

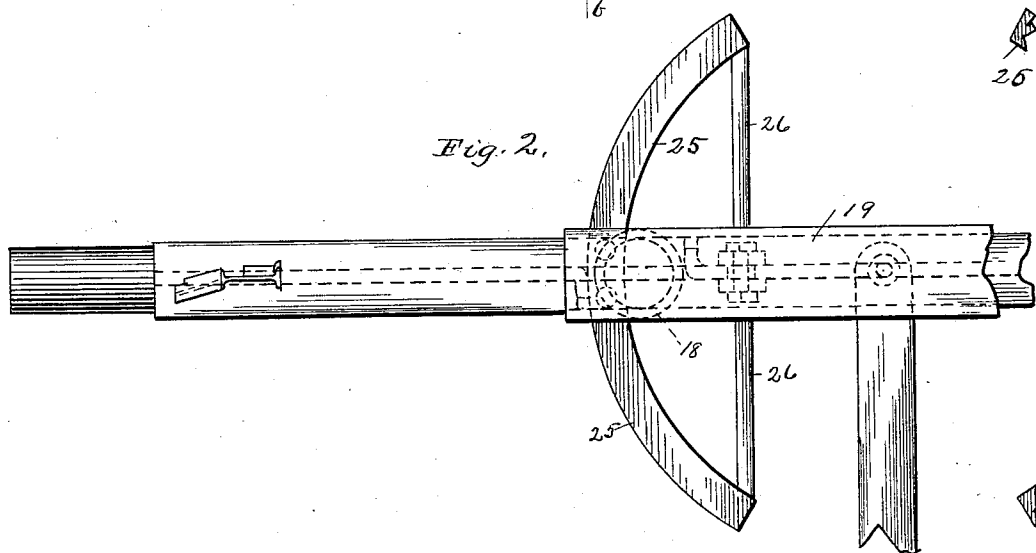
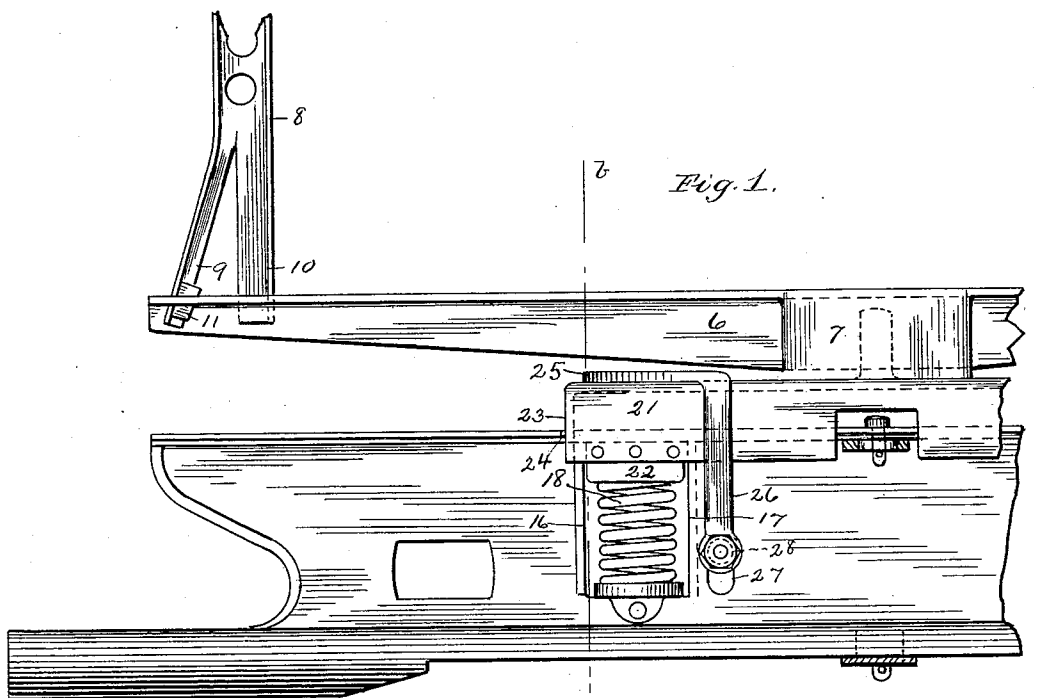
(No Model.)

