

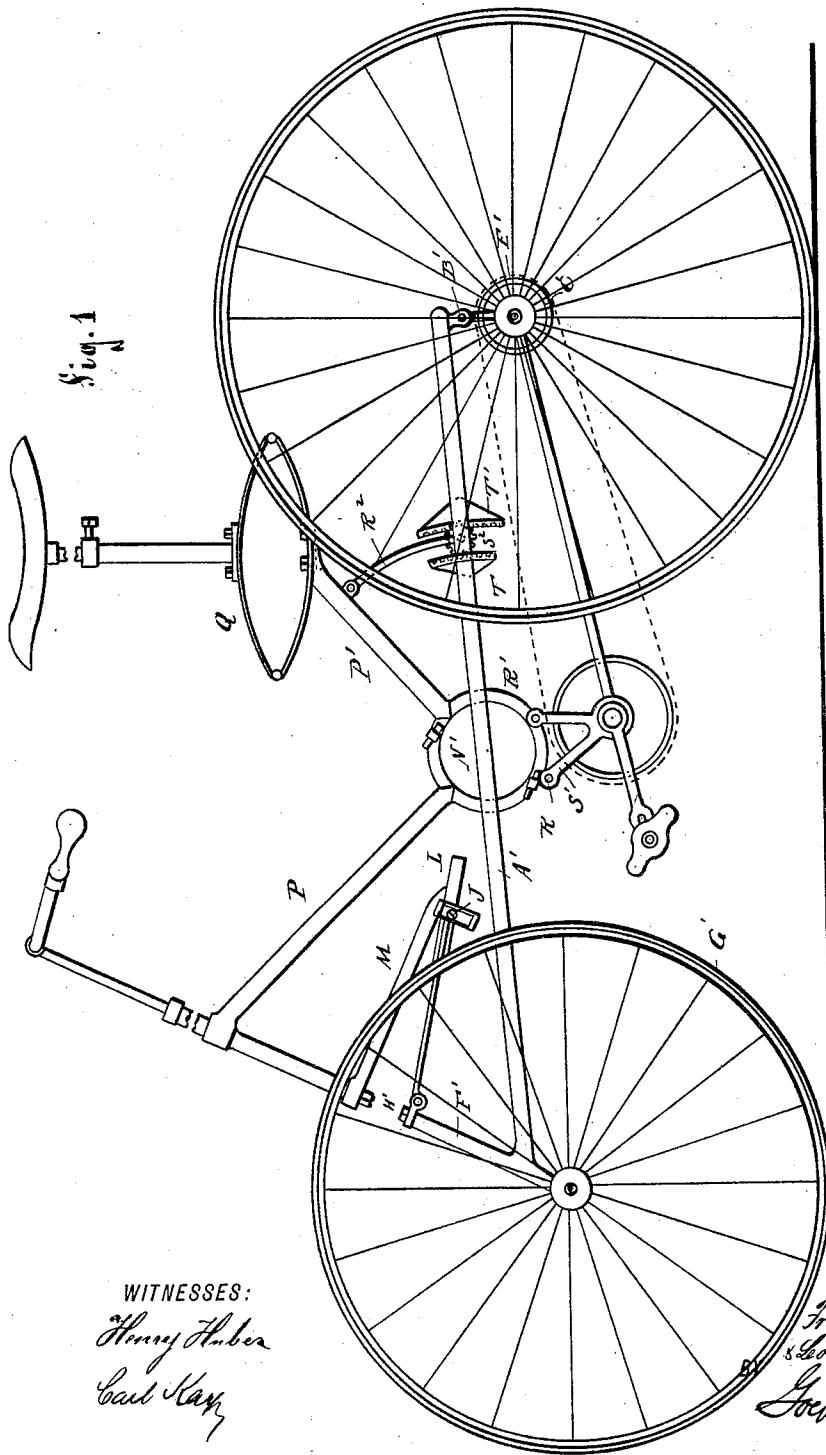
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6 Sheets—Sheet 1.

F. & L. C. HOPKINSON.  
VELOCIPEDE.

No. 432,312.

Patented July 15, 1890.



WITNESSES:

*Henry Huber*  
*Carl Kay*

INVENTORS

*Frederick Hopkinson*  
*Leonard C. Hopkinson*

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ATTORNEYS.

