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JOHN BALL, Sr.
Improvement in Iron Running Gear for Wagons.
No. 119,106. Patented Sep. 19, 1871.

2 Sheets.
Sheet 1.

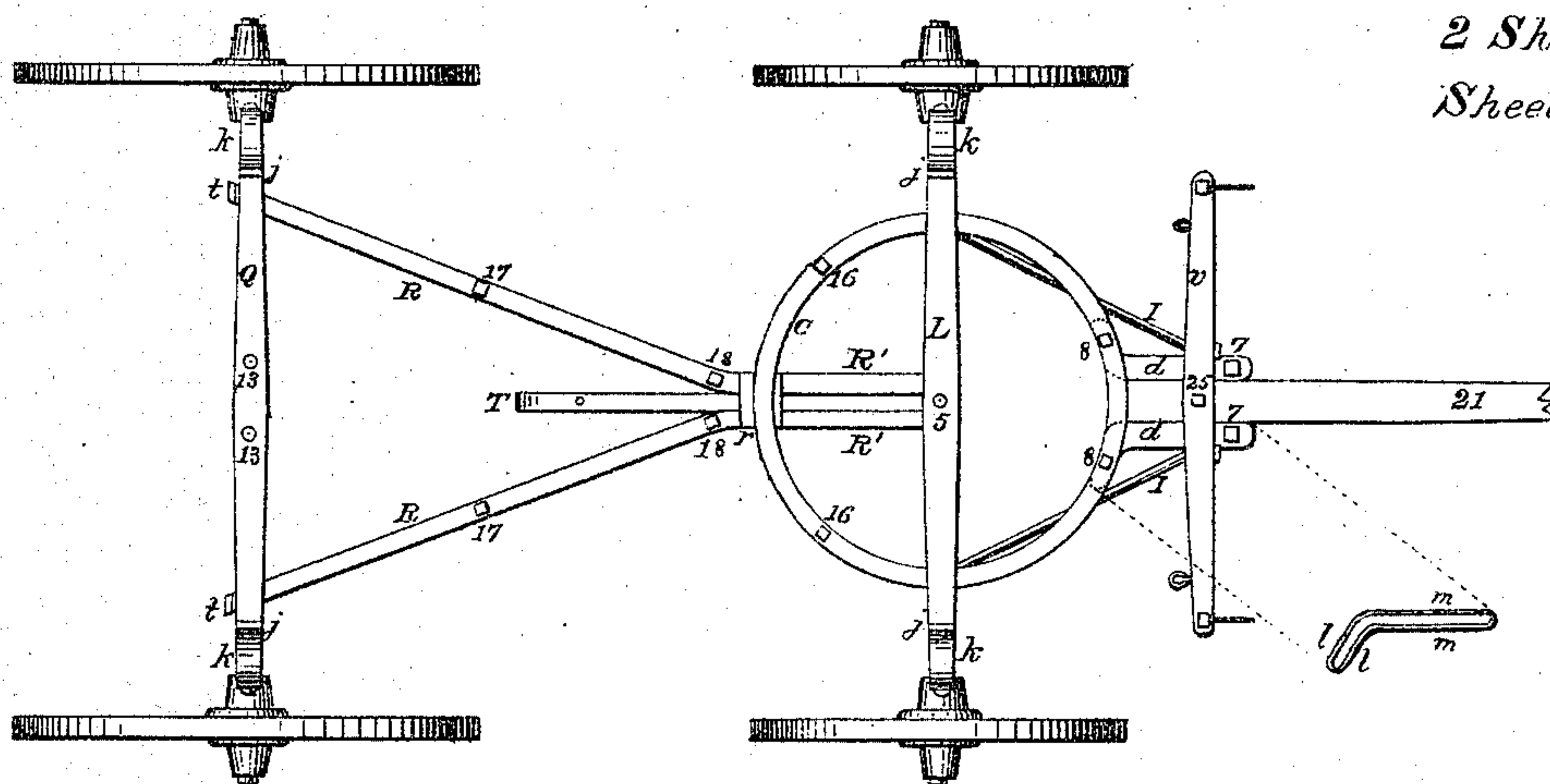


Fig. 1.

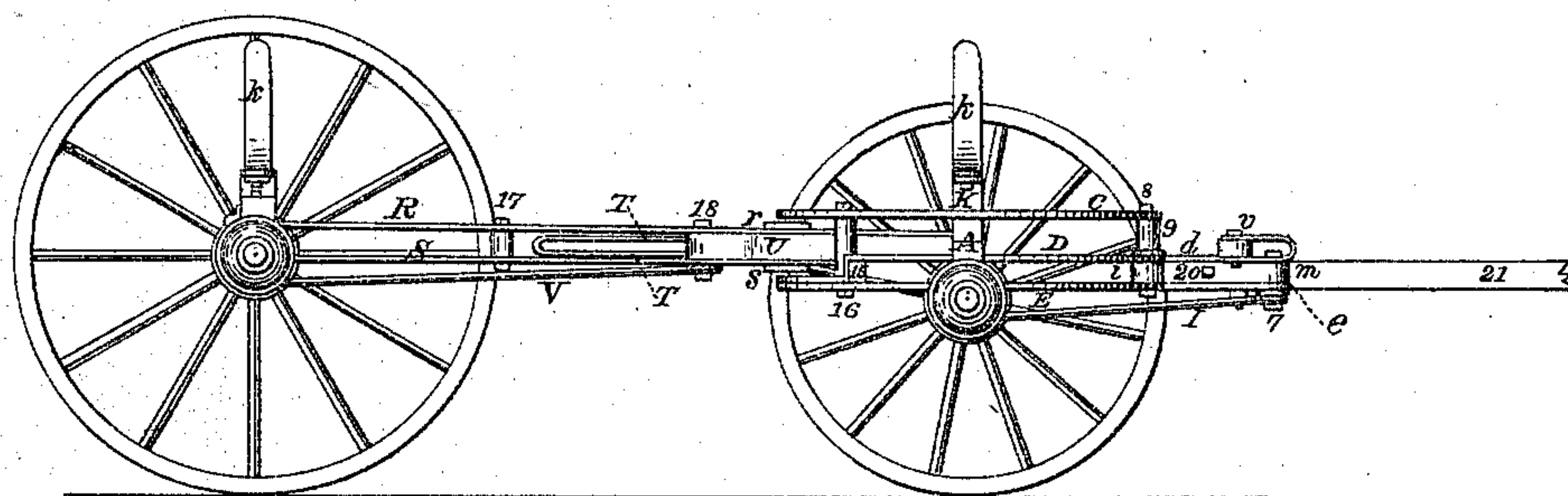


Fig. 2.