4 Sheets—Sheet 1.

J. H. BAKER.
WAGON RUNNING GEAR.

No. 480,379.

Patented Aug. 9, 1892.



Witnesses:
H. E. Harrison,
J. V. Beal

Inventor,
James H. Baker
by his attorney
Wm. L. Pierce

(No Model.)

4 Sheets—Sheet 2.

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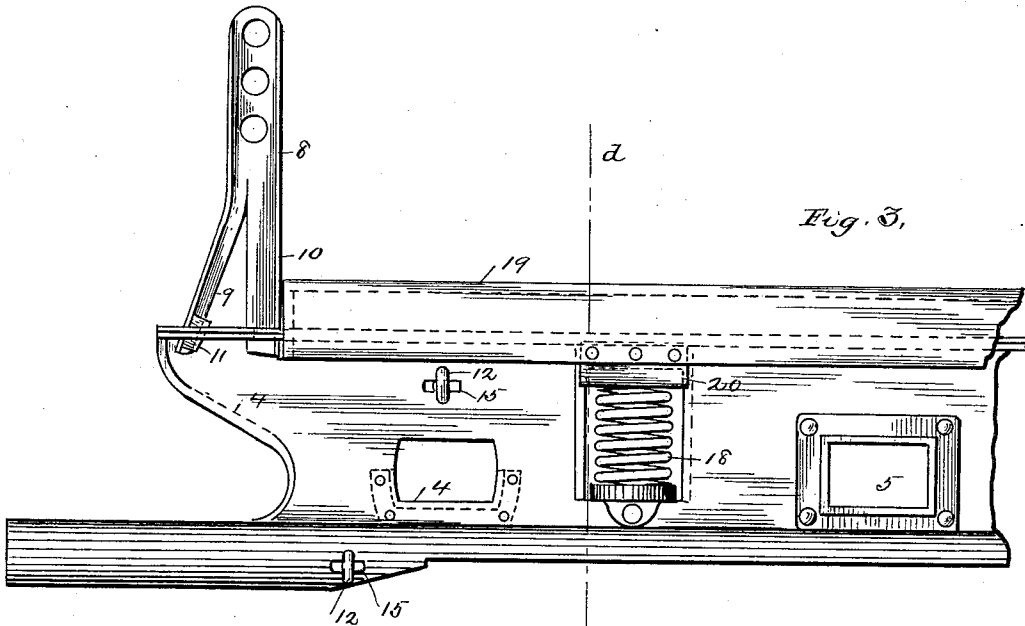


Fig. 5.

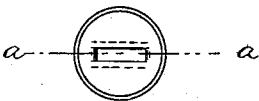


Fig. 6.