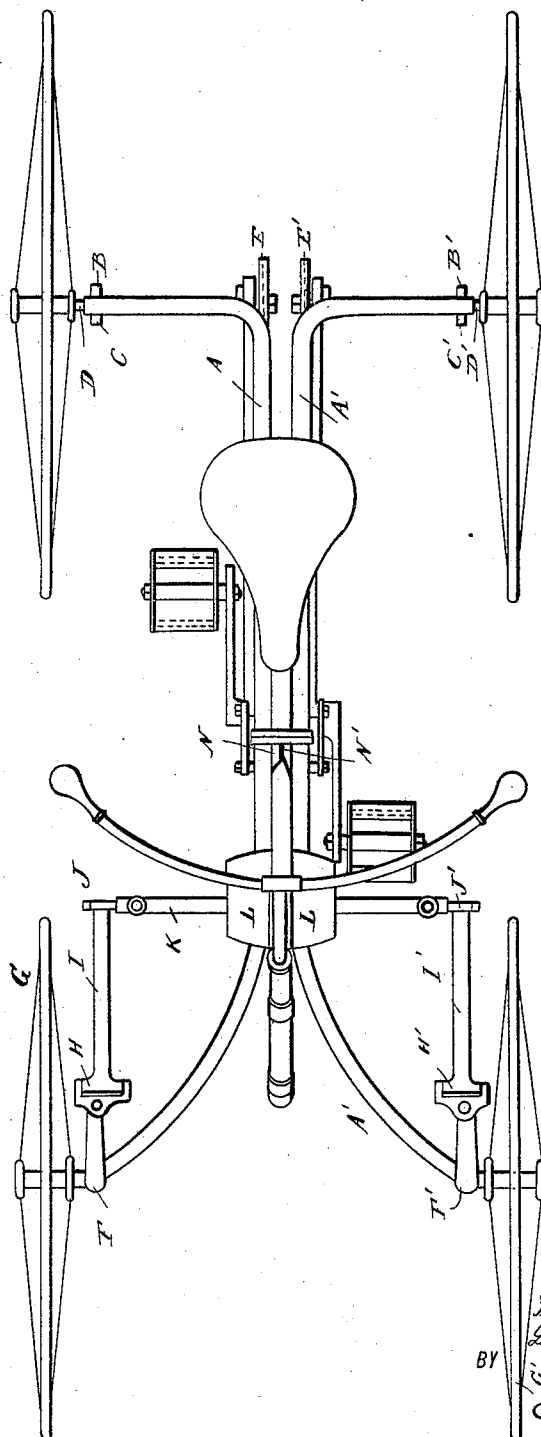
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6 Sheets—Sheet 2.

