No. 692,900. Patented Feb. 11, 1902.

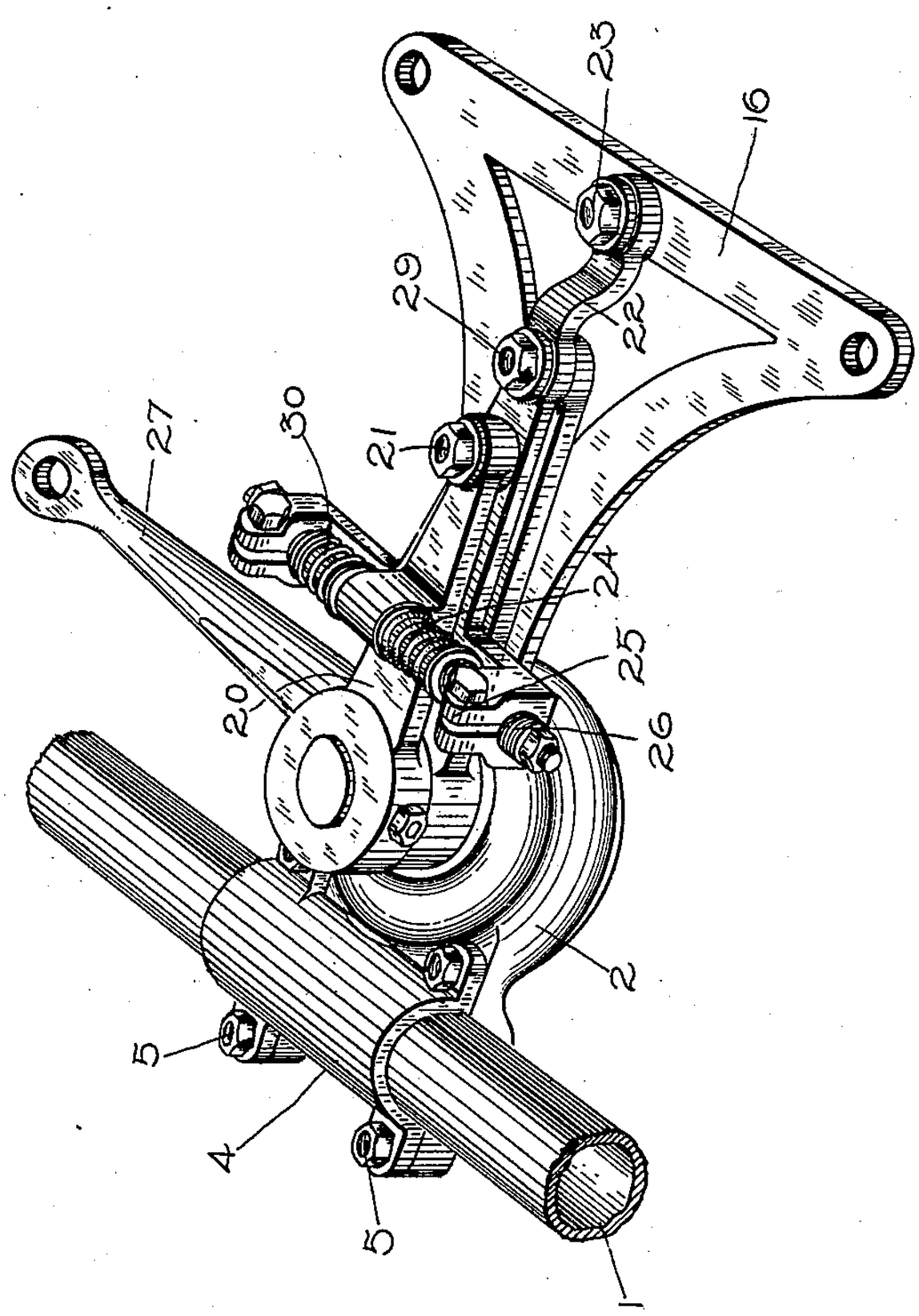
O. F. PERSSON.

MECHANISM FOR OPERATING MOTION CHECKING DEVICES.

