No. 703,499. Patented July 1, 1902.

J. J. H. STURMEY.

HINGE JOINT.

(Application filed Sept. 4, 1900.)

(No Model.) 2 Sheets—Sheet 1.

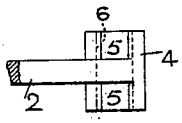


FIG. I.

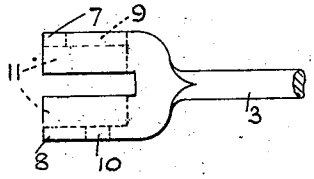


FIG. II.

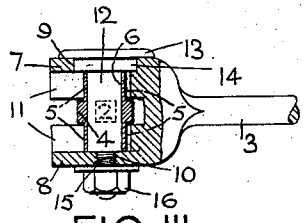


FIG. III.

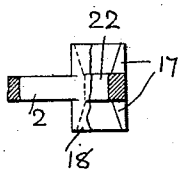


FIG. IV.

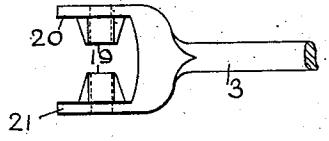


FIG. V.

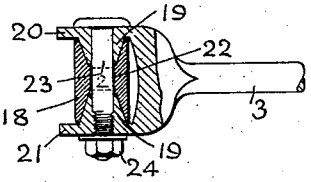


FIG. VI.

Witnesses,
N. W. Stainer
John T. Fozakarley.

Inventor,
John James Henry Sturmey.
per Douglas Leechman
attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 703,499.

Patented July 1, 1902.

J. J. H. STURMEY.

HINGE JOINT.

(Application filed Sept. 4, 1900.)

(No Model.)

2 Sheets—Sheet 2.

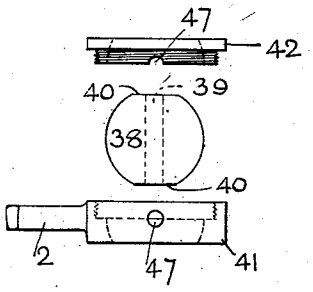


FIG. VII.

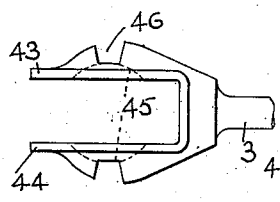


FIG. VIII.

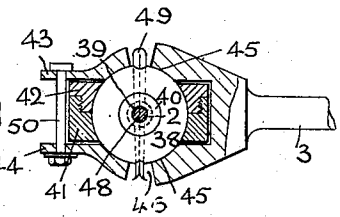


FIG. IX

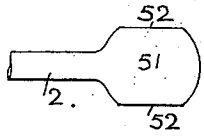


FIG. X.

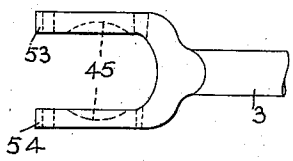


FIG. XI.

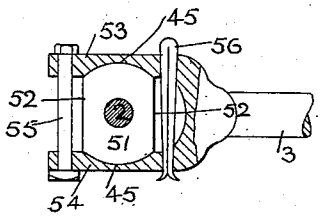


FIG. XII.

Witnesses,
H. W. Skaner
John J. Farakarley.

Inventor,
John James Henry Sturmey.
per
Douglas Leechman.
attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN JAMES HENRY STURMEY, OF COVENTRY, ENGLAND.

HINGE-JOINT.

SPECIFICATION forming part of Letters Patent No. 703,499, dated July 1, 1902.

Application filed September 4, 1900. Serial No. 28,977. (No model.)

To all whom it may concern:

Be it known that I, JOHN JAMES HENRY STURMEY, journalist, a subject of the Queen of Great Britain, residing at Coventry, in the county of Warwick, England, have invented certain Improvements in Hinge-Joints, of which the following is a specification.

My invention relates to hinge-joints in which the parts to be jointed together are adapted to work through a normally limited angle, and has for its object to provide a hinge-joint which shall not be liable to become disjointed owing to the loss of the hinge-pin, if any; and to this end my invention consists, essentially, in a hinge-joint the parts of which are adapted to interlock and remain interlocked whether a hinge-pin be employed or not.

