(No Model.)

L. V. MOULTON & J. H. REMPIS.

SLED.

No. 369,359. Patented Sept. 6, 1887.

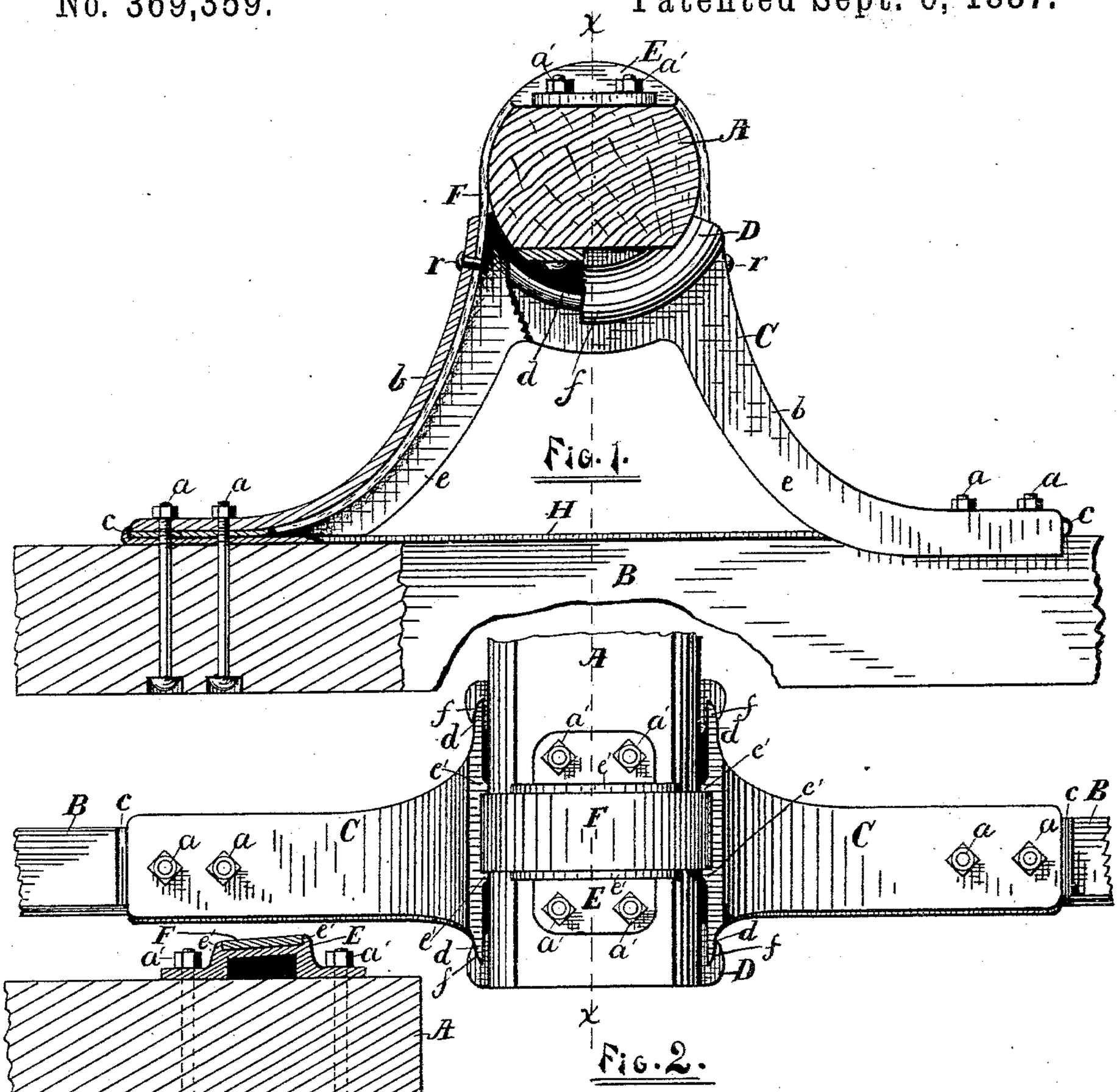

Fig. 1.

Fig. 2.