(Application filed Aug. 28, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



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3 Sheets—Sheet 2.

Fig. 4.

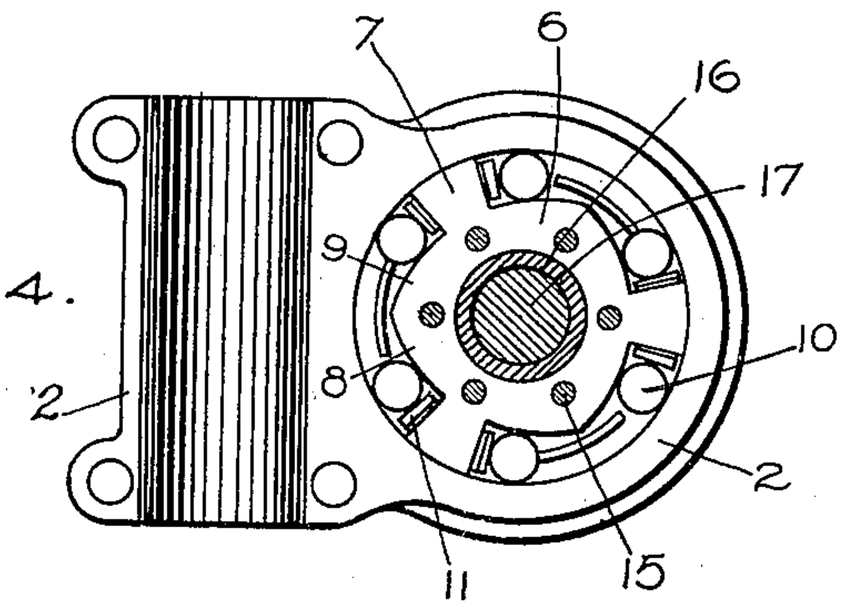

Fig. 3.

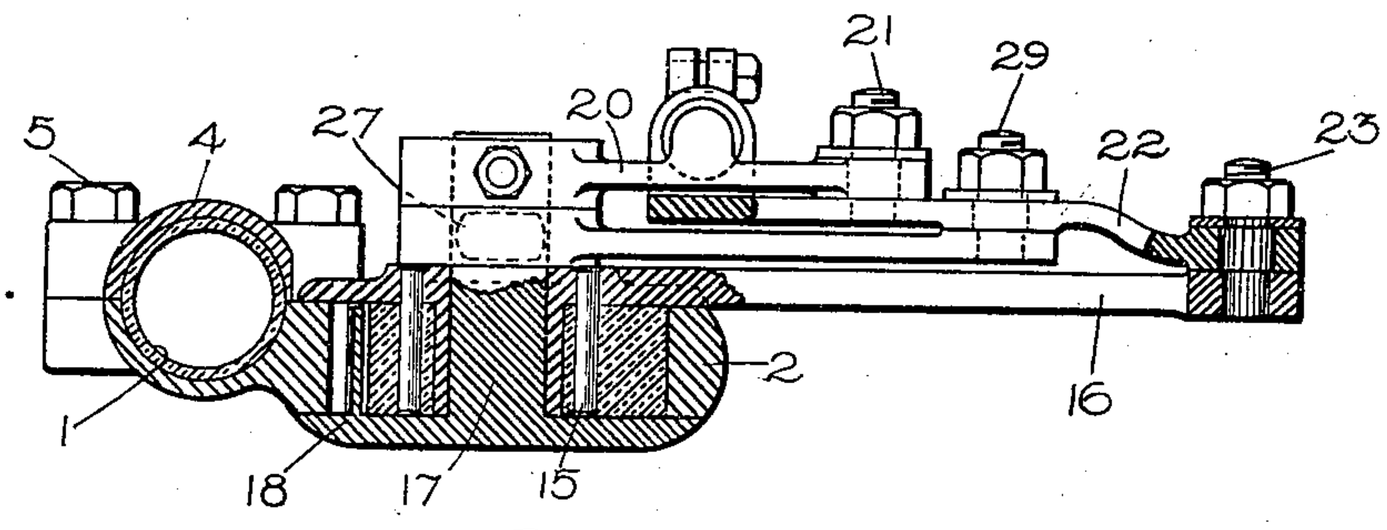

Fig. 2.