In the accompanying drawings, Figure I is an elevation of the end of a first part or rod. Fig. II is an elevation of the end of a second part or rod; and Fig. III is an elevation, mostly in vertical section, of the hinge-joint connecting the two parts or rods together. Figs. IV, V, and VI are similar views to Figs. I, II, and III, respectively, and show a modification. Figs. VII, VIII, and IX are similar views to Figs. I, II, and III, respectively, showing another modification. The parts are separated in Fig. VII and include a certain ball. Figs. X, XI, and XII are similar views to Figs. I, II, and III, respectively, showing another modification.

The same reference-numerals indicate the same parts in the members of each set of figures.

Referring to Figs. I, II, and III, on the end of, say, a first rod 2 I form a vertical projection 4, preferably directed both upward and downward. This projection is provided with flats 5 on one or preferably both sides and is bored through 6 axially at right angles to the length of the rod. On the end of, say, a second rod 3 I form a pair of jaws 7 8 and make them of greater depth over all than the length of the projection 4. The said jaws are bored through vertically with a hole 9 of somewhat greater diameter than that of the exterior of the projection 4, except at the bottom, where the hole is of reduced diameter (10) and is preferably tapped with a screw-thread. One or each of the opposing faces of the jaws 7 8 is slotted from the hole 9 to the periphery, the slots 11 being slightly wider than the projection 4 measured over the flat or flats 5, so that the said projection may be introduced into the jaws through the said slots, which are arranged at such an angle to the rod 3 that the flats 5 will not come in line with the slots 11 in the normal working of the joint. When the hole 6 in the projection 4 is brought into a position coaxial with the hole 9 in the jaws 7 8, a hinge-pin 12 is passed through both parts. The head of the pin is of two diameters, the larger part 13 being adapted to lie on the top of the jaw 7 and the smaller part 14 being adapted to fit closely in the top of the hole 9. The shank 12 of the pin is adapted to fit closely within the hole 6 in the projection, so that the friction is normally taken between the interior of the projection 4 and the pin 12. The lower end 15 of the pin is preferably screw-threaded to engage with the tapped hole 10 in the jaw 8, below which it may project and be finished off with one or more nuts 16, with or without a split pin or the like. It will thus be seen that so long as the hinge-pin 12 remains in position it forms the positive connection between the rods 2 3; but should the said pin be lost the rods will remain securely connected, the friction then being taken between the exterior of the projection 4 and the interior of the hole 9 through the jaws, and the parts will remain connected so long as the flat or flats 5 on the projection 4 are not brought into line with the slot or slots 11 in the jaws 7 8.

In the modification shown in Figs. IV, V, and VI, I form a notch 17 in each end of a projection 18 on the first rod 2, and I provide an inwardly-directed sleeve 19 on both jaws 20 21 of the second rod 3. The sleeves 19 are adapted to pass into the projection 18 through the notches 17 when the parts 2 3 are set at a certain angle, which they are not normally adapted to occupy. The central part of the projection 18 is of contracted bore 22. In this case a hinge-pin 23 passes through the jaws 20 21 and through the projection 18, the bearing being taken either between the contracted portion 22 of the said projection and the pin alone or preferably, also, between the exterior of the sleeves 19 and the corresponding portions of the bore of the projec-

tion. The exterior of the said sleeves and the parts of the projection 18 with which they are adapted to make contact may conveniently be made of taper form, as shown, so that by screwing the pin 23 farther into the lower sleeve 19 (which is preferably tapped to receive it) or by merely tightening the nut or nuts 24 on the end of the pin (if the said lower sleeve be of plain bore) the taper sleeves may be approached nearer together and the bearing correspondingly tightened in case of wear.

In the modification shown in Figs. VII, VIII, and IX, I employ a ball 38 to connect the two rods 2 3. The ball is bored (39) diametrically and is provided with a flat 40 at one or both ends of the hole. The first rod 2 is provided with a socket adapted to hold the ball freely and consisting of two rings 41 42, of which 41 is secured to the rod and is tapped to receive the other, which is screwed thereinto. The end of the second rod 3 is slotted through, the distance between the jaws 43 44 being great enough to allow the ball to be inserted in the slot edgewise, but less than the full diameter of the ball. The end of the rod 3 is also cupped out, suitable concavities 45 being formed in the opposing faces of the jaws, and a hole 46 is preferably bored through both of the jaws, so as to communicate with the concavities formed therein. The socket 41 42 is small enough to allow of its being introduced into the slot and is provided with a hole 47, passing through its screwed parts. The ball having been introduced into the slot with the socket is turned so as to engage with the concavities, and thus connect the first rod 2 to the second 3. A bolt 48 is passed through the socket and ball to prevent the said ball accidentally turning back to its first position and to prevent the parts 41 42 of the socket being relatively displaced. The bolt is preferably secured by a nut. A small peg or other suitable stop 49 may be secured in the part of the ball normally opposite the hole 46 in either jaw, so that if the bolt 48 be lost the ball will still be prevented from turning too far. Another bolt 50 preferably connects the free ends of the jaws to strengthen the same and to allow of wear being taken up.