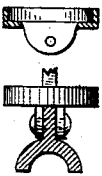
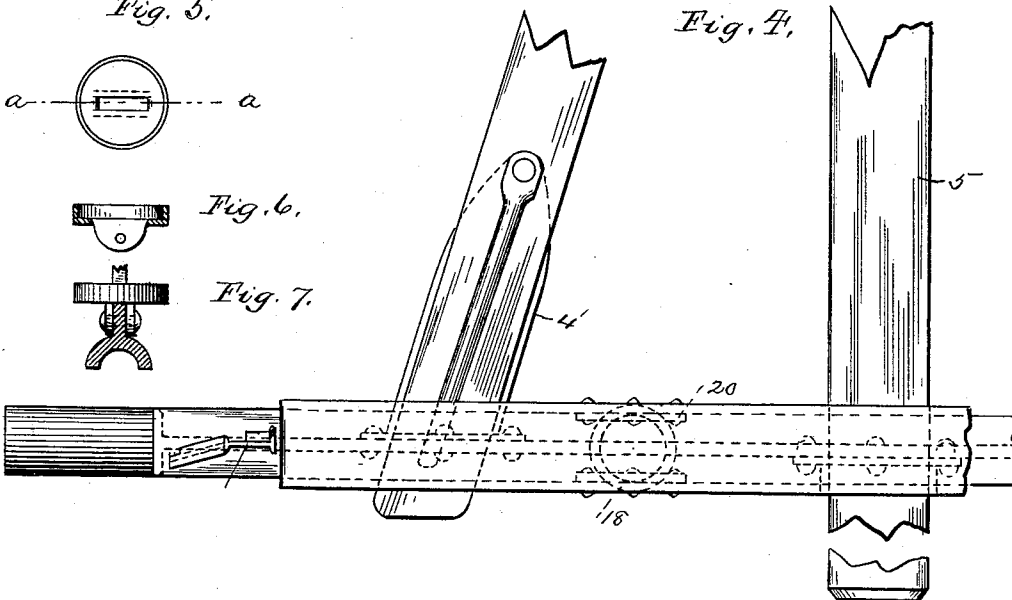


Fig. 7.



Fig. 4.