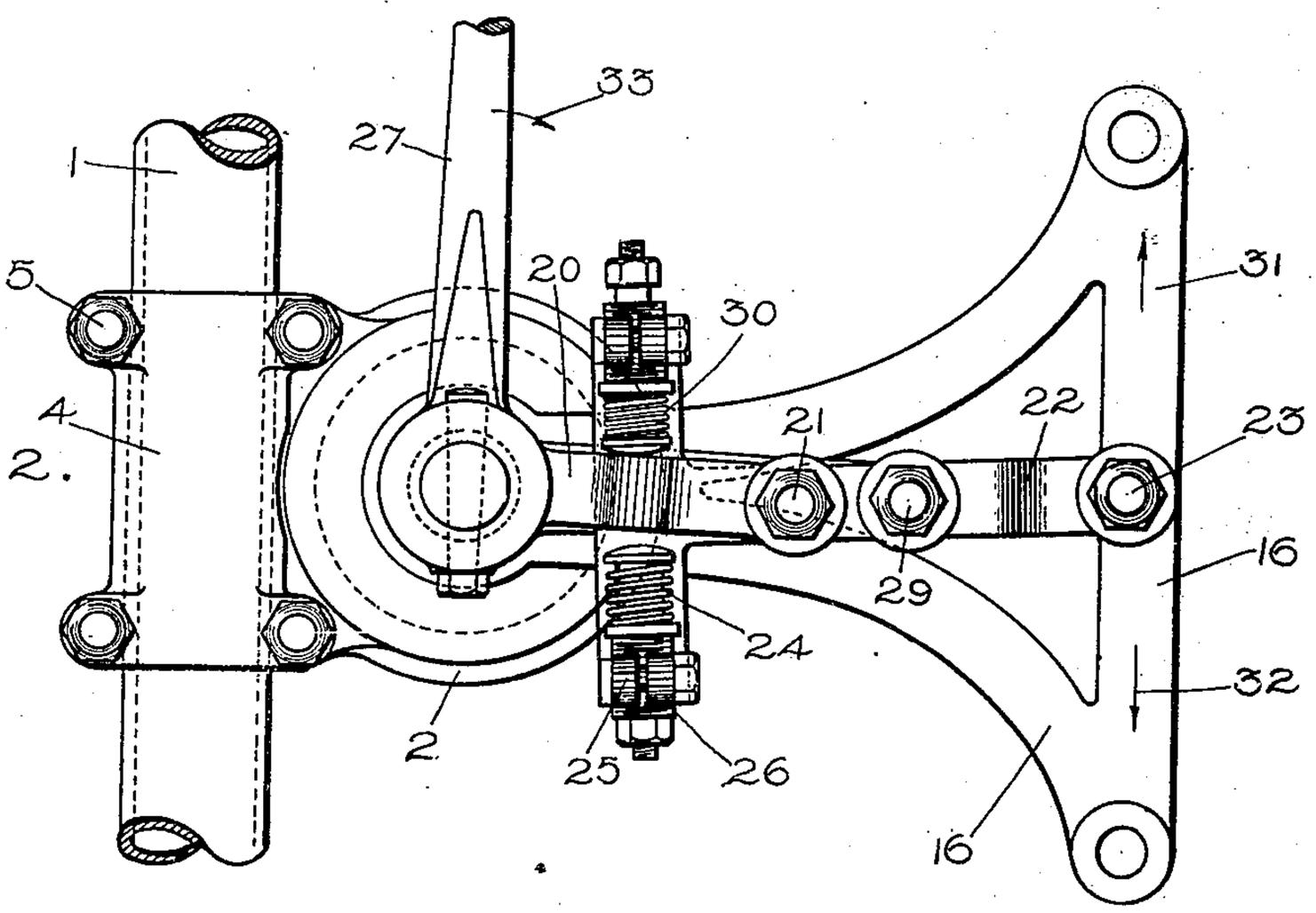

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Fig. 5.

