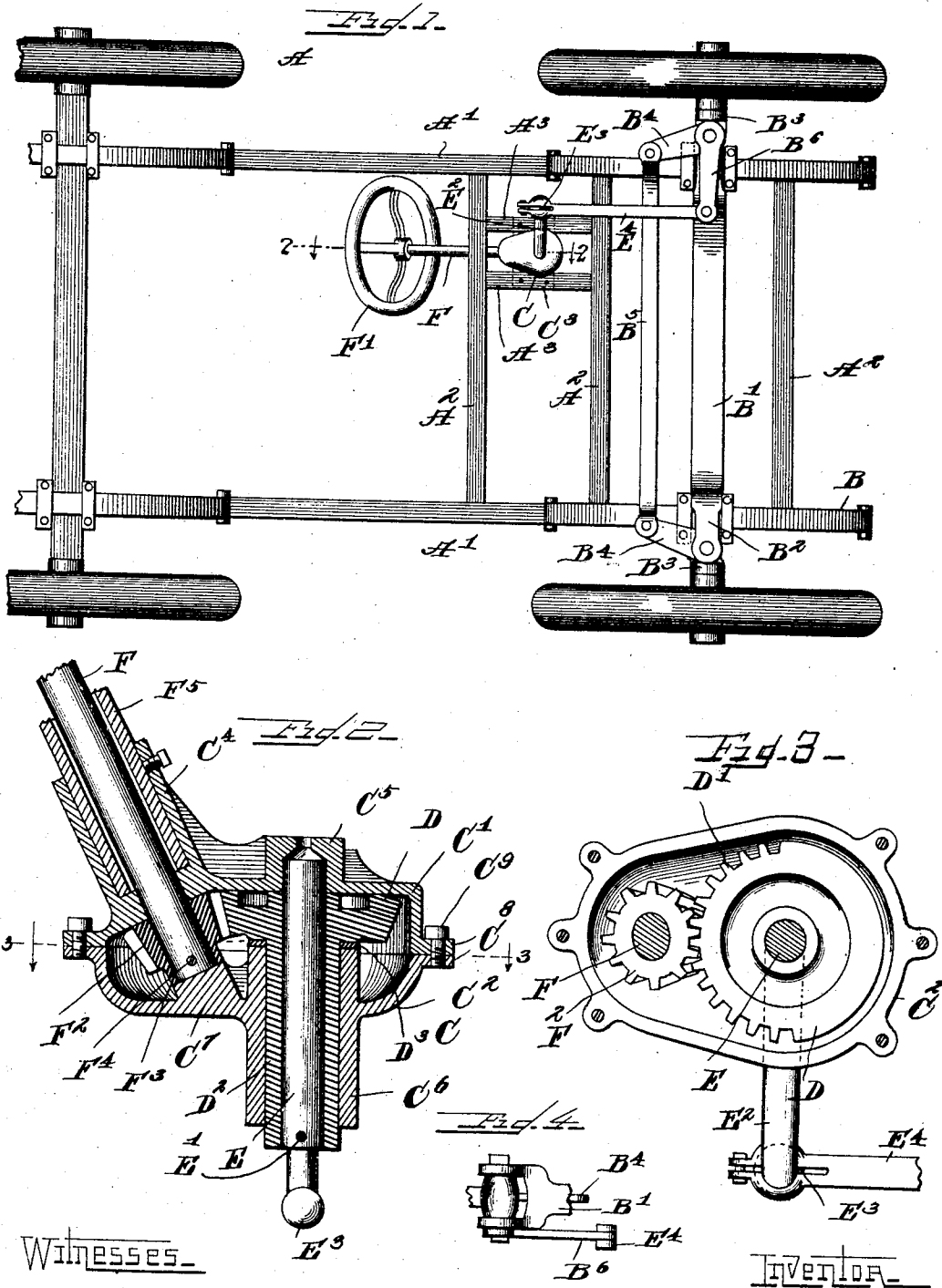


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N. M. BENSON.
STEERING MECHANISM FOR MOTOR VEHICLES.
APPLICATION FILED APR. 11, 1904.