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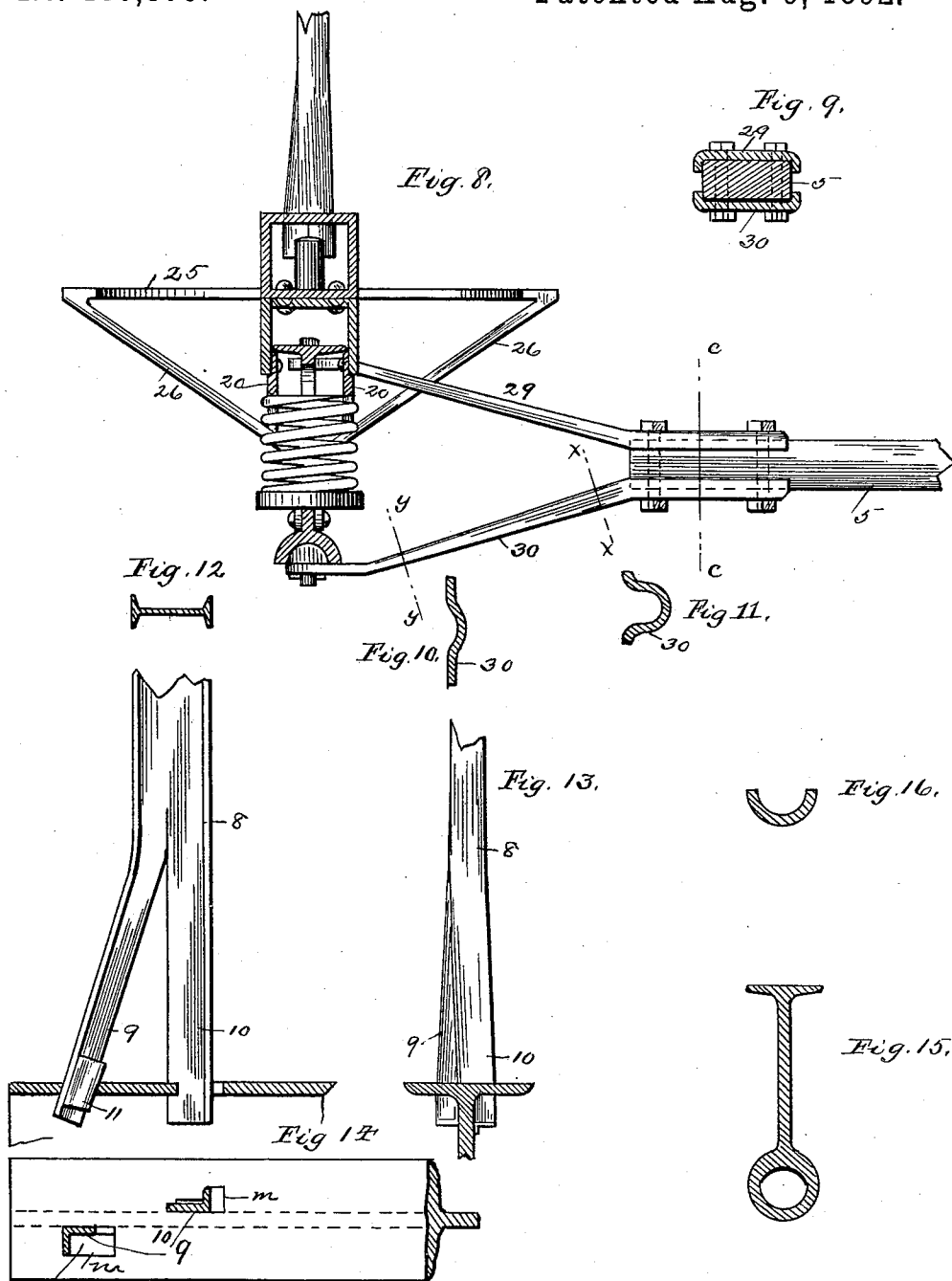
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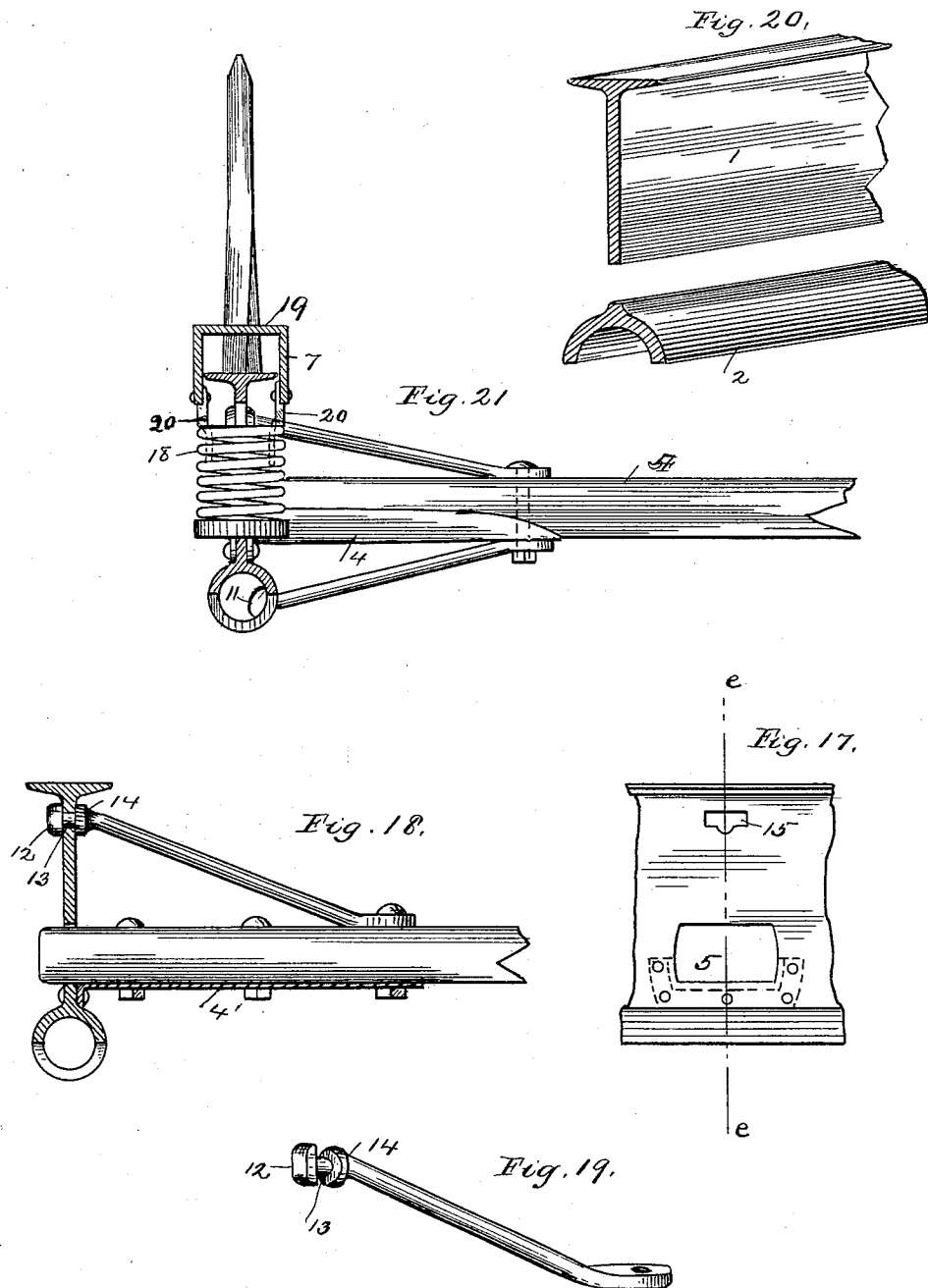
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4 Sheets—Sheet 4.