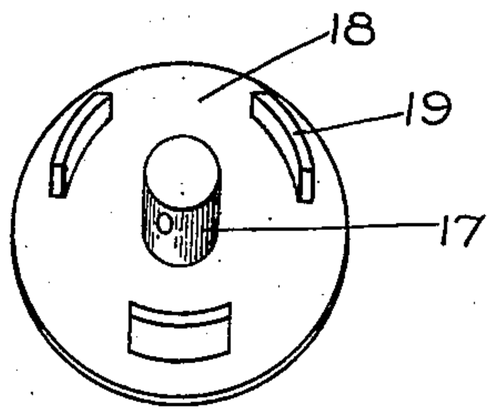


Fig. 6.

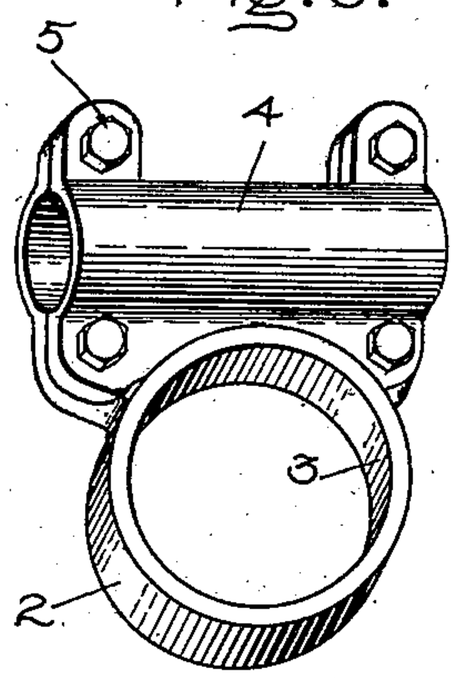


Fig. 7.

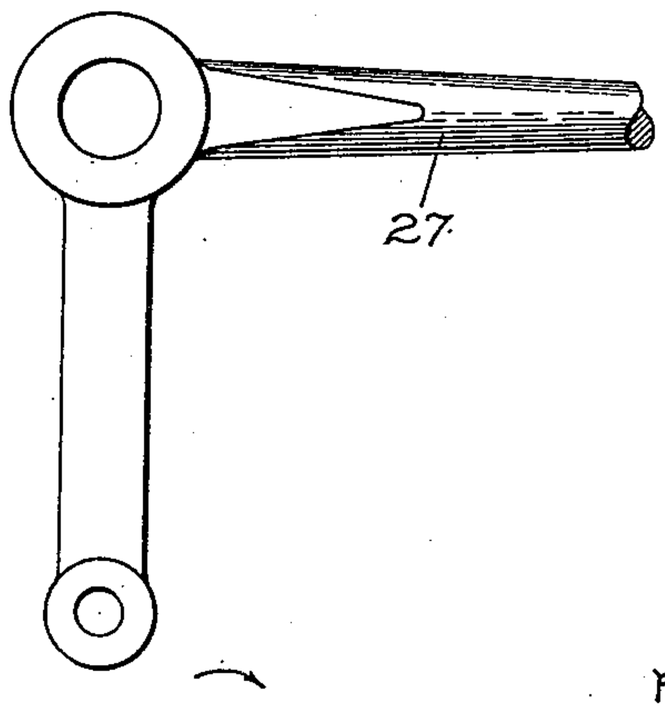


Fig. 8.