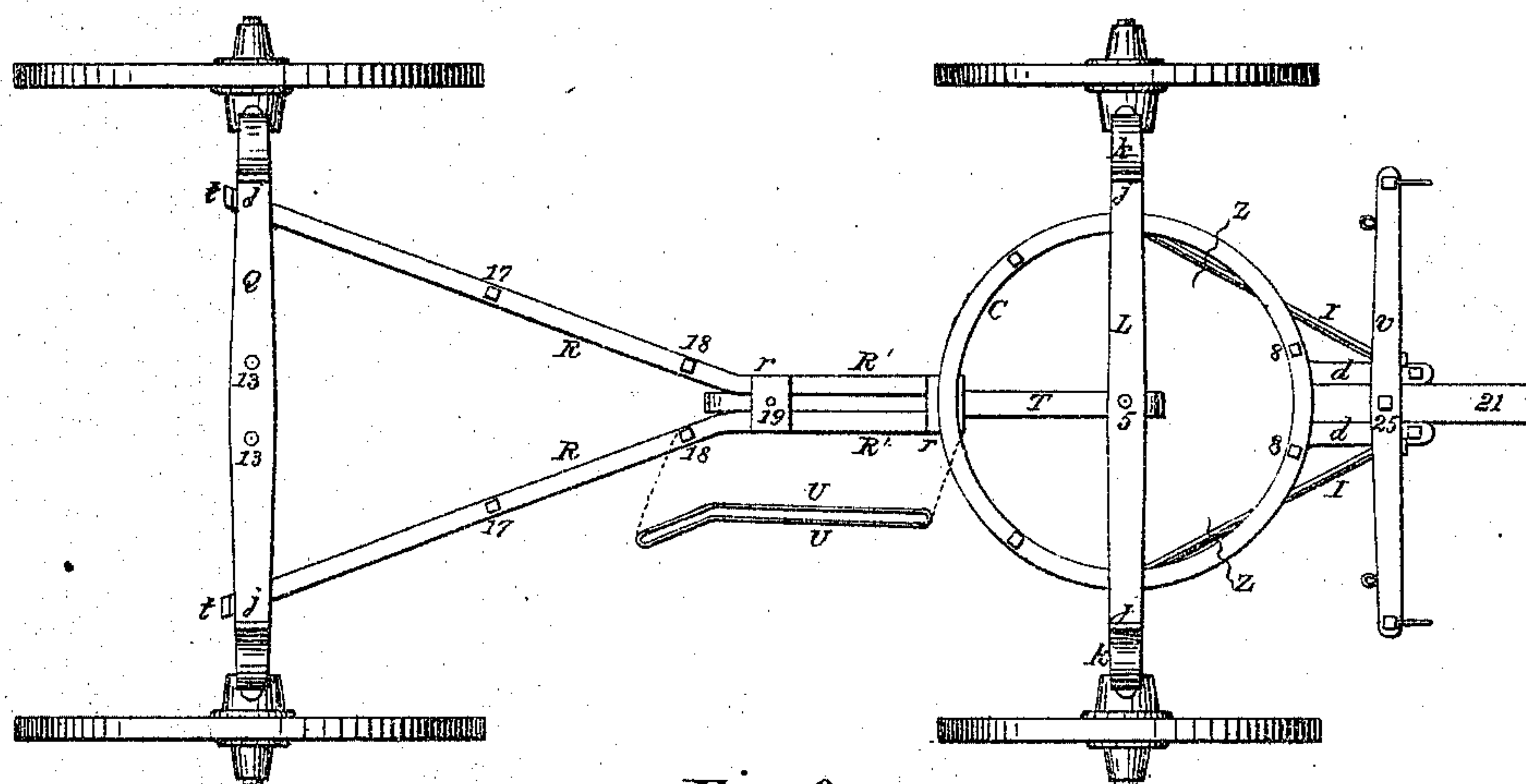


Fig. 3.