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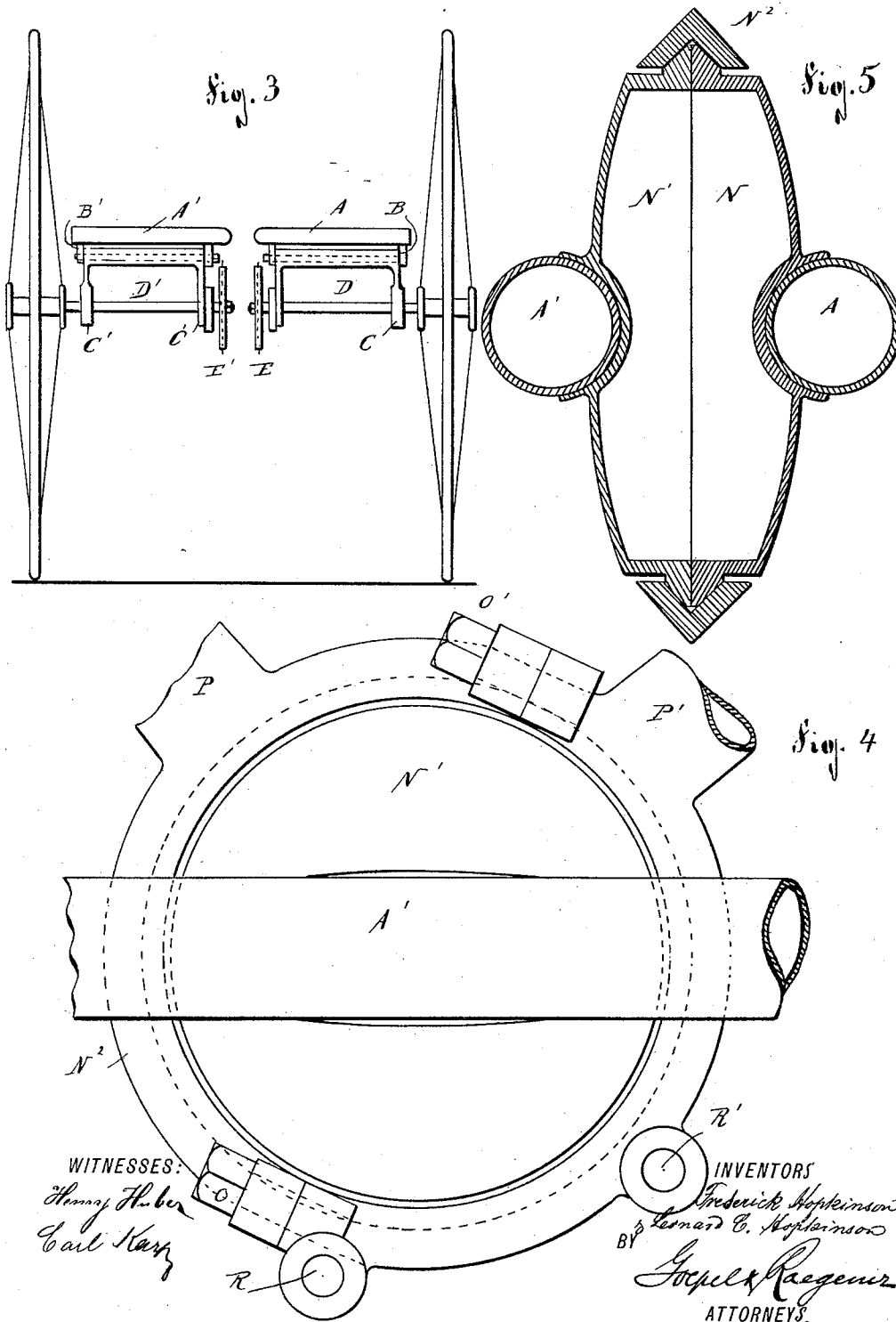
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F. & L. C. HOPKINSON.  
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6 Sheets—Sheet 3.