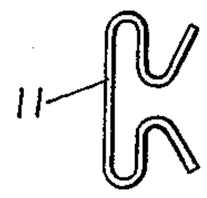
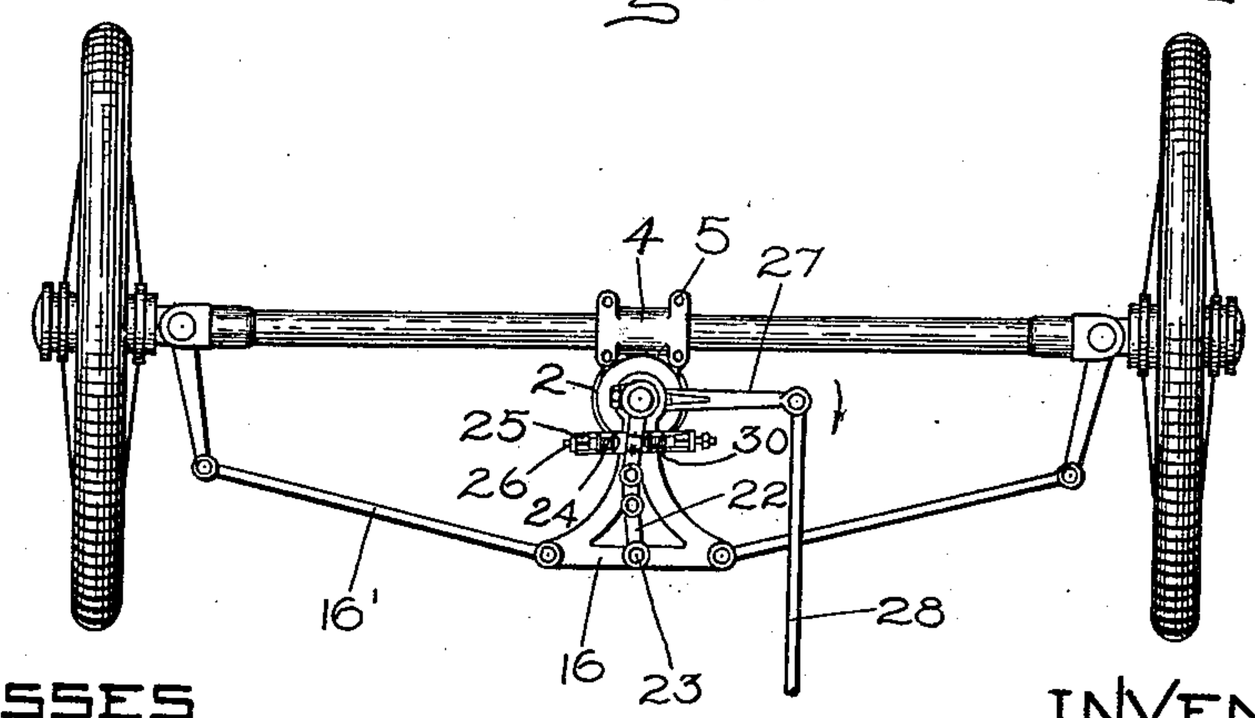


Fig. 9.



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UNITED STATES PATENT OFFICE.

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MECHANISM FOR OPERATING MOTION-CHECKING DEVICES.

SPECIFICATION forming part of Letters Patent No. 692,900, dated February 11, 1902.

Application filed August 28, 1901. Serial No. 73,588. (No model.)

To all whom it may concern:

Be it known that I, OTTO F. PERSSON, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Mechanism for Operating Motion-Checking Devices, (Case No. 2,406,) of which the following is a specification.

Motion-checking devices have been made wherein the two principal parts which are movable with respect to each other are locked together by means of frictional devices of one kind or another. Between the actuator and the moved part a certain amount of lost motion is provided, and during the interval that this lost motion is being taken up a suitable device is employed to render the frictional devices inoperative, thus permitting one or both of the principal parts to be moved.

In order to return the actuator to an initial position, springs are employed. When the springs are weak, they frequently fail to return the actuator, while, on the other hand, with strong springs a time may come when a less effort is required to move one of the principal parts than to compress a spring or springs, and the result is that the lock fails to open.

In all the motion-checking devices with which I am familiar the movement of the unlocking piece or part is in the same direction as that of the principal moving element. In devices embodying a friction-lock when the manual actuator is momentarily relieved of its load for any reason the springs under certain conditions of adjustment cause the parts to be partially locked at one instant and unlocked at the next, resulting in a series of jerks more or less great and highly objectionable. The momentary relieving of the manual actuator is caused by the principal moving part receiving a thrust from some extraneous means in the same direction as its movement. In the case of a steering-check this is usually occasioned by one of the steering-wheels striking a road obstruction or it may be due to some inequality in the road. I overcome this objection by so arranging the parts that the thrust of the unlocking-piece opposes the movement of the steering-wheel or other moving element. With such an arrangement any road or other thrust tending to create movement of the wheel or other moving element in the same direction only serves to maintain the unlocked condition of the parts. In this connection it must be borne in mind, however, that I do not mean great shocks or thrusts, for when one of these occurs which is greater than the force exerted by the spring or springs the lock will operate to prevent the transmission of wheel or other strains in the usual manner.