Geo. W. Raff,
Andrew Choffin } Witnesses

John Ball Sr. Inventor
by Job Abbott Attorney

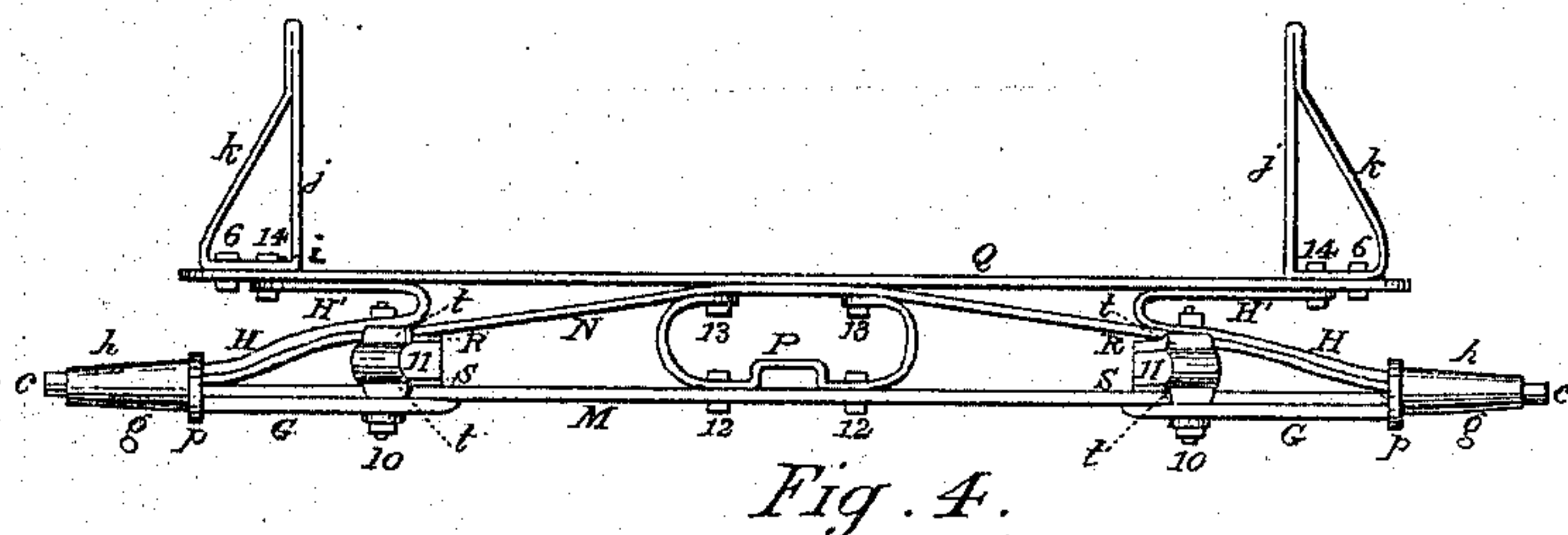


Fig. 4.

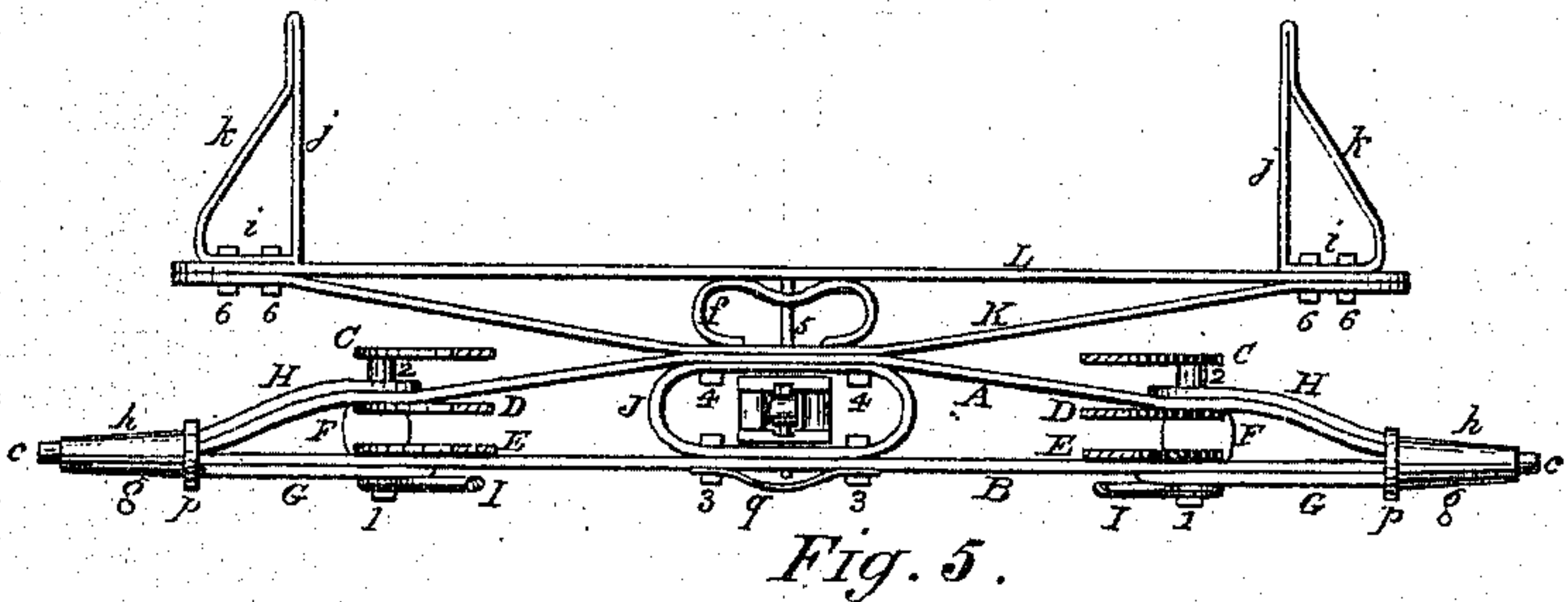


Fig. 5.