In all of the above joints it will be obvious that the pin may be omitted entirely without interfering with the scope of the invention. Ball-bearings may be substituted for the plain friction-surfaces.

In the modification of the lastly-described device shown in Figs. X, XI, and XII, I form or fix a ball 51 on the end of the first rod 2 and provide it with two flats 52, so that it may be inserted in the jaws 53 54 on the end of the second rod 3. The rod 2 is then turned on its axis through ninety degrees, so as to cause the ball to engage with the concavities 45. After the rods 2 3 have been set at their normal angle a bolt 55 is passed through the jaws so near to one of the flats on the ball as to prevent the rod 2 turning far enough on its axis to disengage the said ball from the concavities 45. To prevent the said disengagement of the ball in the event of the bolt 55 being lost, a split pin 56 or other suitable stop may be arranged adjacent to the other flats on the said ball.

An important feature of the construction of joint shown in Figs. VII to IX is that by making the socket 41 42 of comparatively small depth a universal though limited movement may be obtained, and in the modification shown in Figs. X to XII such a movement is also attainable and is limited by the clearance between the bolt 55 or the stop 56 and the corresponding flat 52, or a universal movement may be obtained by duplicating any of the above joints, arranging the two axes at right angles.

The above-described joints are very suitable for connecting the members of the steering-gear in autocars, where it is most important failures should not take place in the connections. Joints constructed according to the modifications shown in Figs. I to VI may be employed between the ends of the steering-arms and the connecting-rod. A duplex joint may be employed to connect the arm on the foot of the steering-stem to the transverse or operating rod, the other end of which is preferably coupled to the third steering-arm or the like by one of the ball-joints above described with reference to Figs. VII to XII, or one of the ball-joints may be used for all the connections.

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

1. In a hinge-joint, the combination with the two parts to be connected together, of a projection on the first part having a flat thereon, a pair of jaws on the second part having a hole therein, adapted to contain the said projection and having also a slot therein, adapted to admit the projection to its seat in said hole when the two parts are approached at an abnormal angle, substantially as specified.

2. In a hinge-joint, the combination with the two parts to be connected together, of a projection on the first part having a flat thereon and an axial hole therein, a pair of jaws on the second part having a hole therein, adapted to contain the said projection and having also a slot therein, adapted to admit the projection to its seat in said hole when the two parts are approached at an abnormal angle, a pin passing through the holes in the projection and jaws, and means for retaining the said pin in position, substantially as specified.

3. In a hinge-joint, the combination with the two parts to be connected together, of a projection on the first part having a flat thereon and an axial hole therein, a pair of jaws on the second part of greater depth than the projection and having a hole adapted to contain the said projection and of greater diam-

eter than the said projection except at the bottom, and a slot therein adapted to admit the said projection to its seat in the said hole when the parts are approached at an abnormal angle, a pin having a head with portions of two diameters, the larger portion being adapted to lie on the top of one jaw and the portion of smaller diameter being adapted to fit into the hole in the said jaw, while the body of the pin is adapted to fit into the axial hole in the projection and the lower end of the pin is adapted to be screwed into the bottom of the hole in the other jaw, substantially as specified.

4. In a hinge-joint, the combination with the two parts to be connected together, of a projection on the first part having a flat thereon and an axial hole therein, a pair of jaws on the second part of greater depth than the projection and having a hole adapted to contain the said projection and of greater diameter than the said projection except at the bottom, and a slot therein adapted to admit the said projection to its seat in the said hole when the parts are approached at an abnormal angle, a pin having a head with portions of two diameters, the larger portion being adapted to lie on the top of one jaw and the portion of smaller diameter being adapted to fit into the hole in the said jaw, while the body of the pin is adapted to fit into the axial hole in the projection and the lower end of the pin is adapted to engage in the bottom of the hole, and means for locking the pin, substantially as specified.

JOHN JAMES HENRY STURMEY.

Witnesses:
J. A. NORBERG,
DOUGLAS LEECHMAN.