Another novel feature of my invention lies in the construction and arrangement of the locking and unlocking device, whereby the idle movement of the manual actuator can be reduced to a minimum.

In the accompanying drawings, which illustrate an embodiment of my invention, Figure 1 is a perspective view of the motion-checking device designed for use in connection with self-propelled vehicles. Fig. 2 is a plan view of the device. Fig. 3 is a side elevation with certain of the parts in section. Fig. 4 is a plan view of the stationary and rotary members of the parts in position for operation. Fig. 5 is a perspective view of the device employed to release the friction-rollers. Fig. 6 is a perspective view of the stationary member. Fig. 7 is a plan view of the manual actuator. Fig. 8 is an enlarged detail view of one of the springs employed for forcing the clutch-rollers into the frictional engagement with the main members of the motion-checking device, and Fig. 9 is a plan view showing the motion-checking device mounted on a vehicle.

In the drawings, 1 represents a stationary support or axle. It may be solid or tubular, as desired. Mounted on the shaft is the stationary member of the motion-checking device, consisting of the lower casting 2, having a smooth-sided central bore 3 to receive the moving part of the motion-checking device. This member is secured to the axle by means of a cap 4, which encircles the axle and is retained in place by bolts 5. By means of the construction illustrated the motion-checking device as a whole can readily be removed from the vehicle for the purpose of inspection or repair. The rotatabe member 6, Fig. 4, is provided with projections 7, which make a

working fit with the interior of the ring-like structure of the stationary member. These projections serve to center the moving and stationary parts with respect to each other. Between the projections are cam-surfaces 8 and 9, which are oppositely disposed, and between these cam-surfaces and the surface 3 of the stationary member are rollers 10, which are normally pressed into frictional engagement with both of the parts by the springs 11. These springs are represented in side elevation in Fig. 8, and I have found that by giving them the peculiar configuration shown they will have great flexibility and will hold the rollers in frictional engagement with the parts at all times, except when they are released by a suitable device, to be hereinafter described. I have shown six rollers in connection with the steering-check in order that the friction may be distributed at a number of places; but it would be feasible to make the steering-check with only two rollers—one arranged to act when moving in one direction, the other arranged to work when moving in the opposite direction. As arranged when the rotatable member tends to move counter-clockwise a roller or rollers 10 will be jammed between the cam-face 8 and the surface 3 of the stationary member. On the other hand, if the rotatable member tends to move clockwise a roller or rollers will be jammed between the cam-surface 9 and the surface 3. The rotatable member is rigidly secured by a number of rivets 15 to the triangular frame 16. The latter is secured to the steering-axles by rods 16', Fig. 9. By reason of the projections 7 the center of motion of the frame is the same as the center of the stationary member.

The means for releasing the rollers and moving the triangular frame when it is desired to impart motion to the steering-wheels will now be considered. Extending through the center of the rotatable member and capable of movement independent thereof is a stud 17, which is rigidly secured to the plate 18, Figs. 2 and 5. In addition to the stud the plate carries three upwardly-extending projections 19, which when the parts are assembled extend between pairs of rollers. When the projections are moved clockwise, they release the rollers which prevent the movement of the rotatable member in that direction, and when moving counter-clockwise they release the rollers which prevent the movement of the rotatable member in the counter-clockwise direction. Bolted or otherwise secured to the upper end of the stud 17 is a lever 20. The outer end of the lever is pivotally secured by the bolt 21 to a lever 22, that is pivotally mounted on the triangular frame 16. The lever 22 is T-shaped and is pivotally secured at one end to the triangular frame by the bolt 23. On the opposite end of the lever are mounted two spring-pressed buffers 24 and 30, of similar construction, that are arranged to engage on opposite sides with the lever 20 and return the parts to a central or initial position. The ends of the lever are provided with split bosses 25, in which are mounted screw-threaded adjustable supports 26 for the spring-pressed buffers. By changing the position of the support the tension of the buffer may be altered.