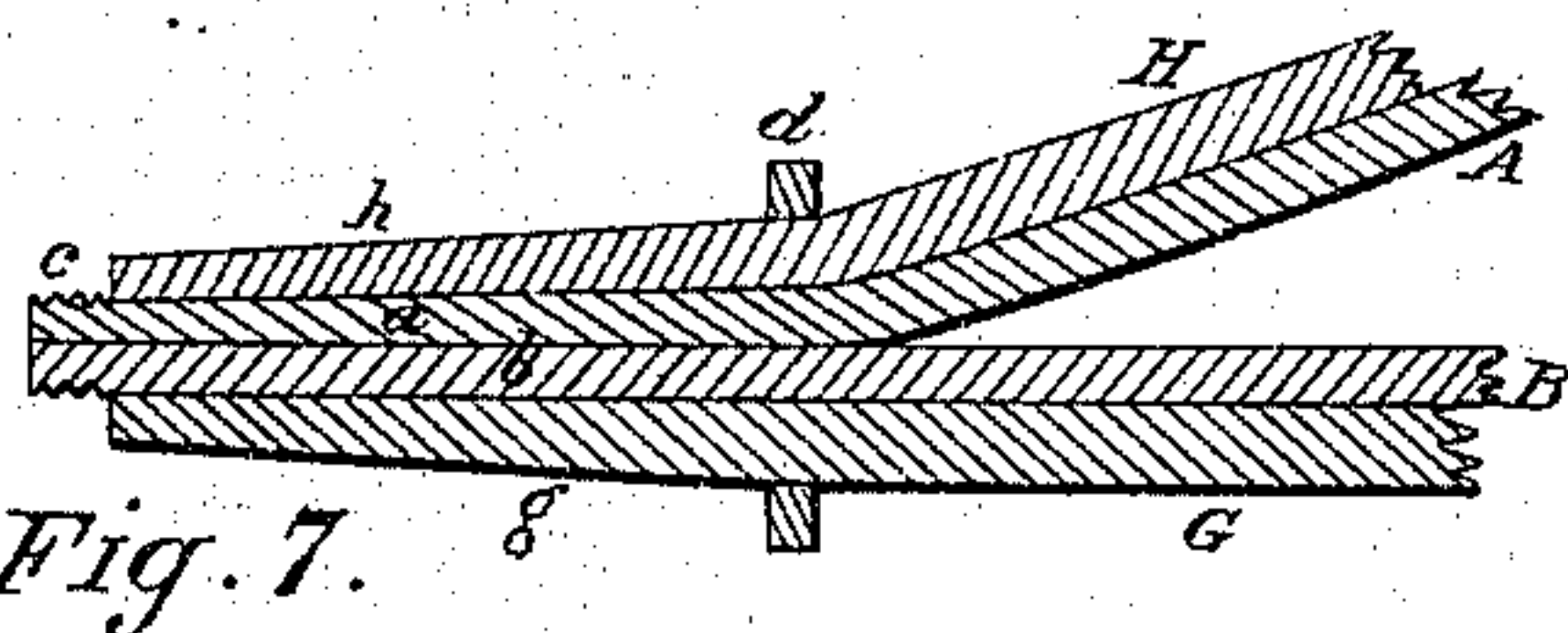


Fig. 7.