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UNITED STATES PATENT OFFICE.

JAMES H. BAKER, OF ALLEGHENY, PENNSYLVANIA.

WAGON RUNNING-GEAR.

SPECIFICATION forming part of Letters Patent No. 480,879, dated August 9, 1892.

Application filed March 15, 1892. Serial No. 424,983 (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 a new and useful Improvement in and Method of Making Wagon Running-Gears, of which the following is a specification.

In the accompanying drawings, which make part of this specification, Figure 1 is a rear elevation, broken off, of the front axle, sand-board, spring-bar, rock-bolster, and stake, broken away. Fig. 2 is a plan view of the same. Fig. 3 is a rear elevation of the back axle, bolster, and spring-bar, broken away, and stake. Fig. 4 is a plan of the rear axle, bolster, spring-bar, reach, and hound, broken away. Fig. 5 is a plan of the rosette on which the spring rests. Fig. 6 is a section through the rosette on the line *a a* of Fig. 5. Fig. 7 is a section through the axle and an end view of the rosette. Fig. 8 is a section on line *b b* of Fig. 1. Fig. 9 is a section on line *c c* of Fig. 8. Figs. 10 and 11 are sections on lines *x x* and *y y* of Fig. 8. Fig. 12 is a section through the bolster and an elevation through the stake and also a section through the stake. Fig. 13 is an edge view of the stake with bolster in section. Fig. 14 is a plan view of the bolster, showing openings for attaching the stake. Fig. 15 is a section through bolster and axle-arm. Fig. 16 is a cross-section of the lower half of the axle-arm. Fig. 17 is a front elevation, broken away, of the rear axle-web and bolster adjacent to the hound-openings. Fig. 18 is a section on line *e e* of Fig. 17. Fig. 19 is a perspective of a brace. Fig. 20 is a perspective of the upper and lower pieces of an alternative way of forming the blank from which the combined axle and bolster is made, and Fig. 21 is a section on line *d d* of Fig. 3.

My invention, generally stated, consists in a new method of making an axle and bolster or axle and sand-board in one piece, in the combined axle and sand-board resulting from this method, and in certain novel constructions embracing the springs, spring-bars, braces, slide-arms, stakes, reach, and hounds of metal running-gear, as well as the devices employed in securing the above parts to each

other, all of which are more minutely described hereinafter.

It is to be noted that in the following description I treat the rear axle and bolster and front axle and sand-board as synonymous unless otherwise specified; also, when speaking of a combined axle and bolster in one piece I do not include therein the washers, nuts, linchpins, or collars, as these all are parts common to wagon-axes.