Sleeved on the stud 17 between the frame 16 and the lever 20 and free to move independent thereof is a bell-crank actuating-lever 27. One end of this lever is arranged to be secured to the manually-actuated steering-rod 28, Fig. 9, and the other end is pivotally secured to the lever 22 by the bolt 29. By changing the position of this bolt with respect to the bolt 23 the magnitude of movement of the manual actuator required to release the friction-rollers can be varied. The nearer the pivot 29 is moved toward the pivot 23 the less will be the movement required of the lever 27 to throw the rollers out of frictional engagement with the stationary and movable member of the check.

In Figs. 2, 4, and 9 the parts are shown as being in the released position and ready to impart movement to the steering-wheels—that is to say, the lever 27 has been moved in the direction of the arrow 33, which in turn causes the lever 22 to be deflected from a straight line, and as this lever is deflected the spring-pressed buffer engages with the lever 20. The lever 20 being rigidly connected with the projections 19 causes the latter to engage with and force the rollers out of frictional engagement with the parts. Continued movement of the lever 27 will now impart movement to the steering-wheels in the direction indicated by the arrows, Fig. 9.

Assuming that the vehicle is to be turned to the right, the action of the apparatus is as follows: The lever 27, which is connected to the steering-handle, is moved in the direction of the arrow. This causes the lever 22 to be deflected, carrying with it the pivot 21 of the lever 20. As the lever 20 is deflected the projections 19 are moved around, Figs. 4 and 5, until they force the rollers to release the cams from the inner wall of the ring-like portion of the stationary member. At or about the instant the frictional engagement of the parts ceases the spring-buffer 30 is seated, and further movement by the lever 27 in the same direction causes motion to be transmitted to the triangular frame and to the wheels. To steer the vehicle in the opposite direction, the movement of the lever 27 is reversed and the buffer 24, engaging with the lever 20, releases the friction-rollers 10, so that the parts may be moved in the opposite direction. The instant that the lever 27 is relieved from pressure the spring-pressed buffers 24 and 30 bring the parts to the locked position.

The frame 16 is held stationary when not in the act of steering by the wheel-connecting rods 16' and the rollers 10 engaging with the cams. As the manually-actuated lever 27 is moved in the direction of the arrow 33, Fig.

2, it causes the pivot 29 to deflect the T-shaped lever 22 from a central position. In other words, 22 is a lever, and 29 its fulcrum, and consequently there is a thrust on the triangular frame 16, through the pivot 23, in the direction indicated by the arrow 31, which thrust is exactly opposite to the movement of the wheels, rods, and triangular frame under the action of the manually-actuated lever 27.

In deflecting the wheels in the opposite direction, due to applying pressure to the lever 27 in the opposite direction, a thrust is exerted on the triangular frame in the direction of the arrow 32, which is in opposition to the movement of the steering-rods 16′ and the wheels. It is by reason of this thrust in the direction of the arrow 31 when the wheels are deflected one way and by reason of the thrust in the direction of the arrow 32 when deflected in the opposite way that I am enabled to release the lock under all conditions, thus avoiding delicate adjustments of the springs. To put the matter in a different light, the thrust required to release the lock is always opposite to the movement of the steering-wheels. Hence all tendency of the parts to partially lock and unlock during the act of steering is avoided and all unpleasant jerks and resulting strains are prevented.

I am also familiar with certain other types of motion-checking devices wherein each is provided with a fluid-containing chamber and a moving piston, the former being attached to one part and the latter to another, the said parts being movable with respect to each other, with valves for controlling the passage of fluid from one side of the piston to the other. My improved lock-releasing mechanism can also be applied to devices of this last-mentioned class, and I aim to embrace such a use in the claims.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In combination, a pair of elements movable with respect to each other, means for moving one of the elements, a locking device between the elements, and a lock-releasing means which imparts a thrust to the moving element against its direction of motion.