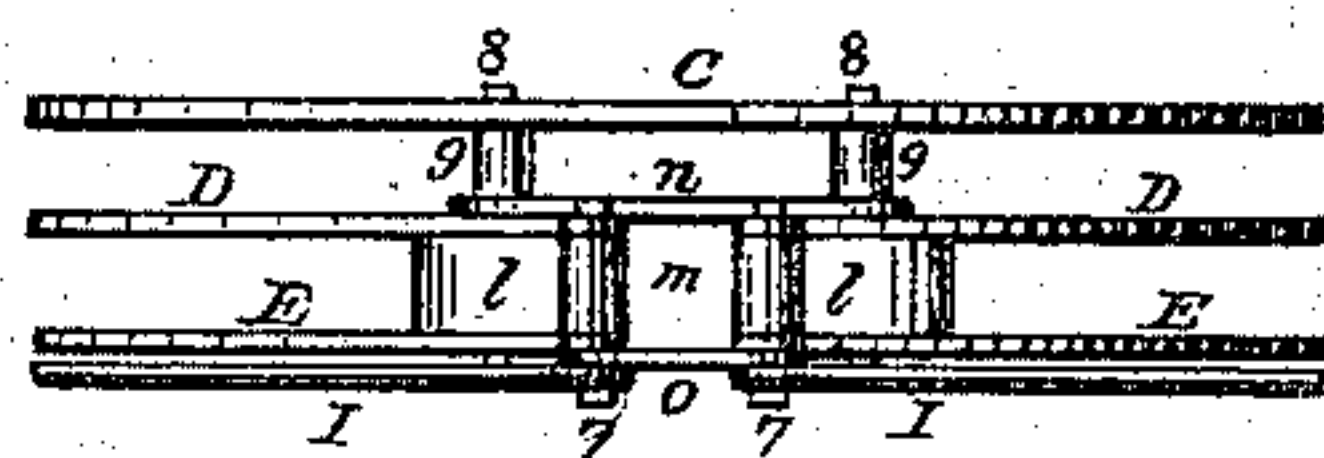


Fig. 6

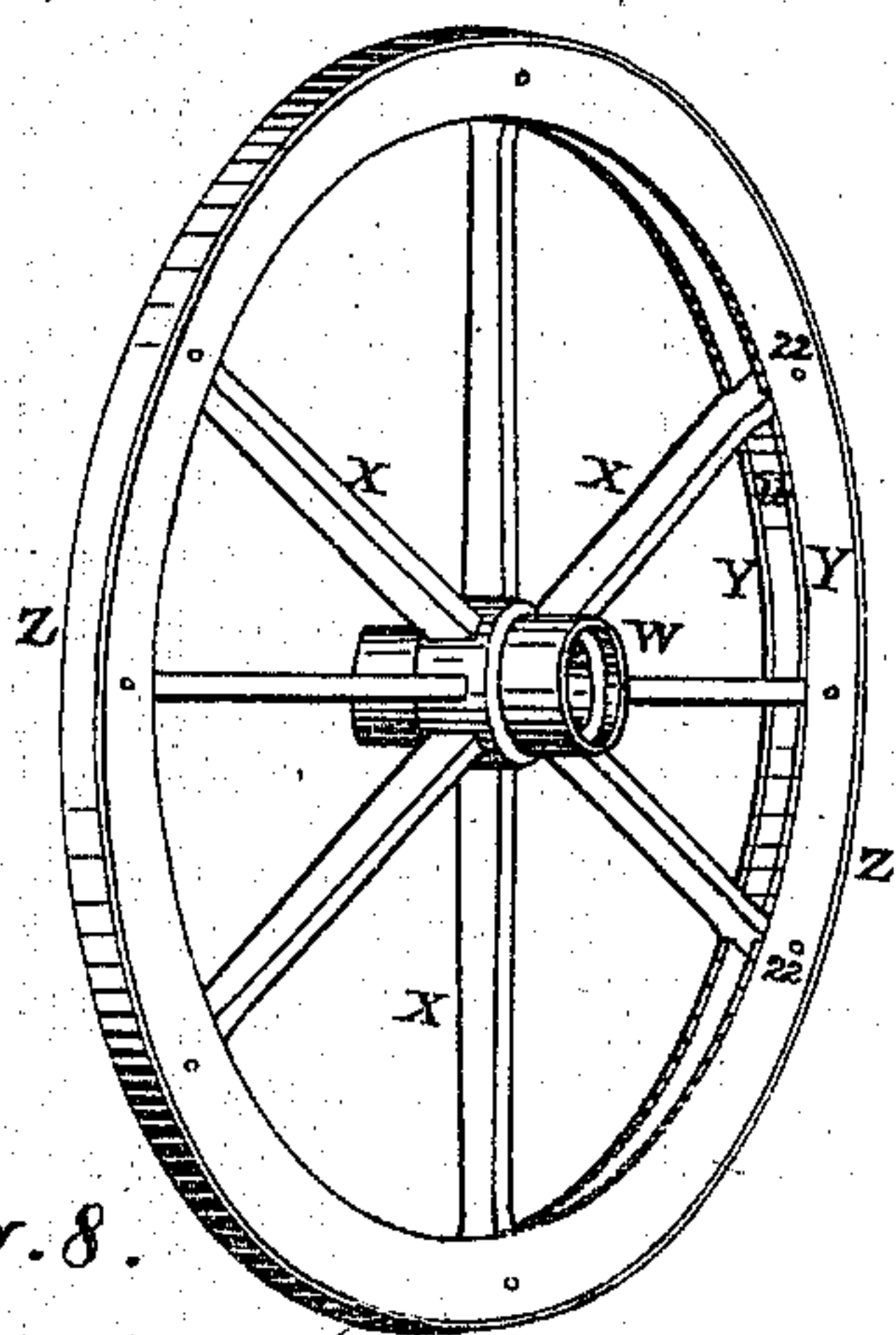
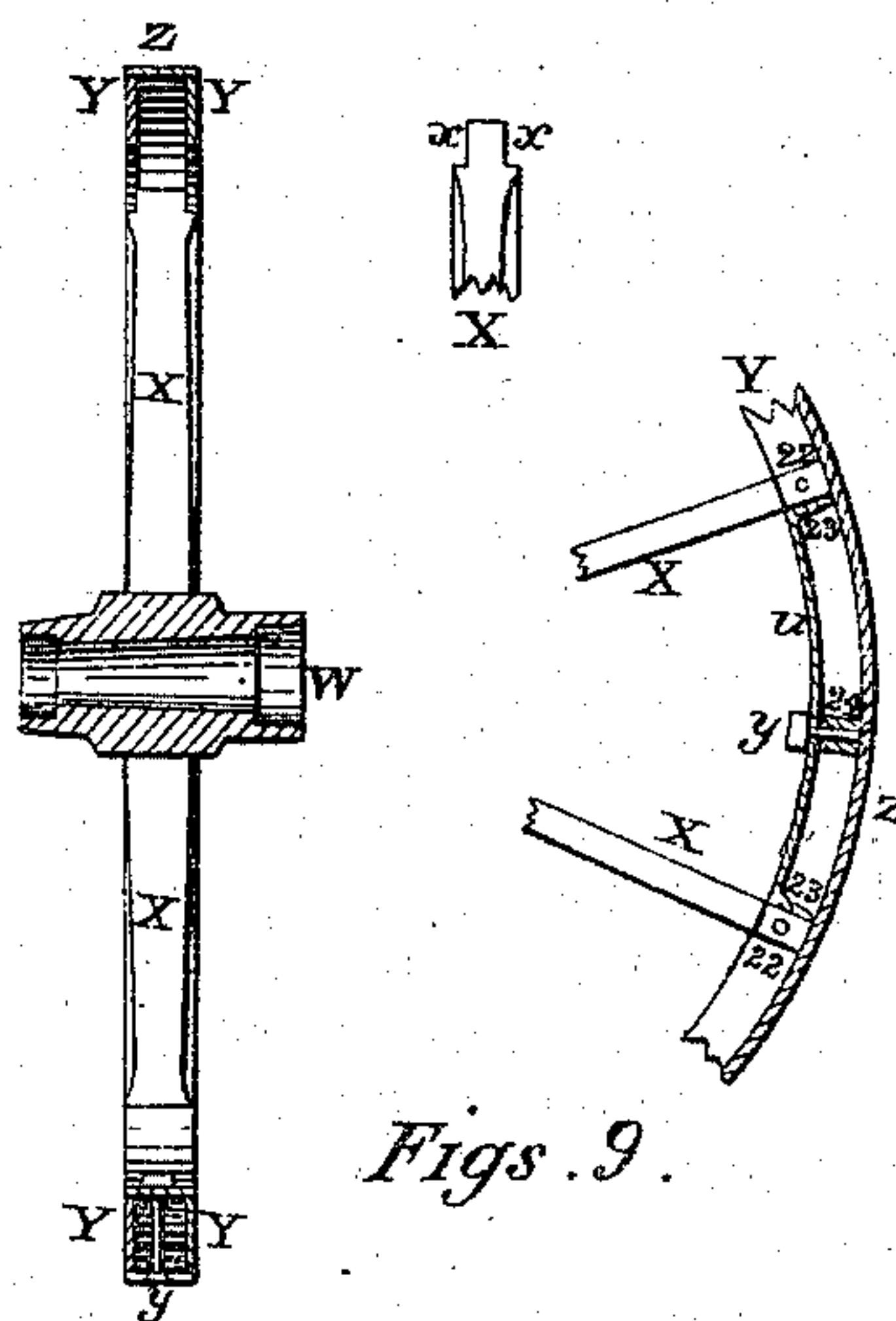
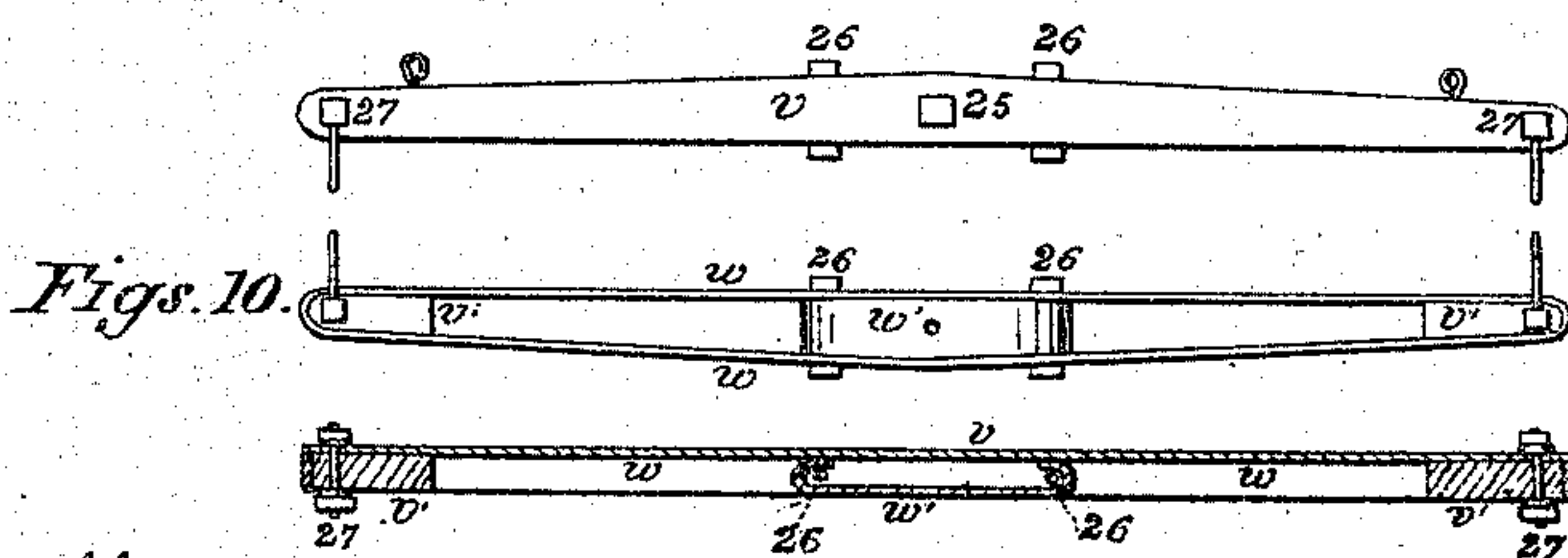


