(No Model.)

J. H. BAKER.

WAGON RUNNING GEAR.

No. 509,354. Patented Nov. 28, 1893.

Fig. 1.

Fig. 2.

Fig. 3.

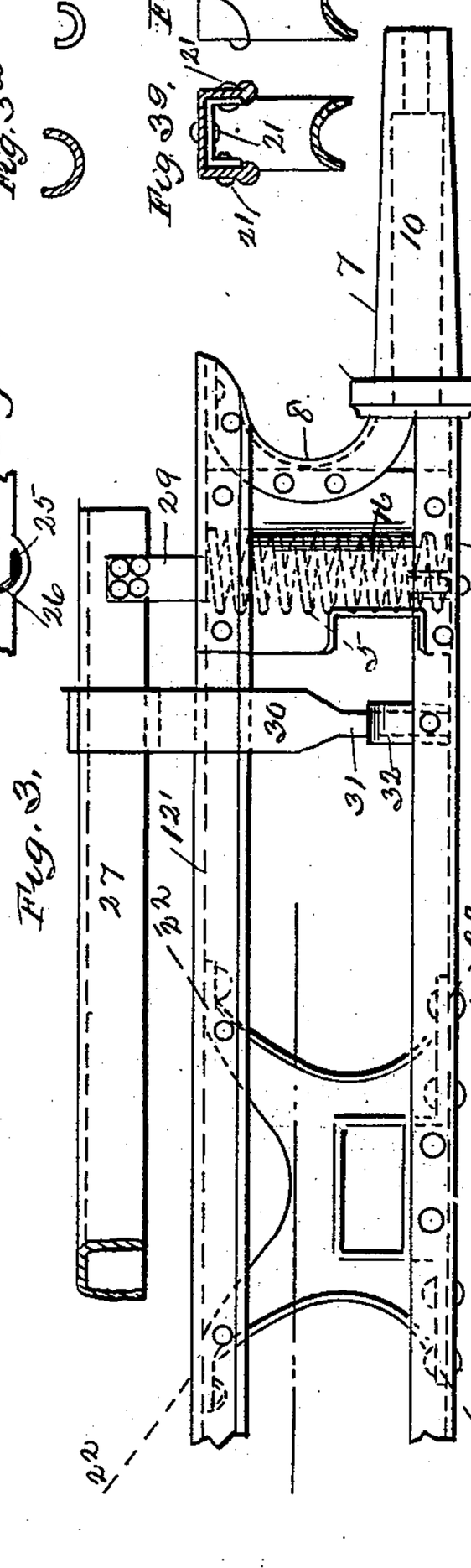

Fig. 3a.

Fig. 3b.

Fig. 3c.

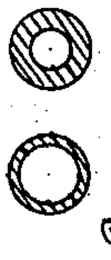

Fig. 3d.

Fig. 3e.

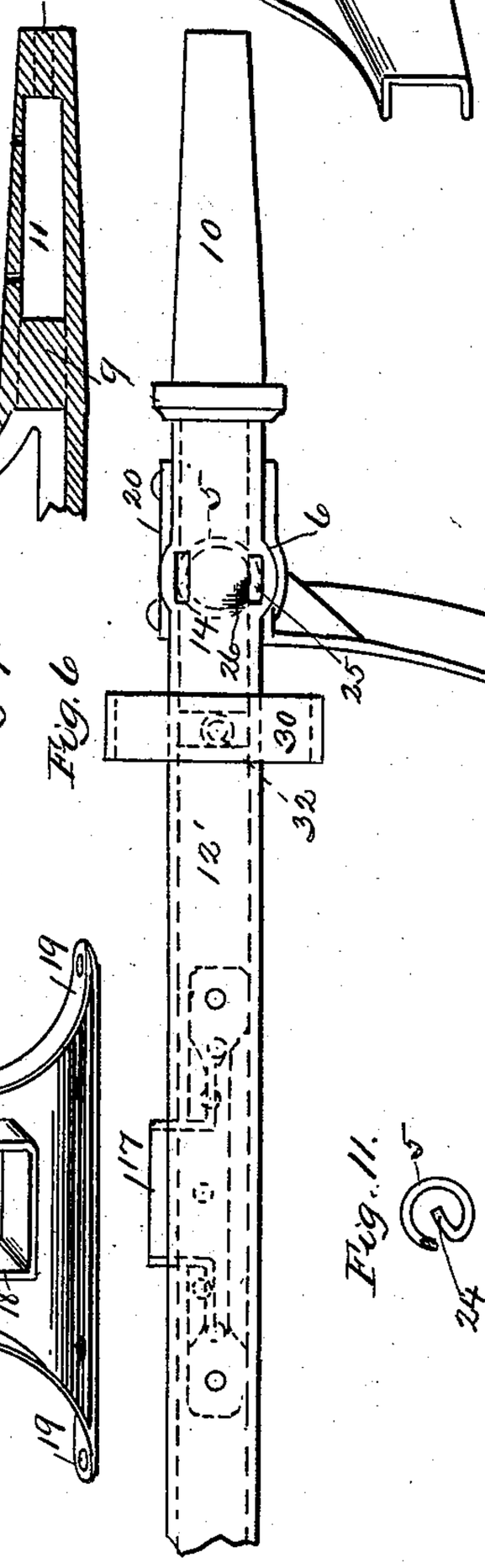

Fig. 4.