While the method of making and the resulting axle and bolster described in my application, Serial No. 422,891, filed February 26, 1892, are highly desirable for certain kinds and sizes of wagons, the method and resulting axle and bolster which I now show are better for certain other and heavier styles of wagons. In making these combined axles and bolsters where their depth is great and where the openings in them are large I preferably form the axle and bolster by welding together the shapes of metal—such, for example, as seen at Fig. 20, at 1 and 2. The line for welding for these pieces is generally best along the bottom lines of the hound and reach openings, which thus reduces the amount of the welding. The lines of welding, however, will often be determined by the relative widths of the bolster and the axle and the easiest way of rolling or producing said widths. An extra-wide bolster might thus cause the welding-line to be raised nearly to the bolster, leaving most of the intervening web to be rolled integral with the axle. This method of welding two pieces together instead of rolling in one piece saves the scraps at the ends, which would have to be cut from the web and bolster where the axle-arms project beyond them.

The best way to accomplish the welding of the two pieces together is to force them together butt-weld fashion by power while subjected to the heating agent and then passing the weld between a pair of rolls or hammer-dies. The heating agent should be gas and compressed air or electric current. The welding may be done before the bolster and axle-blanks have had any work done on them; but I prefer to cut the various openings in the bolster and finish the axle-arms before welding the two together. To complete the axle-

arms, I take a piece of hard steel of the cross-section seen at 3 in Fig. 16 and of such length that it will extend back under the structure a sufficient distance to get the right distribution of strain. The upper and lower halves of the axle-arms are then raised to a welding heat only along the lines of the surfaces to be joined. As these surfaces form the line of neutral strain in a loaded wagon, the body of the piece is not weakened, and I can therefore use hard steel and so get a good wearing-surface. I then taper the arms in any of the well-known ways. I then heat the piece and place it in suitable dies to turn the end flanges 4 and shape up the entire structure. If any strengthening corrugations are wanted in the web, they can be made in the same dies at the same time.

Another advantage of rolling the axle and bolster in two pieces and welding is that both of the sections seen in Fig. 20 can be rolled much easier and in much lighter rolls than if rolled together as one shape, and the cross-section of the bolster and axle can be produced in a much greater variety of shapes by this separate rolling than if rolled as an integral piece, and I therefore do not confine myself to the particular cross-sectional shapes seen in Fig. 20, as they may be widely varied and yet the purposes of my invention secured. The result of making the axle and bolster in one piece is that either the axle or bolster has the combined strength of both from arm to arm. The arms can, therefore, also be increased in strength and size without increasing the weight of the balance of the axle, which will still be as strong as the arms, because it is reinforced by the web and bolster. I can thus procure an arm of large diameter, which is desirable in avoiding excessive friction in the box of the wheel; but the most important feature is that it distributes the vibration of the metal, which arises from the use such wagon-axles are subjected to, for since my structure is so much stiffer between the arms by reason of the axle and bolster being made integral, if the arms were not increased in strength, as noted, there would be a tendency to crystallize and break at the points next to the wheels. This construction gives the elasticity necessary to long life.

There are obviously many ways to increase the size of the arms without increasing the size of the balance of the axle, such as by sleeves, casting to the arms, &c. I prefer to make the central part of the axle in about the form of a half-circle in cross-section, as seen in Fig. 15. This section can be made partly hollowed out in proportion as a larger arm is wanted with a given weight.

To attach the hounds and reach to the rear axle and the hounds to the front axle, I may make the hound and reach brackets integral with the axle and bolster; but in order to chiefly adapt my axle and bolster to the variety of wants of the smaller makers of wagons I make the hound and reach brackets of

pressed metal, preferably steel, and rivet them on. In this way these parts can be made of different shapes without changing the large dies used to cut and shape up the axle and bolster.

To make the hound and reach brackets, I take sheet metal and cut it to a suitable shape and form them in dies at one stroke of a press for each. While I show only the hind-hound attachments at 4 in Figs. 4 and 18, ordinary skill can adapt them to the front gear of wagons. The reach attachment is seen in Figs. 4 and 17, at 5.