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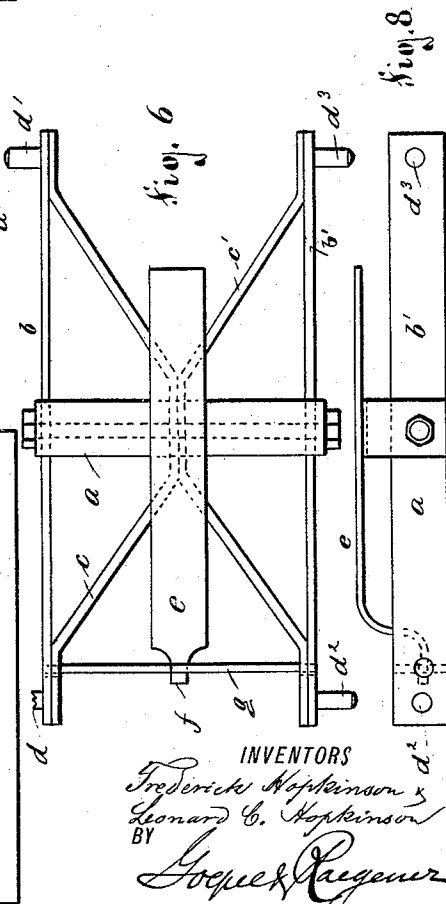
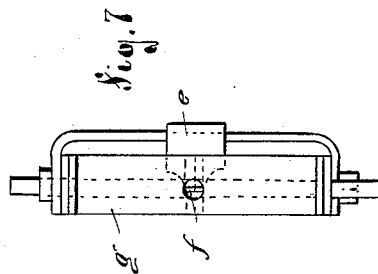
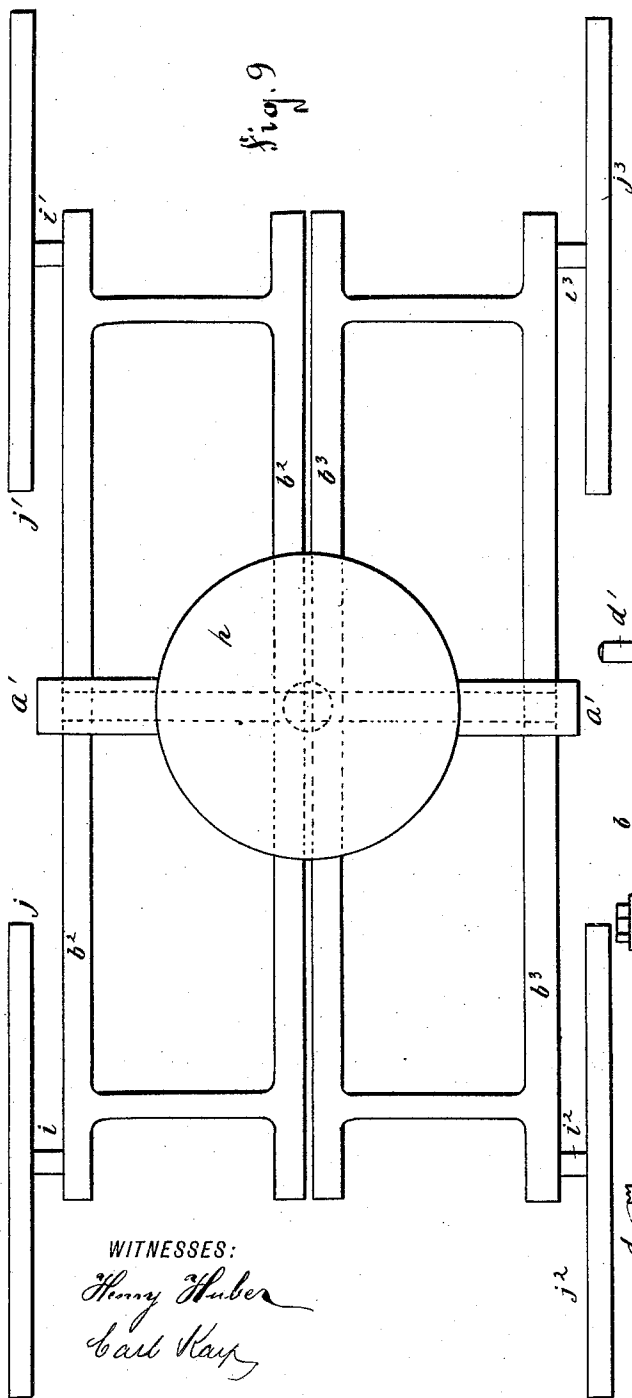
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6 Sheets—Sheet 4.

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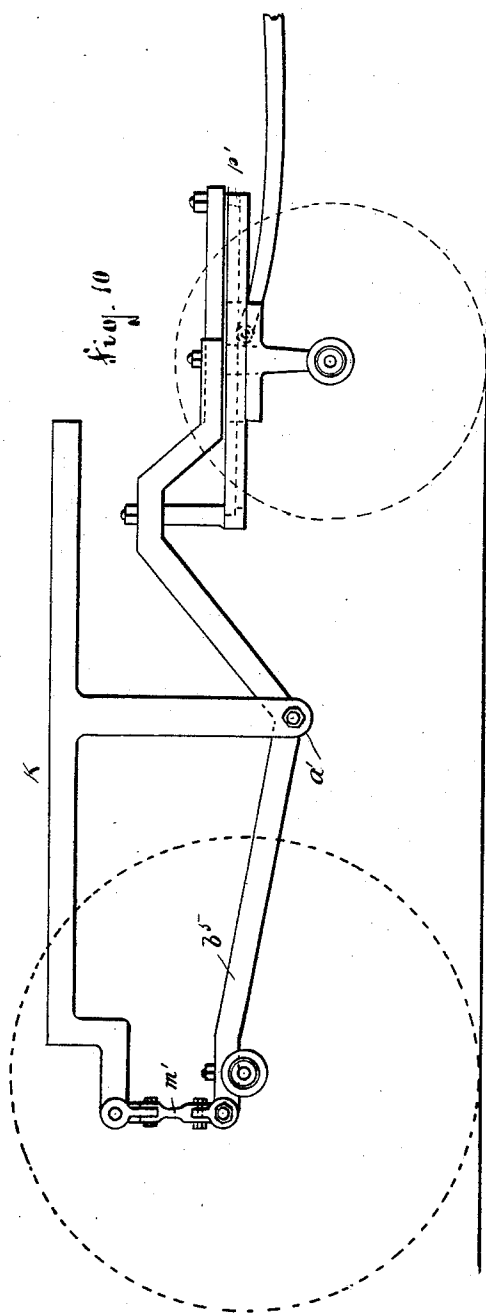
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F. & L. C. HOPKINSON.  
VELOCIPÈDE.