Fig. 3

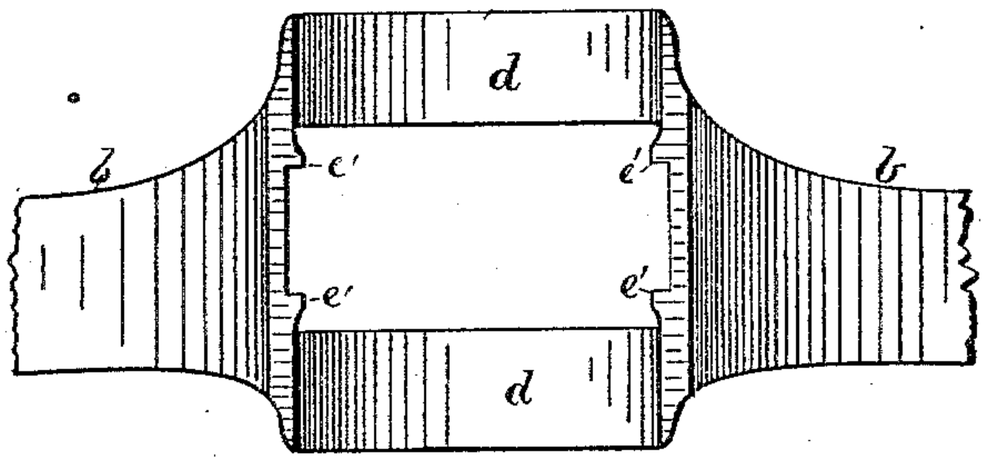

Fig. 4. C

Witnesses

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SLED.

SPECIFICATION forming part of Letters Patent No. 369,359, dated September 6, 1887.

Application filed June 10, 1887. Serial No. 240,944. (No model.)

To all whom it may concern:

Be it known that we, LUTHER V. MOULTON and JOHN H. REMPIS, citizens of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented a new and useful Sleigh-Knee, of which the following is a specification.

Our invention relates to that class of sleigh-knees which provide for an oscillating motion of the runner, which is attached to a single beam by means of said knee. Heretofore the construction of this class of sleigh-knees has been such that wrought-iron could not be advantageously used in their construction. They were therefore necessarily heavy and cumbersome to avoid breakage. The center of oscillation of the runner has also been outside the center of the beam, which tends to throw the structure out of "square" and produce unnecessary strains therein when the runner oscillates. But a single bearing upon the runner has been provided, which tends to spring the runner at the middle and break the shoe.

The objects of our invention are, first, to provide a knee that will have an oscillating movement about the axis of the beam without the expense of forming a journal upon the end of said beam; second, to so support the beam that it will have no tendency to rotate upon its own axis, as is the case when the runner is pivoted below the axis of said beam; third, to so adapt the form of the structure that both cast and wrought iron may be used in its construction; fourth, to provide means whereby the runner may readily be detached from and attached to the beam; fifth, to provide a cheaper, stronger, and more durable structure. We accomplish these results by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of our improved sleigh-knee with portions broken away, showing it partly in section; Fig. 2, a plan view of said sleigh-knee complete; Fig. 3, a vertical section on the line *x x* of Figs. 1 and 2, and Fig. 4 a plan of the upper part of the knee proper.

Like letters refer to like parts in all the figures.

A is the beam, having its upper and lower sides flattened and its front and rear sides rounded or cylindrical, their surfaces being concentric to the axis of said beam.

B represents a portion of the runner.

C is the knee, which consists of a concave seat, *d*, having its upper surface concentric to the axis of the beam and having its outer edges adapted to engage with grooves in the flanges *f* of the saddle D, and legs *b b*, which extend downward and outward from said seat, to the lower end of which is attached the runner B. These legs are provided with flanges *e e* at either side, which engage with the sides of the runner, and also with the edges of the wrought-iron strap F, along which they extend, as indicated at *e' e'*.

D is the saddle, the upper side of which is fitted to the under surface of the beam, and the under surface of which saddle is made convex to fit the seat *d* and adapted to slide thereon about the axis of the beam. At either end of the saddle are flanges *f f*, which abut against the edges of the seat *d*, and are also extended inward upon the under side of said seat, thus forming curved grooves, in which the edges of the seat slide freely.

E is the cap, the upper surface of which is convex, the radius of said convex surface being the same as the sides of the beam and about the same center. Said cap has also upon its upper surface flanges *e' e'*, engaging the edges of the strap F.