My improved web-bolster 6 (seen in Figs. 1 and 21) I make of metal, T-shaped in cross-section, tapered in the usual form. To get a bearing on the lower side, I weld a section of channel-iron 7 to the bottom of the bolster T, while the sides of the channel extend upward and are welded to the top of the bolster, preferably to the edges of the flange.

8 is a metal stake. The difficulty with them is to attach them so that they may be easily removed and at the same time keep them from clattering. This I overcome, first, by securing them with wedges, and, second, by making the stakes with self-contained tension. The stakes are made of hard steel out of T-shaped cross-sections. (Seen at *n*, Fig. 12.) I then cut and separate the lower portion, as seen at Figs. 3, 12, and 13, into two members 9 and 10. I then cut out openings of the shape seen at *m m* of Fig. 14 in the flange of the bolster or rock-bolster, as the case may be, to make locking-recesses. As the mortises or holes in the top of the bolster are made on opposite sides of the web, it is clear that by bending the legs of the stakes properly they will have to be sprung in, which will prevent their rattling. The parts 9 and 10 of the stake which enter the flange of the bolster have slots which are forced back until they engage with the flanges. I then drop in a suitable wedge 11, which holds the stake in place.

In Figs. 17, 18, and 19 I show my improved brace-head, by which a hound can be braced to the axle or bolster without any thread or nut, the latter being very hard to keep tight in a wagon structure, especially where the surfaces joined are all of metal.

The end of the brace which is to be secured to the axle and bolster is provided with a head, substantially as shown at 12 in Fig. 19, back of which is a neck 13 and collar 14. A hole is punched through the metal web of the axle, substantially such as seen at 15, Fig. 20. The head 12 is slipped through said hole and rotated about ninety degrees, and thus locked in place. The other end of the brace can be secured to the hound in any suitable manner.

My improved system of placing springs in farm and lumber wagons and kindred classes of wagons in bearing is simple and cheap. Taking my metallic axle and bolster, I cut out an opening of the required size for the spring by cutting down the center where the open-

ing is to be and along the top and bottom. This leaves two flaps of metal 16 and 17, one of which I turn back and one forward. At the bottom of these openings I insert metal rosettes of the usual form—such as seen at Figs. 5, 6, and 7—and set on them the spiral springs 18 18.

The spring-bar or false bolster can be of any desired form. I prefer to use one seen in the drawings. This spring-bar is shown as a length 19 of channel-iron, with pieces 20 20 riveted on to engage the springs 18 18. The pieces 16 and 17 turned out I so trim off or direct that their edges are about flush with the outside edges of the flange of the bolster or sand-board, so that they serve as guides for the spring-bar to slide over or against.

So far as I am informed, springs for the front gear of wagons have never been put under the same board. The main difficulties in placing them there have been the fact that the rock-bolster changes its relative lateral position to the sand-board as the wagon turns and that the slide-arms must maintain the same relative height to the center bearing of the rock-bolster. They have been attached to the rock-bolster, and thus rendered the structure stilted and unsteady. I overcome the above objections.

Leaf-springs can be used, if desired, though I prefer coil-springs as being cheaper.

The openings for the springs in the sand-board and axle for hind gear are made the same as in the bolster and axle.

I provide a bearing 21 for the rock-bolster with sides to slide vertically, having projections 22, which rest upon and engage with the springs 18 18. This piece I make much of the same general style as the cap shown on the hind bolster; but I do not make it so long, but only long enough to reach from one spring to the other. To prevent lateral motion, I turn the ends in at 23 23 to fit loosely in slots 24 24 in the sides of the top of the sand-board.

Instead of resting slide-arms for the rock-bolster to rest upon in turning upon the top of the sand-board, as is usually done, I fasten the slide-arms 25 to the ends of the rock-bolster bearing, and they are thus kept in right relative height to the rock-bolster as the springs operate.