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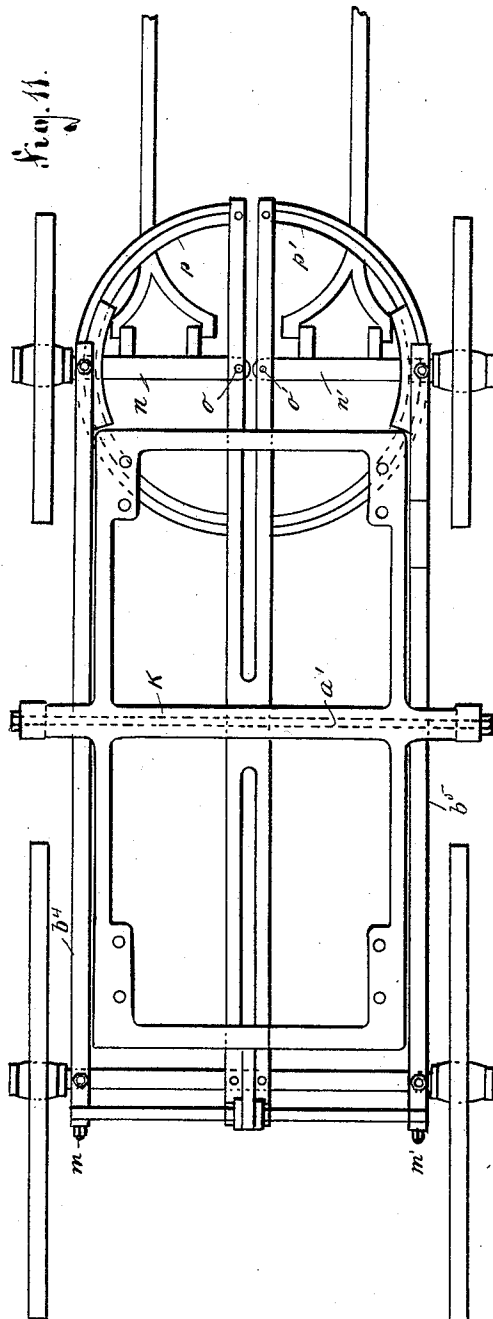
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6 Sheets—Sheet 6.

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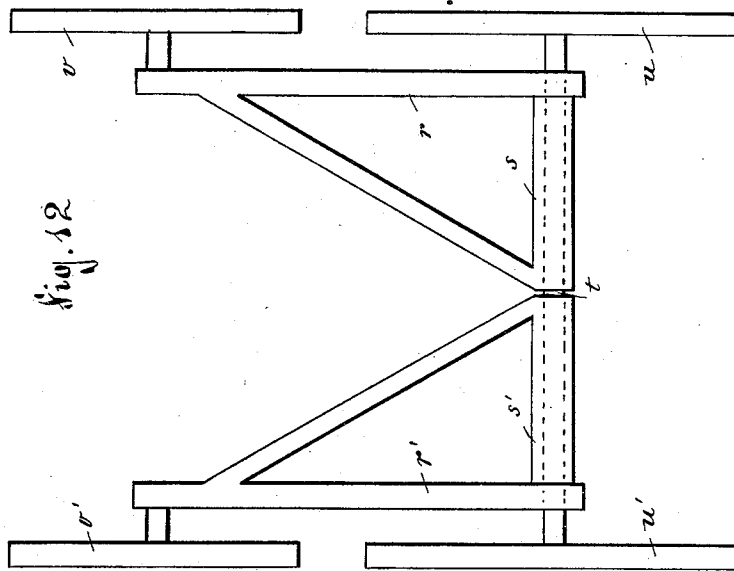
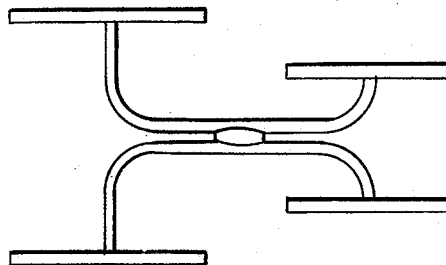


Fig. 13



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# UNITED STATES PATENT OFFICE

FREDERICK HOPKINSON AND LEONARD C. HOPKINSON, OF DONCASTER,  
COUNTY OF YORK, ENGLAND.

