and the links and wheels having means for preventing the escape of 105 said rods or pins, substantially as specified.

6. The combination, with the brake-flange, of a revolving arm carrying brake-shoes and pivoted levers, and brake-arms having engaging projections with which said pivoted levers engage, whereby a movement of said pivoted levers in either direction produces a positive movement of the brake-shoes, substantially 110 as specified.

7. The combination, with the brake-flange, 115 of a revolving arm having the pivoted levers therein, a connecting link between said pivoted levers, and a spring on said link, brake-shoes adapted to impinge on said flange, brake-arms attached to said shoes and adapted to 120 move longitudinally in said revolving arm, a cam portion on said levers, and engaging projections on said arms, adapted to engage on each side of said cam portion, substantially as and for the purpose set forth. 125

In testimony whereof I have hereunto set my hand this 26th day of August, A. D. 1889.

ELMORE W. ROSS.

Witnesses:

CHARLES L. WHEATON,
DAVID Z. GARDNER.