The necessary braces to support the ends of the slide-arms 26 26 I make, as shown, to extend downwardly to the lower side of the structure; but as these braces must move vertically as the springs operate I make a vertical slot above, as 27, and insert a collar 28, to which I rigidly bolt or rivet the ends of the braces; but if no springs are used then the slide-arms can be fastened to sand-board in the usual way. The advantages of this arrangement of the springs, rock-bolster bearing, and slide-arms, with their braces, are apparent.

The object of my new improved form of reach is to cheapen and at the same time render less liable to need of repairs the form of

construction of wagons. By my new reach I do this by dispensing with the slider, sway-bar, and that portion of the front hounds which extends back of the front axle with their plates, braces, bolts, &c. I am fully aware of the fact that these parts have been done away with in the general construction of most classes of spring-wagons, buggies, &c; but these have had a rigidly-bolted body or frame fastened to the gearing, which largely served to keep the front-axle structure in a vertical position. This support a wagon without a fixed body does not have. I surmount these difficulties by making the front parts 29 30 of the reach of pressed steel, as shown at Fig. 8, one part going to the lower part of the axle, where it is engaged by a pin fastened to the axle, and the other going to the top of the sand-board, where it is fastened by a pin. From Fig. 8 it is clear that the axle and sand-board will be held in a vertical position. To allow for unevenness in the surface of roads, I make the lower part of the reach-projecting arm slightly loose-fitted and the upper part rounding and in addition make the opening for the pin in the form of a cross-slot.

Having described my invention, I claim, broadly—

1. A method of making a metallic axle and bolster, which consists in making the bolster portion in one piece and the axle portion in another and welding the two together, substantially as set forth.

2. A metallic axle and bolster in one piece for wagons, with a heavier cross-section at the point where the arms leave and lose the support of the metal connecting the axle and bolster, substantially as set forth.

3. A metallic axle and bolster in one piece for wagons, the axle having a cross-section substantially of a half-circle, substantially as set forth.

4. A metallic axle and bolster in one piece for wagons, the axle having a cross-section substantially of a half-circle and the axle-arms being formed by welding thereto pieces of metal substantially, also, of a half-circle in cross-section, substantially as set forth.

5. A metallic axle and bolster in one piece for wagons, in which the lower half of the arms is of hard steel welded to a softer upper part, substantially as set forth.

6. A metallic rock-bolster for wagons, with cross-section in the T form and with a center bottom bearing of a channel-section having its sides fastened to the upper part of the bolster, substantially as set forth.

7. A metallic stake for wagons, made of I-shaped sections divided at the lower end and locked in place by wedges, substantially as set forth.

8. A metallic stake for wagons, divided at its lower end and having self-contained tension when put in position, substantially as set forth.

9. A metallic brace for wagons, having a

head adapted to be locked in an opening of another metallic piece, substantially as set forth.

10. A metallic axle and bolster for wagons, 5 having springs between the axle and the top of the bolster, with a cap or spring-bar to vertically slide, substantially as set forth.

11. A metallic axle and bolster for wagons, 10 having guides for a spring-cap made integral with the axle and bolster, substantially as set forth.

12. A metallic axle and sand - board for wagons, having springs fastened between the axle and the top of the sand-board, substan- 15 tially as set forth.

13. A metallic axle and sand - board for wagons, with a rock-bolster bearing hung over them, substantially as set forth.

14. A metallic axle and sand - board for 20 wagons, having a rock-bolster bearing resting

on springs having slide-arms fastened there- to, substantially as set forth.

15. A metallic rock-bolster bearing having slide-arms fastened thereto, with slide-arm braces extending downward to and arranged 25 to slide vertically on the sides of the lower part of the structure, substantially as set forth.

16. A metallic axle and sand-board in one piece in gear, having a reach forked at the 30 front end, with one part fastened to the axle and the other part fastened to the sand-board at or near the top of the sand-board, substan- tially as set forth.

In testimony whereof I have hereunto set 35 my hand this 10th day of March, A. D. 1892.

JAMES H. BAKER.

Witnesses:

WILLIAM BEAL,
WM. L. PIERCE.