Fig. 8.



Figs. 9.



Figs. 10.

Geo. W. Raff.

Andrew Choffin

Witnesses

John Ball is Inventor
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UNITED STATES PATENT OFFICE.

JOHN BALL, SR., OF CANTON, OHIO.

IMPROVEMENT IN IRON RUNNING-GEAR FOR WAGONS.

Specification forming part of Letters Patent No. 119,106, dated September 19, 1871.

To all whom it may concern:

Be it known that I, JOHN BALL, Sr., of Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Iron Running-Gear for Wagons; and that the following is a full, clear, and exact specification thereof, which will enable others skilled in the art to make and use the said invention.

In most if not all of the iron running-gear for wagons heretofore constructed use has been made of the various peculiar forms of rolled iron commercially known as "channel bar," "T-iron," "angle" or "L-iron," "I-bar," "star," or "X-iron," &c., as essential features of construction, most of which forms of iron were designed for bridge and other heavy work, and are sold of such sizes and weights as to be inapplicable to wagon-work, so that new rolls would be required to roll iron in such forms, of sizes suitable for the application of these plans, which forms a serious objection to the adoption of such plans. In addition to this fact the small sizes of these peculiar forms of iron cost from two to three times as much per pound as ordinary bar-iron, and the necessity of keeping a stock of peculiar and high-priced iron, to be used only when a wagon-gear is to be built or repaired, makes these plans too expensive for the ordinary mechanic or blacksmith, or for any persons except those who would make the building of such iron running-gear a specialty; and even then the difficulty of repairs, which are liable to be needed in localities where these running-gears are in practical use and where there are no persons supplied with the peculiar forms of iron needed, makes the use of such forms of construction very objectionable.

My invention is designed to overcome these objections by enabling the mechanic to construct a light, strong, and economical iron running-gear of the ordinary round and bar-iron, which is of a moderate price, and is usually kept on hand by the blacksmith for various purposes; and to this end the first part of said invention consists in the construction of a circular front hound, composed of an upper hoof formed by bending plate-bar iron edgewise, and of two underlying bar-iron circular pieces bent in a similar manner and having tongue-pieces turned out at their ends, the middle circular piece being raised above the lower one to fit up to the upper axle piece and to admit bent tongue-plates between the tongue pieces on

the middle and lower circular pieces, and the several parts being united by suitable clamping-blocks and bolts so as to form a light and strong hound, which cannot be twisted or drawn out of shape under any ordinary usage. The second part of said invention consists in the combination of a straight and an arched axle piece of bar-iron, united, by a bent-iron support at the center, with the circular hound, constructed as herein described, said axle pieces being bolted to the circular hound at each side, so that said hound acts as a support both to the thrust of the arched axle piece and to the tension of the straight axle piece, and the axle pieces and hound together form a stiff trussed girder, by which the load is transferred from the bolster-bearing to the ends of the front axle. The third part of said invention consists in the construction of a front bolster composed of a straight bed-plate of bar-iron and of an arched bar-iron plate, resting with its convex side on the axle pieces and united to the bed-plate by a bent-iron support at the center, and by rivets, bolts, or welding at the ends, the whole forming a bolster in the form of an inverted bow-string girder, and combining the advantages of economy of construction with great strength. The fourth part of said invention consists in the construction of a box or bolster-standard of plate-bar iron, having a base to rest on the bolster, and bending up from said base on the inside in an upright position and on the outside in a braced position, the upper ends being united by rivets or welding and the whole forming a light and stiff standard, which is easily made and readily attached to the bolster. The fifth part of said invention consists in the construction of a trussed reach, composed of four iron plates placed in pairs on each side and secured near the ends of the rear axle, and from thence running nearly together in a triangular form, and then running parallel to each other for a sufficient distance to form a base of attachment for an additional reach when required, said plates being united in pairs by bolts or rivets and intervening thimbles, and being united at their front ends by edge and top plates, and the whole forming a trussed reach in which no ordinary reach-piece in the center is required under ordinary circumstances, but which allows of the intersection of such center reach when the additional length is required. The sixth part of said invention consists in the construction of a center reach composed of