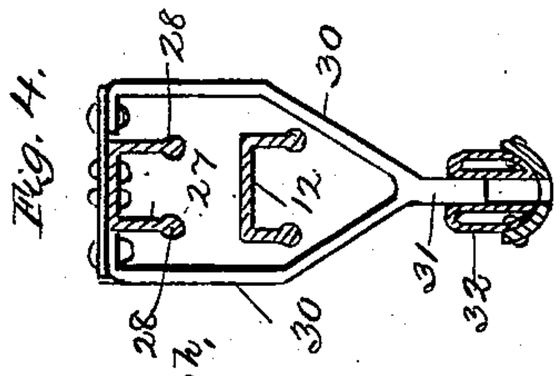

Fig. 5.

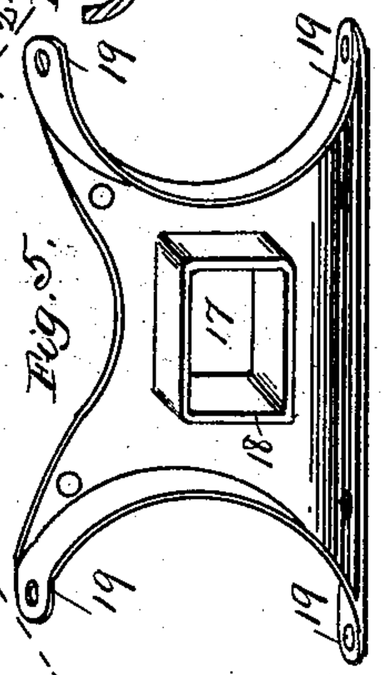

Fig. 6.

Fig. 7.

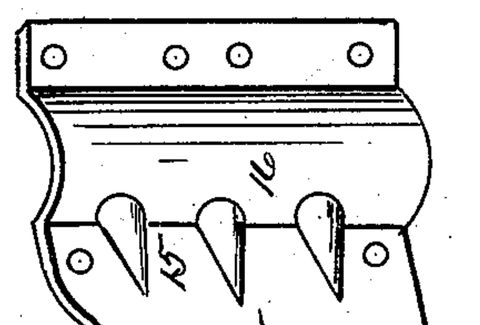

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

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JAMES H. BAKER, OF ALLEGHENY, PENNSYLVANIA.

WAGON RUNNING-GEAR.

SPECIFICATION forming part of Letters Patent No. 509,354, dated November 28, 1893.

Application filed November 4, 1892. Serial No. 450,978. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. BAKER, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented or discovered new and useful Improvements in Wagon-Gear, of which the following is a specification.

In the accompanying drawings which make part of this specification, Figure 1, is a plan of the blank from which the axle is made. Fig. 2, is a plan of the axle after it has passed through eccentric rolls. Fig. 3, is a front elevation of axle, bolster, spring bolster, center, spring bolster, braces and guide. Figs. 3^a, 3^b, 3^c, 3^d, 3^e, 3^g and 3^h are sections on various lines of Fig. 3. Fig. 4, is a vertical section through spring bolster, braces and guide. Fig. 5, is a perspective of center piece. Fig. 6, is a plan of Fig. 3. Fig. 7, is a perspective of rear end of hound. Fig. 8, is a central longitudinal section of axle arm. Fig. 9, is a section of plate from which bolster is made. Fig. 10, is a plan of spring cap in bolster. Fig. 11, shows inward bend of spring.

My invention relates to improvements in wagon gears, such as are usually called lumber or farm wagons. Such wagons are nearly all made of wood end then ironed with plates, straps, bolts, &c., which have rendered them expensive and liable to repairs.

The object of my invention is to make them of metal, and decrease the number of parts and eliminate bolts and braces and to generally improve their quality as will hereinafter more fully appear.