Witnesses

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STEERING MECHANISM FOR MOTOR-VEHICLES.

SPECIFICATION forming part of Letters Patent No. 782,818, dated February 21, 1905.

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To all whom it may concern:

Be it known that I, NILS M. BENSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Steering Mechanism for Automobiles, of which the following is a specification.

This invention refers to improvements in steering mechanism for automobiles, and has for its object the production of such a steering mechanism in which simplicity and strength are combined with ease and certainty of movement.

A further object of the invention is the production of a steering mechanism embodying the improvements hereinafter shown and described.

In the accompanying drawings, Figure 1 is an under side view of an automobile-frame fitted with my improved steering mechanism. Fig. 2 is a vertical central section through a portion of such steering mechanism, taken on dotted line 2 2 of Fig. 1. Fig. 3 is a section on broken dotted line 3 3 of Fig. 2, showing also the connection between the connecting-rod and the crank-arm of the steering-head. Fig. 4 is a detail view showing the connection between the forward end of the connecting-rod and the steering-axle.

In the embodiment of this invention I provide a main frame A, comprising side bars A', transverse bars A², and bars A³ for supporting the casing for the steering mechanism. Springs B of common construction are secured beneath the frame in the usual manner and carry upon their lower side the axle B'. At its ends the axle B' is bifurcated, forming the yokes B², within which yokes are pivotally supported the bell-crank steering-knuckles B³, having the integral inwardly-extending crank-arms B⁴, pivotally connected by means of the pivoted link B⁵. One of the steering-knuckles B³ is provided with an arm B⁶, fixed with relation to said knuckle and providing a means for attaching thereto the connecting-rod to be hereinafter mentioned.

The steering mechanism proper is supported within a casing C, comprising an upper portion C' and a lower portion C², the former having integral side flanges C³, adapted to rest

upon and be secured to the supporting-bars A³. The upper portion C' of the casing C comprises an integral sleeve C⁴ for the steering-rod and a pocket C⁵ for receiving the upper end of the shaft of the steering-gear, both to be hereinafter described. The lower portion C² of the casing is also provided with an integral sleeve C⁶ for the steering-head and with an integral abutment-stud C⁷ for the end of the steering-rod. The two parts of the casing are secured together by means of coinciding ears C⁸, the lower ear of each pair being screw-threaded to receive the screws C⁹.

A steering-gear D is located within the casing C, said gear being slightly beveled and having teeth D' upon only a portion of its periphery. A stem D², formed integral with said gear, lies within the bearing-sleeve C⁶ of the lower portion of the casing C, a washer D³ being placed upon said stem between the inner end of said sleeve and said gear.

A shaft E lies within the hollow stem D² of the bevel steering-gear D, the upper end of said shaft entering the bearing-pocket C⁵, formed in the upper portion of the casing C. The shaft E is secured to the stem D² by means of the pin E', and the lower end of said shaft is turned at a right angle to form the crank E². At its outer end the crank E² is turned downwardly and provided at its end with an integral ball E³ for forming a ball-and-socket joint with the connecting-rod E⁴, which joins said crank with the arm B⁶ of the bell-crank steering-knuckles.

A steering-rod F lies within and extends upwardly from the bearing-sleeve C⁴. At its upper end this steering-rod is provided with the usual steering-wheel F' and at its lower end with the bevel-pinion F², meshing with the steering-gear D. The pinion F² is provided with a hub F³ and by means of a pin F⁴ is secured to the steering-rod F. A tubular casing F⁵ surrounds the steering-rod.

By the arrangement shown the steering-gear D is provided with a long bearing within its bearing-sleeve C⁶, and a strong and positive steering connection between the steering-wheel F' and the front wheels is provided. The means of attachment of the casing C to the supporting-bars A³ of the main frame

makes the entire steering-gear readily removable, while the separable casing makes the parts of the mechanism easily accessible for cleaning or repair. The washer D³ is provided between the upper end of the bearing-sleeve C⁶ and the steering-gear D, so that when the teeth of said gear and of the pinion F² become worn the washer may be placed above the steering-gear in order to move said gear downwardly, thus bringing the rotative centers of said gear and pinion nearer together and taking up wear between them.