two plate-iron bars placed one above the other, and united at the ends by bolts and intervening blocks, or by welding and binding, either with or without intermediate connection; said reach being used between the parallel ends of the trussed reach, and possessing all the necessary lateral stiffness with a small weight of metal. The seventh part of said invention consists in the combination of a straight bar iron rear axle piece and arched bar-iron axle piece united at the ends by blocks and bolts and at the center by a bent, iron support, with a straight iron bolster-plate connected at the center with the arched axle piece, and supported at the ends by bent-iron supports placed over the ends of the axle pieces, the whole forming a trussed girder of great stiffness in proportion to its weight, by which the weight of the rear portion of the load is suspended between the rear wheels. The eighth part of said invention consists in the construction of an axle-spindle made by drawing out and welding together the two axle pieces of bar-iron, and by combining therewith two skein pieces placed one above and one below the body of the spindle, and united to the axle pieces back of the collar of the spindle, the whole forming a cheap construction of great strength at the spindle-neck, which is usually the point where the spindle is broken in practice, and the use of the skein pieces allowing the repair of the spindle when worn, which is not practicable in the ordinary construction of spindles. The ninth part of said invention consists in the construction of an iron wheel composed of a cast-iron hub having bar-iron spokes with shoulders formed on their upper ends cast therein, and a felly composed of two or more bar-iron hoops formed by bending the iron edgewise; said felly having an iron or steel-tire shrunk on it in an ordinary manner, and having flat-iron filling pieces secured by lugs, blocks, and bolts between its sides and the spokes, and the whole forming a stiff, strong, and economical wrought-iron wheel, which can be constructed by any good mechanic in any locality where the casting for the hub can be obtained. The tenth part of said invention consists in the construction of a double-tree composed of a broad flat top plate of iron, which gives the principal transverse strength to the double-tree, and beneath which are secured two edge plates united at the ends by blocks or welding and at the center by a block or filling piece, by which the vertical stiffness of the double-tree is secured, the whole forming a light and durable construction easily made by any blacksmith.

In the accompanying drawing, Figure 1 is a plan of a running-gear embodying my invention as it appears without the center reach. Fig. 2 is a side view of the same, with the wheels toward the observer removed. Fig. 3 is a plan of the same as it appears with the center reach. Fig. 4 is a rear view of the rear axle and bolster. Fig. 5 is a front view of the front axle and bolster, with the hound broken off, as indicated by lines *z z*, Fig. 3. Fig. 6 is a front view of that portion of the hound broken off, and not shown in Fig. 5. Fig. 7 is a longitudinal vertical section of the axle-

spindle. Fig. 8 is an enlarged perspective view of one of my improved wheels. Figs. 9 are cross-section elevation of spoke end and longitudinal section of felly of wheel. Figs. 10 are top and bottom plans and longitudinal section of double-tree.

The hound C D E consists of the upper hoop C made in the form shown, and of the lower pieces D E made in the circular form shown, and having their ends *d d e e* bent out parallel to form tongue pieces, as shown in Figs. 1, 2, and 6. The piece D rests on the piece E on the rear of the hound, and is offsetted at 15 (see Fig. 2) to bring it up to the axle piece A, and to admit the tongue-plates *l m* between the tongue ends *d e*, said tongue-plates *l m* being bent out of bar-iron into the form shown by detached plan in Fig. 1, and the ends of the tongue pieces *d m e* being united at the rear by the cross-piece *n* placed above the piece D, and in front by the cross piece *o*, as shown in Fig. 6. The straight axle piece B is placed under the circular piece E, and is connected by a bent iron support, J, and bolts 3 4, to the arched axle piece A, which rests on the circular piece D, which is supported from the piece E by filling-blocks F, and the hound and axle pieces are firmly united at their intersections by bolts 1, which pass down through the hoop C, intervening thimble 2, axle-skein piece H, axle piece A, hound piece D, filling-block F, hound piece E, axle piece B, skein piece G, and an eye on the brace-rods I, which are connected to the front ends of the tongue pieces *d m e* by bolts 7, as shown in Figs. 5 and 6. Bolts 16 16 are run through the hound pieces C D E and intervening thimbles, as shown in Fig. 2, and bolts 8 8 are run through said hound pieces and the thimbles 9 9 and rear ends of tongue-plates *l m*, as shown in Fig. 6. The axle-spindles *g a b h* are formed by heating and drawing out the ends of the axle-pieces A B to a tapering form, *a b*, and welding them together, and by combining therewith the skein pieces *g h*, which may be riveted or welded to the part *a b*; or they can be secured by the collar *d*, which is shrunk onto the spindle, and by a nut screwing over a thread cut on the four parts *a b g h* at their ends, or by a thimble fitting over said ends and secured by a lynch-pin, the plan of welding being the strongest and preferable one, that of riveting allowing the skein pieces to be removed and replaced when worn, and the last plan of using a clamp-nut or thimble affording superior facilities for changing the skein pieces, but being liable to work loose in practice. When the pieces are welded or riveted together the spindle can be turned up to a smooth tapering form, and provided with a nut-screw, *c*, and face-nut, in the ordinary manner, as shown. The front bolster K L consists of the bed-plate L, which is supported at the center on the bent support *f*, which rests on the inverted arch-plate K, which plate is united at the ends to the ends of the bed-plate L either by welding or riveting said ends together, or by uniting them by the bolts 6 6, by which the box-standards are secured to the bolster. The box-standards *i j k* consist of the base piece *i*, which rests on the bed-plate L, and at the ends of which