I take for illustration a hind gear, though what I shall describe will apply as fully to a front gear. When I name the bolster in this description, I mean that the same shall apply to what is called the sand board in the front gear. The piece which has projections reaching downward and resting on the springs, and therefore which comes between the bolster proper and the load, I will call a spring bolster. To make the axle I take a plate 1 of proper width and of even thickness seen in Fig. 1, and heating it I pass it between eccentric rolls, and reduce it to about the section shown at Fig. 2. It may not always be necessary to reduce the part 2. The main thing is to get it heavy at 3, and lighter from there toward the center. If a blank is wanted wider between the arms, then the thin part 4 can be made by rolling sidewise. This is for the purpose of placing the extra weight only where needed. I then press it into the form of Fig. 3^a. At the point where the spring 5 is to rest on the axle, I form the seat or cup 6 to contain the spring. I now take a piece of preferably similar section, and make the upper half of the arm 7 and having pressed the arm part into corresponding shape to meet the axle part, and having a projection 8, I weld the arm portion to the corresponding portion of the axle, having first trimmed the edges from the shoulder out to give the requisite taper. I prefer to place a short round section 9 in the semi-tubular parts at the shoulder of the arms 10, as this makes the welding easier and the arm stronger at the critical point, and closes one end of what is to be the oil chamber 11. A similar piece may be welded in the end 12, of the arm, to make the threaded part or the end welded without it and a nut inserted. The rest of the arm can be welded along the sides. For some work the thickness of the plate, to make the axle would not be reduced from the shoulders outward but made solid by having the piece 9 extend to the end. For the very best results the changing form of section should be about as Fig. 2. The special features of this axle are its lightness between the arms, and strength at the shoulder, and the projection 8 carried up to engage with the bolster 12, so that any inclination of the arm to bend behind the shoulder, will be checked by the upward projections being held from giving in toward each other by endwise pressure of the bolster. As the end pressure of these projections cannot well be brought directly against the ends of the bolster I secure them by riveting.

To make the bolster I now take a channel section with preferably reinforced edges seen at Fig. 3^b. This is made by first rolling a plate 12, and then pressing it into shape Fig. 3^f for the bolster. This reinforcing of the edges of the flanges of the channel renders it much stronger and therefore makes it possible to use a lighter bolster to a given strength. The same is true of the spring bolster described

below. Between the flanges I make the spring cap 14, Fig. 10. At the ends of the bolster I close the channel flanges as at Fig. 3h.

I now make the hounds, Fig. 7, of plate metal with a channel or corrugated section and shaped at the end 15, to join the sides of the bolster and axle and having a portion of a circle 16 made to form one side of the casing for the coil springs. This hound is much deeper at this point where it joins the axle and bolster than elsewhere.

I now form the center piece, Fig. 5, for connecting the bolster and axle in the center. In this I make the opening 17 for the reach and I flange the edges at 18, 18, so as to stand at right angles to the line of the axle to give strength against buckling. I also extend the four points 19, 19, for reasons to be mentioned in speaking of the general form of the structure. I then make holes and rivet the center piece, and the hounds, to the axle and bolster, and the hounds to the arm projections, and the arm projections to the bolster. On the opposite side of the hounds I rivet a plate 20, to form the other side of the spring casing. I also deem it important that a part of the rivets holding these members together shall be placed at right angles to the others as shown at 21, 21; and further the members and rivets shall be so disposed that they form lines 22, 22 of resistance to sliding. While these lines may pass from the axle to the bolster and vice versa at an angle of more than forty-five degrees and be the better for it, they should not pass at a less angle. In the absence of any other connecting medium the simple running of members from the axle to the bolster at nearly right angles, would not make a durable wagon inside of prohibitory weight.

To save expense I make the coil springs of rolled steel but do not forge them down and close them at the ends. This necessitates the placing of a forked upward projection 23 in the bottom of axle spring seat. I turn in the lower end 24 of the spring as seen at Fig. 11, which placed in the forked piece holds the spring from turning. The bottom of the seat is made to fit the winding surface of the spring. A further object in making the springs open at the ends is to insert them or remove them from the spring case without removing and replacing any rivets which would impair the structure. To insert the springs I make a hole 25 in the upper edge of top spring-cap, and a slight depression 26 in part of its surface, and into this opening I wind the spring into its place.

The spring bolster I make of channel section 27 reinforced at its edges 28, 28, and rivet projections 29, 29, to its top to extend downward through the sides of the top of the bolster and engage with the spring. That the spring bolster may be prevented from getting out of vertical line with the bolster and axle, I secure braces 30, 30, to it and unite them to a guide piece 31, arranged to slide vertically in a suitable hollow piece preferably a tube 32. This guide piece I make of a tube by splitting its top and bending out and down and fastening to the edges of the axle.

I have now shown how to carry out my invention in what I consider the best way, though the skilled wagon maker will find many ways to vary in details. For instance, the axle arm described in my application for wagon gear executed October 7, 1892, may be used to form the upward projection to the bolster or the upward projection from the arm might be made by turning up a part of a tubular axle; or other section of axle or bolster either solid or otherwise can be used.