## VELOCIPED.

SPECIFICATION forming part of Letters Patent No. 432,312, dated July 15, 1890.

Application filed March 21, 1889. Serial No. 304,098. (No model.) Patented in England March 26, 1888, No. 4,571; in Belgium February 28, 1889, No. 84,953; in France April 2, 1889, No. 195,956, and in Germany January 20, 1890, No. 50,498.

*To all whom it may concern:*

Be it known that we, FREDERICK HOPKINSON and LEONARD CHARLES HOPKINSON, engineers, of 49 and 51 Cleveland Street, Doncaster, in the county of York, England, subjects of the Queen of England, have invented certain new and useful Improvements in Velocipedes, Carriages, and like Vehicles, (for which Letters Patent were granted to us in Great Britain, No. 4,571, dated March 26, 1888; in Belgium, No. 84,953, dated February 28, 1889; in France, No. 195,956, dated April 2, 1889, and in Germany, No. 50,498, dated January 20, 1890,) of which the following is a specification.

Our invention has for its object improvements in velocipedes and other wheeled carriages, and relates to that class known as the "two-track" variety—that is to say, pairs of wheels making parallel tracks. We elucidate as follows the nature of our invention in the first instance as applied to that class of velocipede using two front steering-wheels having their axles swiveling on independent pivots and turned from a cross-bar carrying steering-handles.

The two first sheets of drawings and figures and letters of reference marked thereon are now referred to, and in these Figure 1 is an elevation of a velocipede constructed according to our invention. Fig. 2 is a plan of the same. Fig. 3 is a back elevation of the machine. Fig. 4 is a side elevation of the form of joint we prefer to adopt between the backbones, and Fig. 5 is a transverse section of the same.

A A' are a pair of backbones placed side by side and jointed at B B' to bearing C C' carrying axles D D', on which are mounted chain-wheels E E'.

On the front ends of the backbones are mounted tubes F F' on stud-axles, carrying steering-wheels G G'. These tubes are jointed at H H' to links I I', in turn universally jointed at J J' to a cross-bar K, which swivels on a frame L, carried from a rod M, fixed to the steering-pivot of the handle-bar. The backbones are centrally or otherwise jointed, so as to allow each, carrying its wheels, to rise

and fall independently of the other, as follows: To each backbone we braze or fix disks N N', having parallel butting surfaces, as clearly seen in Fig. 5 and also in Fig. 4. Round the outer periphery of these disks we place an adjustable strap N<sup>2</sup>, (see Figs. 4 and 5,) which can be set up or tightened by nuts O O'. To this strap are brazed or otherwise affixed stays or tubes P P'. One P carries the steering-pivot of the handle-bar, and the other one carries the seat-spring and seat-pillar Q. There are eyes R R', (the ones on the corresponding side not being shown,) affixed to the strap, and to these are firmly screwed or fixed V-shaped brackets S S', which carry the driving-chains and cranks. The cranks may be mounted on a balance-gear in a box, and each chain runs to the chain-wheels E E'. The V-shaped brackets S S' also carry stays, which oscillate at their other ends on the axles D D'. From the stay or tube P', we pivot a rod or bar R<sup>2</sup>, carrying a pinion S<sup>2</sup>, gearing in racks T T', carried by each backbone, respectively.

The action of the machine is as follows: The backbones carrying each pair of wheels can rise and fall independently of each other as they oscillate on the strap N<sup>2</sup>. The links I I', pivoted to the cross-bar K, worked from the steering-handle, allow the two front wheels to be steered at all times without affecting the handle-bar, which always moves in unison with the seat and pedals. Thus the machine can mount obstacles without shock to the rider or riders. If desired, the disks and straps forming the pivot between the backbones might be replaced by a pin passing through disks or plates, each carrying a backbone or by other suitable form of joint.

We lay no claim to the use of stay-rods carried from a chain wheel or wheels (or a balance-gear box carrying pedals) and oscillating from the axles of driven chain-wheels, in order to maintain the distance between driving and driven chain-wheels. If desired, bands or straps could be substituted for chains. The machine might also be arranged as a tandem or sociable velocipede.