are bent up the upright box piece *j* and the inclined brace piece *k*, which are united at their upper ends by riveting or welding, as shown. The trussed reach R S R S consists of four plates, R S R S, arranged in pairs, as shown, and united by bolts or rivets 17, with intervening thimbles, the front ends R' R' of said pairs being bent so as to lay parallel to and at a short distance from each other, and being united by the cross-plates *r r s s* and the intervening face-plates U U, bent from bar-iron into the form shown in detached plan in Fig. 3, which are secured between the ends of each pair by bolts 18. In the ordinary use of the running-gear the parallel ends R' R' of the trussed reach extend between the hound-pieces C D to the front axle A B, where they are secured by the king-bolt 5, which is a simple bar of round iron run through the bolster K L and front axle A B and the front cross pieces *r s* on the reach, and resting on the plate *q* secured by the bolts 3 3 under the axle piece B, in which case the rear cross pieces *r s* serve as chafing-pieces for the hound; but where a long reach is required, the center reach T T, consisting of two iron plates placed one above the other, and united at the ends by a bent weld or clamping-bolts and blocks, as shown in Fig. 2, is placed between the parallel ends R' R', where it is secured by a pin, 19, run through the rear cross-pieces *r s*, its front end being secured in the axle A B by the king-bolt, and the front cross-plates *r s* serving in this case as the chafing-plates for the hound. The rear axle M N consists of the straight axle piece M, which is connected at the center with the arched axle piece N by the bent-iron support P and bolts 12 13, the ends of said axle being drawn out and welded together to form, with the skein pieces G H, the axle-spindles *g h*, as before described. The lips *t t* are bent up on the ends of the reach pieces R S R S, which fit up between the axle pieces M N, where they are held by bolts 10 run through the axle and reach pieces, and a filling-block, 11, placed between the ends of the reach pieces. Where the running-gear is designed for very heavy work the tension-rods V can be secured under the reach pieces R S by eyes fitting over the bolts 10 in the rear axle at one end, and the bolt 18 in the reach near the hound at the other end. The rear bolster Q is a plain plate bolted to the axle piece N by bolts 13 at the center, and supported at the ends by bent-iron supports H', which are conveniently made by bending the ends of the upper skein pieces H and securing said bent ends under the ends of the bolster by bolts 14, which can also serve as one of the bolts for the box-standards *j k*. The wheels W X Y are constructed with a cast-iron hub, W, in which are cast the wrought-iron spokes X, on the ends of which are formed the shoulders *x x*, which receive the felly-rings Y Y, which are made by bending bar-iron edgewise, and are secured to the ends of the spokes X, in the seats formed by the shoulders *x*, by means of bolts or rivets 22 run through the felly-rings and ends of spokes, as shown. The filling pieces *u* consist of bar-iron curved to the form of the fellies, and having the lips 23 23 bent down at their ends, and

they are secured between the felly-rings Y Y and between the adjacent spokes X X by bolts *y*, which run through the piece *u* and tire Z, as shown in Fig. 9. The tongue 21 is secured between the tongue pieces *d m e d m e* by a pivot-bolt, 20, run through the tongue-plates *l m l m*, and is supported in a horizontal position by its bearing on the cross-piece *o* and under the cross-piece *n*. The double-tree *v w w* consists of the top plate *v* and the edge plates *w w*, which are placed edgewise under the plate *v*, and are united to each other by bent welds at the ends, and the filling-blocks *v' v'* and bent-iron center plate *w'* with bolts 26 26, and to the plate *v* either by welding their edges to said plate, or by the bolts 27 26 27, which unite the draft-links to the tree and the tree to the tongue.

Having thus fully described the principles and details of construction of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The circular hound C D E, composed of the circular hoop C, circular pieces D E with tongue-ends *d d e e*, bent tongue-plates *l m l m* united by clamping-bolts, plates, and cross pieces, as described, the several parts being constructed and arranged substantially as and for the purpose herein specified.

2. The straight axle piece B and arched axle piece A, in combination with the bent-iron support J and circular hound C D E, constructed as described, said axle pieces and hound being united by clamping-bolts 1 1, with intervening filling-blocks F F, and the several parts being constructed and arranged substantially as specified.

3. The front bolster K L, consisting of the bed-plate L, inverted arch-plate K, and bent-iron support *f'*, said bed and arch-plates being firmly united at their ends, substantially as and for the purpose specified.

4. The bolster-standard *i j k*, consisting of the base-plate *i* having the upright leg *j* and inclined brace-leg *k* bent up at the ends thereof, said legs being united at their upper ends, substantially as and for the purpose specified.

5. The trussed reach R S R S, consisting of the four bars R S R S arranged in pairs and having their front ends R' R' placed parallel and at a short distance from each other, said front ends being connected by bent face-plates U U and cross pieces *r s r s*, and the several parts being arranged and combined substantially as specified.

6. The tension-rods V V, in combination with the trussed reach R S R S and the rear axle M N, the several parts being arranged and connected substantially as and for the purpose specified.

7. The center reach T T, consisting of two plate-bars placed one above the other and united as described, in combination with the trussed reach R S R S having the parallel front ends R' R', substantially as and for the purpose specified.

8. The combination of the straight axle piece M, blocks 11 11, arched axle piece N, plate-bar bolster Q, end bent-iron supports H' H', and bent-iron center support P, the several parts be-

ing arranged and connected substantially as and for the purpose specified.

9. The axle-spindle *g a b h*, formed by drawing out and uniting the axle pieces A B, and combining therewith the skein pieces G H, substantially as specified.

10. The combination of the cast-iron hub W, wrought-iron spokes X X with shoulders *x x* formed thereon, and felly-rings Y Y formed of plate bar-iron bent edgewise, the several parts being arranged and connected substantially as specified.

11. The filling piece *u* with bent end lips 23 23, in combination with the felly-ring Y Y, formed as described, and the tire Z, said tire and filling piece being connected by one or more bolts, *y*, with intervening thimbles, and the several parts being arranged substantially as specified.

12. The herein-described wheel W X Y Y Z, consisting of the cast-iron hub W, wrought-iron spokes X with shoulders *x x* thereon, felly-rings Y Y formed as described, filling pieces *u*, and tire Z, the several parts being constructed, arranged, and connected substantially as and for the purpose specified.

13. The double-tree *v w w*, consisting of the broad top plate *v*, edge plates *w w*, bent center plate *w'*, and end blocks *v' v'*, the several parts being arranged and connected substantially as and for the purpose herein specified.

As evidence of the foregoing witness my hand this 12th day of August, A. D. 1871.

JOHN BALL, SR.

Witnesses:

JOB ABBOTT,

ANDREW CHAFFIN.

(22.)