2. In combination, a pair of elements movable with respect to each other, means for moving one of the elements, a locking device between the elements, and a system of lock-releasing levers, which when operated, imparts a thrust to the moving element against its direction of motion.

3. In combination, a stationary element, a movable element, a lock for holding the parts against relative movement, means for releasing the lock, which when operated imparts a thrust to the movable element against its direction of motion, and a means common to the second element and the lock for moving the one and releasing the other.

4. In combination, a stationary member, a movable member, a lock between the members for preventing relative movement, a lever pivoted to the movable member, a second lever pivoted concentrically with respect to the stationary member, and a lock-releasing device operated by the conjoint action of the levers.

5. In combination, a stationary member, a movable member, a lock between the members for preventing relative movement, a lever pivoted to the movable member, a second lever pivoted concentrically with respect to the stationary member at one point, and to the first-mentioned lever at another point, a third lever pivoted to one of the other levers, and a lock-releasing device operated by the last-mentioned lever.

6. In a motion-checking device, the combination of a stationary member, a frame movable about the stationary member as a center, a lever pivoted to the frame and extending toward the center of motion, a second lever concentrically supported with respect to the center of motion, and extending toward the pivot of the first lever, a pivot for uniting the levers, a lock between the members for preventing relative movement, and a third lever which controls the lock and is pivotally secured to the other two.

7. In a motion-checking device, the combination of a stationary member, a movable frame, a lock between the member and the frame, an actuator for moving the frame, a lever pivotally secured to the frame and to the actuator, a second lever rigidly secured to the releasing mechanism of the lock and pivotally secured to the first, and means permitting a certain amount of lost motion between the first-mentioned lever and the releasing mechanism of the lock.

8. In a motion-checking device, the combination of a stationary member, a movable frame, a lock between the member and the frame, an actuator for moving the frame, a lever pivotally secured to the frame, a pair of spring-pressed buffers carried by the lever, and a lever which controls the releasing mechanism of the lock, and passes between the buffers.

9. In a motion-checking device, the combination of a stationary member, a movable frame, an actuator for moving the frame, a friction-lock between the member and the frame, a device for throwing the friction-lock out of operation, a system of levers acting on the said device, which levers impart a thrust to the frame in a direction opposite to that imparted by the actuator.

10. In a motion-checking device, the combination of a stationary member, a movable member, an actuator therefor, friction-rolls between the two members constituting a friction-lock, means engaging with the rolls for forcing them out of engagement, a lever pivotally secured to the movable member and extending toward the center of motion, the said lever being arranged to exert a thrust on the movable member in opposition to that of the actuator, and a device which is opera-

tively connected to the lever and to the roll-releasing means.

11. In a motion-checking device, the combination of a stationary member, a second member mounted for movement about the first, a lock, a stud extending through the members and arranged to control the lock, a bell-crank lever sleeved on the stud, a lever pivotally secured to the movable member and also to the bell-crank lever, a second lever pivoted to the second and rigidly connected to the stud, and means for limiting the motion of one lever independent of the other or others.

12. In combination, a pair of members movable with respect to each other, a locking mechanism for preventing said movement, an actuator for moving one of the members, and a lock-releasing device controlled by the actuator which device exerts a thrust on the movable member opposing that of said actuator.

13. In combination, a pair of members movable with respect to each other, a locking mechanism for preventing said movement, an actuator for moving one of the members, a lock-releasing device which exerts a thrust on the movable member opposing that of the actuator, and a lost-motion connection.

14. In a steering mechanism, the combination of a pair of wheels, a separate axle for each wheel, a support for the axles, rods connecting the axles, a motion-checking device having two principal parts, one of which is secured to the support, the other being attached to the rods, a lock between the parts of the device, a steering-handle for moving the wheels, and a lock-releasing mechanism which is under the control of the steering-handle and interposes a thrust against the movement of the wheels during the time that the lock is held in the open position.

In witness whereof I have hereunto set my hand this 26th day of August, 1901.

OTTO F. PERSSON.

Witnesses:
DUGALD MCK. MCKILLOP,
JOHN A. MCMANUS.