On Sheet 3 Fig. 6 shows our invention in

plan as applied to the framing of a baby-carriage, Fig. 7 being an end elevation. Fig. 8 is a side elevation.

$a$  is the central pivot, on which move the  
5 backbones or frames  $b\ b'$ . The said backbones or frames carry stays  $c\ c'$ , running to the center of the pivot  $a$ , so forming central stays. The stud-axes  $d\ d'\ d^2\ d^3$  carry the wheels of the vehicle. Centered on the pivot  
10  $a$  is a frame  $e$  to carry the body of the carriage. This frame has a tongue  $f$ , which fits in a rocking bar  $g$ , pivoted to each backbone or frame  $b\ b'$ , thus connecting their ends. The fulcrum is at  $a$  and the body of the carriage oscillates on the tongue  $f$  and a rocking  
15 bar  $g$ , whereby the occupant of a baby-carriage is not affected by vibration.

Fig. 9 is a plan diagram showing whereby our invention may be used as a bogie for rolling-stock or for other vehicles, or for gun-carriages and the like, wherein the wheels have not to be steered in order to operate the vehicle.  $a'$  represents the pivot which carries the backbones  $b^2\ b^3$ , and each, for the sake  
20 of strength, is made in parallel form. From the bearing of the pivot  $a$  we carry a frame or platform  $h$ , on which we support the body of the vehicle, gun, or the like. On each frame  $b^2\ b^3$  we mount stud-axes  $i\ i'\ i^2\ i^3$ , on which  
30 are mounted wheels  $j\ j'\ j^2\ j^3$ . It will therefore be seen that the parallel frames  $b^2\ b^3$  will rise and fall over any obstacle which the wheels on each side may meet.

Fig. 10 is a side elevation of our invention  
35 as applied to a cart, van, or vehicle, or a gun-carriage or other vehicle adapted to a military ambulance or the like. Fig. 11 shows a plan of the same.  $a'$  is the pivot which passes through the backbones  $b^4\ b^5$  and also through the main frame  $k$ , supporting the body of the vehicle or the like. The parallel sides of the pivoted backbones or frames are linked at  
40  $m\ m'$ , as before mentioned. The axles  $n\ n'$  are pivoted at  $o$  and  $o'$ , respectively, to the backbones or frames  $b^4\ b^5$ , to which the circular guides  $p\ p'$  are attached, and shafts  $q\ q'$  are attached to these axles, whereby the front wheel can be steered to operate the vehicle. The rod or balance-lever connects the  
45 frames or backbones, allowing the wheels on each side of the vehicle to rise and fall, as before described.

In Fig. 12 we show a modification of our invention, wherein we attach backbones or  
55 frames  $rr'$  on tubes or mountings  $ss'$ , through

which passes an axle or spindle  $t$ , on which are mounted wheels  $u\ u'$ , the other end of the backbones or frames  $rr'$  carrying wheels  $v\ v'$  on stud-axes, as shown; or a through-axle might be used.

Fig. 13 is a plan diagram of another variation of our invention wherein we use our jointed backbones or frames as before, but we place the wheels out of parallel or "two-track" and make "four tracks," and the wheels  
60 may be of different or equal diameters.

We are well aware that it has been proposed to joint the frame of a velocipede other than a four-wheel velocipede in such a manner that the frame allowed a single pair of  
70 driving-wheels to rise and fall from each side, and we do not claim such a principle.

We claim—

1. A velocipede having four wheels, each side pair being carried on separate backbones  
75 or frames pivoted together, and either the front or back pair of wheels being used as steerers or drivers, whereby the wheels may rise and fall independently of each other, as described.

2. A carriage or like vehicle having four wheels, each one-track pair being carried on backbones or frames pivoted together, whereby each one-track pair of wheels can rise and  
80 fall independently of the opposite one-track pair, as described.

3. A frame for a vehicle in which the support for the body of the same is carried from a pivot-pin or joint connecting a parallel  
90 pair of backbones or frames, and on each end of which backbones or frames is mounted a pair of wheels in parallel track, as described.

4. A frame for a vehicle in which the support for the body of the same is carried from a pivot-pin or joint connecting a parallel  
95 pair of backbones or frames on which are mounted a pair of wheels in parallel track or otherwise, one pair of wheels being used as drivers and the other pair as steerers or both as drivers and steerers, as described.

In testimony that we claim the foregoing as our invention we have signed our names in presence of two subscribing witnesses.

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