My invention is not restricted to the precise construction and arrangement of parts shown and described herein, as such construction and arrangement may be modified or varied by those skilled in the art without departing from the spirit and scope of my invention.

I claim as my invention—

1. In a steering mechanism for automobiles, in combination, a two-part separable casing, each part comprising a bearing-sleeve; a steering-gear having a stem adapted to lie within one of said sleeves; an abutment formed in one of said casing portions and alined with the other of said sleeves; a steering-rod lying within said last-mentioned sleeve and abutting against said abutment; a pinion on said steering-rod adapted to mesh with said steering-gear; and an operative connection between the steering-gear and the steering-axle.

2. In a steering mechanism for automobiles, in combination, a two-part separable casing, one of the parts of said casing comprising a bearing-sleeve; a steering-gear having a tubular stem rotatably mounted in said sleeve; a steering-shaft lying within and fixed to said tubular stem, said shaft being provided with a crank-arm having a ball-and-socket connection with a connecting-rod, which connecting-rod is pivotally connected with the steering-axle; and a steering-rod having a pinion fixed thereto adapted to mesh with said steering-gear.

3. In a steering mechanism for automobiles, in combination, a two-part separable casing, each part having a bearing-sleeve; a bearing-pocket in said casing coinciding with one of said bearing-sleeves; a bearing-abutment in said casing coinciding with the other bearing-sleeve; a steering-gear having a tubular stem adapted to lie within one of said bearing-sleeves; a steering-shaft within said tubular stem, the end of which shaft is adapted to enter said bearing-pocket; a steering-rod having a pinion fixed thereto adapted to mesh with said steering-gear, the end of the steering-rod lying in contact with said abutment; a crank-arm for the steering-shaft; and a connecting-

rod connection between said crank-arm and the steering-axle.

4. In a steering mechanism for automobiles, in combination, a two-part separable casing, each part having a bearing-sleeve formed integral therewith; a steering-gear having a tubular stem adapted to lie within one of said sleeves; an abutment formed in one of said casing portions and alined with the other of said sleeves; a steering-rod lying within said last-mentioned sleeve and abutting against said abutment; a pinion on said steering-rod adapted to mesh with said steering-gear; a steering-shaft lying within and fixed to the tubular stem of said steering-gear; said shaft provided with a crank-arm; a bearing-pocket formed in one of the casing portions adapted to receive one end of said steering-shaft; and a connecting-rod pivotally connected at one end with the steering-axle and at its other having a ball-and-socket connection with said crank-arm.

5. In a steering mechanism for automobiles, in combination, a casing adapted to be secured to the automobile, said casing comprising an upwardly-extending inclined bearing-sleeve and a downwardly-extending vertical bearing-sleeve; a steering-rod lying within the inclined bearing-sleeve and carrying a pinion fixed thereon; a steering-gear in said casing; a shaft extending through said vertical bearing-sleeve and having fixed thereon a steering-gear adapted to mesh with said pinion; and an operative connection between the steering-axle and said shaft.

6. In a steering mechanism for automobiles, in combination, a separable casing comprising an upper part adapted to be secured to the automobile, said upper part having an inclined bearing-sleeve and a bearing-pocket, said casing also comprising a lower part adapted to be secured to said upper part, said lower part being provided with a vertical bearing-sleeve and an abutment; a steering-rod lying within the bearing-sleeve of the upper part and abutting against said abutment; a steering-gear having a stem adapted to lie within the bearing-sleeve of the lower part; a pinion on said steering-rod adapted to mesh with said steering-gear; a vertical shaft fixed with relation to the stem of said steering-gear, the upper end of said shaft lying within the bearing-pocket of the upper casing portion; a crank-arm on said shaft; and an operative connection between the steering-axle and said crank-arm.

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