The projections 8, 8, need not in my construction be riveted to or rest against the hound except to prevent sliding, as the endwise pressure at that point is too close to the line of strain in the axle to be of much benefit. If elliptic springs, or no springs are desired, then the structure can be so modified.

I prefer to rivet the parts together but welding may be employed at other points as well as at the arm. The section for the axle may be other shapes than semi-tubular.

Some of the advantages of my invention are the cheap and permanent insertion of springs and the absence of bolts and braces. The greatest advantage is that the axle arm has great strength at the shoulder, and the axle and bolster and connecting medium have less, or no more combined weight of section than the axle at the shoulder, and yet has sufficient vertical strength between the arms to carry the load. Some have attached much importance to have the structure overlying the axle, bear upon it only at the point next to the shoulders of the arm. But such construction is only allowable in wagons having a rigid body carrying the load on the side of the bottom, and even in such a case the axle could be lighter in the center, if tied to the upper structure. But in the farm or lumber wagon where the load in a common board body, or in rails or logs, is distributed over the bolster, and sometimes all in the center, and as the distance between the shoulders and the metal axles is about twenty times the diameter of the arms, it is necessary that the central part of the gear be many times stronger than the axle at its shoulders. But any practical method cannot proportionately increase the amount of metal in the central parts.

Since the vertical strength of a horizontal member increases in a ratio with the square of its depth, I make the axle and the bolster, parts of the same member, and by properly tying them together, I get nine times the vertical strength of the arm by making the structure only three times its depth. Again since the strength of such a member lies mostly in the outer vertical edges, and needs only sufficient material between them to tie them together and to prevent sliding or shearing, it is clear that my construction gets the most

strength from a given weight. At the shoulders of the arms, where the depth is limited to a reasonable diameter of the arm I mass the metal and increase the depth rapidly from that point inwardly.

I claim the parts in detail and in combination as follows:

1. In a wagon gear, a metallic axle and a separate overlying metallic bolster; said axle and said bolster being connected by projections from the shoulders of the arms of the axle, said projections being integral with said arms, substantially as described.

2. In a wagon gear, a metallic axle and a separate overlying metallic bolster; said axle and said bolster being connected by projections from the shoulders of the arms of said axle, said projection being integral with said arm and also by a metallic piece intermediate between said arms, substantially as described.

3. In a wagon gear a metallic axle having seats for springs formed integral therewith by the sides of the axle at these points, substantially as described.

4. In a wagon gear, a metaliic axle having seats integral therewith for springs and guides with openings in them for the spring bolster guides to work in, substantially as described.

5. In a wagon gear, the combination of a metallic bolster, a metallic axle having a seat to contain one end of a spiral spring, said seat having an upward projection to receive the end of a spiral spring, substantially as described.

6. In a wagon gear, the combination of a channel axle and a channel bolster, said axle and bolster being connected by projections from the shoulders of the arms of said axle, substantially as described.

7. In a wagon gear a metallic bolster channel shaped in section having the lower edges of the channels reinforced in section, substantially as described.

8. In a wagon gear a metallic cap to receive the upper part of a coil spring and having an opening in its edge to insert the spring, substantially as described.

9. In a wagon gear a channel shaped metallic bolster having openings down through the top of the bolster to admit the downward projections from the spring bearing bolster, substantially as described.

10. In a wagon gear a spring bearing bolster of channel section having guides extending from each side downward and united to a guide rod arranged to slide vertically in guides attached to the axle, substantially as described.

11. In a wagon gear, the combination of a metallic axle; a separate overlying metallic bolster, and hounds connected to said axle and bolster, the vertical sections of said hounds being of sufficient depth at their axle ends to extend substantially from the top of the bolster to the bottom of the axle, substantially as described.

12. In a wagon gear a metallic axle, a metallic bolster, and metallic hounds riveted thereto, the ends of the hounds being suitably shaped, at that point into one half of the coil spring casing, substantially as described.

13. In a wagon gear a metallic axle and a metallic bolster secured in the center by a metal center piece secured thereto, the latter having an opening for the reach and having flanges on the edges set at right angles with the line of the axle, substantially as described.

14. A metallic axle; a separate over lying metallic bolster and a vertical plate, having flanges turned at right angles to the line of said axle and bolster and connecting said axle and bolster at a point intermediate between the shoulders of the arms, substantially as described.

15. A metallic axle; a separate overlying metallic bolster, and a vertical plate at a point intermediate between the shoulders of the arms, said plate having flanges thereon, and rivets through said flanges connecting the same to axle and bolster, substantially as described.

16. In a wagon gear, a metallic axle and a separate overlying metallic bolster connected at a point intermediate between the arms by a vertical metal plate, substantially as described.

In testimony whereof I have hereunto set my hand this 15th day of October, A. D. 1892.

JAMES H. BAKER.

Witnesses:
WILLIAM BEAL,
WILLIAM L. PIERCE.