The saddle D and cap E are secured to the beam by means of the bolts *a'*, and the knee is secured to the runner by bolts *a*, which also pass through the ends of the strap F, securing it in place. Said strap may be further secured to the knee by rivets or bolts *r*, and is made of a continuous strip of band-iron extending along the under side of the legs *b b* and in a semicircle over the top of the beam and cap, inclosing the same.

H is a tie-bar consisting of a strip of iron extended along the top of the runner, the ends of which are turned at right angles at *c*, engaging with the ends of the legs *b b* and strap F.

The operation of our device is as follows: The convex surface of the saddle D, the sides of the beam A, and the upper surface of the cap E all present surfaces concentric to the axis of the beam. Inclosing these are the con-

cave seat *d* and the strap F, which slide upon the same as the runner oscillates. The concavity of the seat *d* and the convexity of the saddle D and the abutment of the edges of said seat against the flanges *f*, together with the engagement of the strap F with the flanges *e* and *e'* and the convex sides of the beam, all operate to retain the runner at right angles to the beam. The length of the seat *d* and saddle D and the engagement of the flanges *f* with the under side of the seat *d*, together with the inclosure of the beam and cap by the strap F, all operate to support the knee in a vertical position under the beam. Either the extension of the flanges *f* to engage with the under side of the seat *d* or the portion of the strap E which encircles the beam may be omitted in light structures, either being sufficient for the purpose described. In the latter case the runner is readily detached from the beam by rotating it about the axis of said beam until nearly inverted, when the edges of the seat slide out of engagement with the flanges on the saddle. The bearing-surfaces being concentric to the axis of the beam and the load resting upon the flattened upper surface thereof, there is no tendency of the beam to roll upon its axis. The strap F being secured to the convex surface of the leg *b* materially increases its capacity to sustain heavy loads, and being inclosed between flanges at the sides also strengthens said leg against lateral strains. The tie-bar H operates to connect the legs *b*, and takes the spreading strain of the load upon the same. Said legs, having separate bearings at considerable distance apart, distribute the load upon the runner, thus avoiding the tendency to break the shoe at the middle.

We are aware that runners have been attached to ordinary wagon-axles by means of hubs inclosing said axles, and connected to said runners by legs or braces; also, that beams having journals formed thereon have been connected to runners by knees having concave surfaces at the top entirely encircling said journals; also, that knees having journals at their upper ends located below the axis of the beam are not new. We do not claim these, broadly.

What we claim and wish to secure is as follows:

1. In a sleigh, in combination with the beam and runner, a knee having a concave seat concentric with the axis of the beam, said seat having edges adapted to engage with grooves in the saddle, and a saddle attached to the under side of the beam, having a convex surface in contact with said concave seat, and grooves engaging with the edges of the same, substantially as described.

2. In a sleigh, in combination with the beam and runner, a knee having a concave seat concentric to the axis of the beam and partially encircling the same upon its under side, and a saddle secured to the under side of said beam, having a convex surface resting upon said seat and flanges abutting against the edges of said seat, and a strap attached to said knee and encircling the beam, substantially as described.

3. In a sleigh, a beam having flat upper and under sides and rounded front and rear sides concentric to the axis of said beam, to the flat sides of which beam are attached a cap and saddle having convex surfaces concentric to the axis of said beam, in combination with a knee having a concave seat at the top supporting said saddle, and a strap attached to said knee and encircling said beam and cap, substantially as described.

4. In a sleigh-knee, in combination with the legs connecting the beam and runner, and provided with flanges at either side, a strap extending along the surface of and secured to the said leg, the edges of said strap abutting against said flanges, substantially as described.

5. In a sleigh, in combination with a knee having legs supporting a concave seat, and provided with flanges at either side, and a beam having attached a saddle provided with a convex surface resting upon said seat, and flanges engaging with the edges of said seat, a strap consisting of a continuous piece extending along the inner surfaces of said legs and abutting at its edges against the flanges of said legs, and also encircling said beam, substantially as described.

6. In a sleigh, in combination with a knee having legs supporting the beam and provided with flanges at either side, straps extending along and secured to the inner surfaces of said legs, the edges of said straps abutting against said flanges, and a tie-bar connecting the lower ends of said legs, substantially as described.

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