(No Model.)

E. SHAY.

UNIVERSAL JOINT.

No. 269,473. Patented Dec. 19, 1882.

Fig. 1.

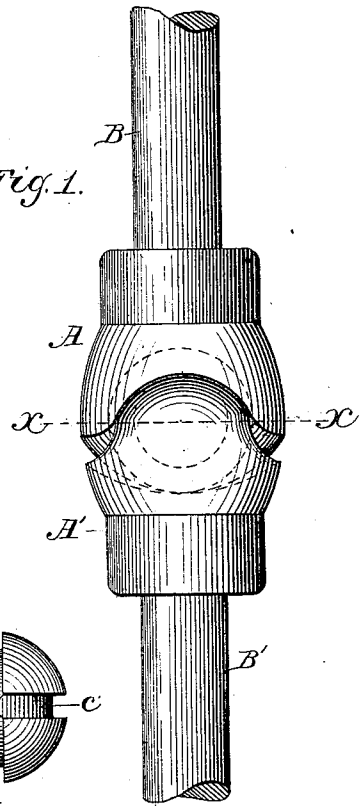


Fig. 2.

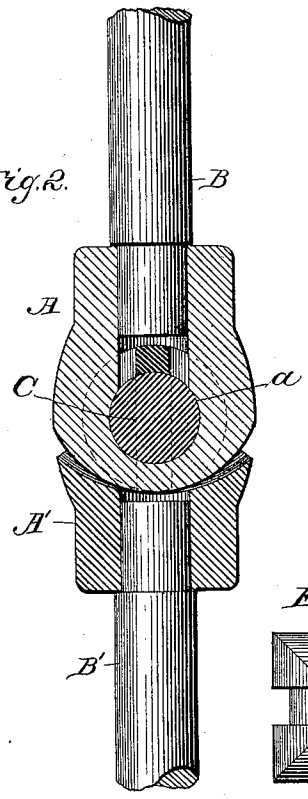


Fig. 5.

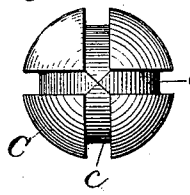


Fig. 6.

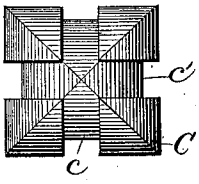


Fig. 3.

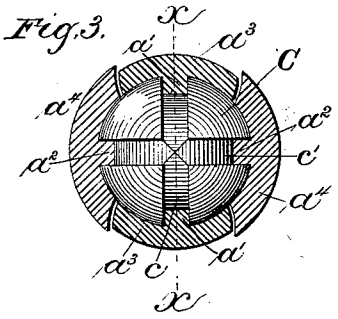
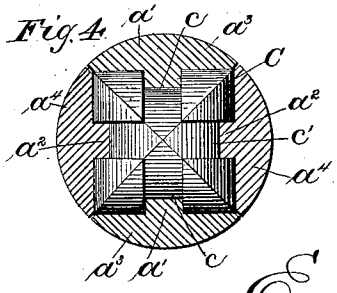


Fig. 4.



Witnesses.
Will R. Onslundra.
Frank C. Doty.

E. Shay
Inventor.
By C. N. Everaud
Atty.

UNITED STATES PATENT OFFICE.

EPHRAIM SHAY, OF BOYNE, MICHIGAN.

UNIVERSAL JOINT.

SPECIFICATION forming part of Letters Patent No. 269,473, dated December 19, 1882.

Application filed March 31, 1882. (No model.)

To all whom it may concern:

Be it known that I, EPHRAIM SHAY, a citizen of the United States, residing at Boyne, in the county of Charlevoix and State of Michigan, have invented certain new and useful Improvements in Universal Joints, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to universal joints; and it consists in a common center-piece, preferably spherical in form, embraced by circular arms or eyes of the heads of the joints.

It also consists in two annular grooves or recesses formed in the center-piece, the plane of one being at right angles with the plane of the other, in connection with annular flanges located on the inner surface of the embracing arms or eyes of the heads, constructed suitably to work freely in the annular recesses of the common center-piece, which recesses are concentric to a common center.

The object of my invention is to provide for the construction of a strong and durable universal joint—one that will have but little or no lost motion in case the direction of strain is reversed, and the avoidance of the employment of bolts or pins in its construction. I accomplish these objects by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the same. Fig. 2 is a sectional view of the same. Fig. 3 is a part section on the *x* line of Fig. 1. Fig. 4 is a modification of Fig. 3. Fig. 5 is an elevation of the common center-piece, and Fig. 6 is an elevation of a modification of the same.

The heads A and A′ are each formed of one piece of metal. There is an eye formed upon the extremity of each of them, spherical upon their inner surfaces. The eye of the head A is shown at *a*, Fig. 2, the representation being a section on the *x* line of Fig. 3, showing the common center-piece C in its position in the said eye. These eyes are provided with the annular flanges a' and a^2, and the eyes are so constructed and arranged as to form the spherical cavity *a*, which is formed by the walls a^3 of the head A and a^4 of the head A′. These eyes may be formed with openings in the extremity of one or both, as shown in the dotted lines of Fig. 1, to admit of their being placed in position; or they may be cast one in the other, thus uniting them, as shown in Fig. 2. This spherical cavity should be located centrally with the shafts B and B′, and of sufficient size to provide for suitable strength of the center-piece C.

Fig. 4 is a modification of the devices shown in Fig. 3. This modification consists in forming the inner surfaces of the eyes cylindrical instead of spherical, as shown in Fig. 3, and providing the several parts with the annular flanges a' and a^2 and the grooves *c* and *c′*. This modification in the form of the eyes provides for a center-piece of the form shown in Figs. 4 and 6, which is a body cylindrical on two axial lines which cross the planes of each other at the center of the body and at right angles with each other.

The common center-piece C is formed by introducing molten metal at the shaft-opening of one of the heads after they have been suitably adjusted to each other for that purpose, thus locking the parts together. The pouring-spur could be removed by a suitable boring-tool, and shrinkage of the common center-piece would free it from the walls of the eyes and their flanges.

I do not wish to confine myself to the forms of annular flanges and grooves as described, as in practice it may be found conducive to greater strength of the joint to so form the annular flanges a' and a^2 as to cause the walls of the annular grooves *c* and *c′* to be on lines radiating from the center of the common center-piece C. By using the modified form of the common center-piece, as shown in Fig. 4, I could further modify the same by forming the inner walls of the eyes cylindrical without the employment of the annular flanges a' and a^2, and consequently without the annular grooves *c* and *c′*. In operation each of the heads A and A′ in its turn oscillates from the center of the common center-piece C, carrying the strain on each of the shafts on a center line of their rotation at all parts of their revolution.

I suggest, for the purposes of facilitating repairs, that the common center-piece be formed of such metal as will fuse at a lower temperature than the metal of the heads, in which case a worn center-piece may be melted out and a new one readily cast in its place, thus practically renewing the joint.

Having thus described my invention, what I deem new in a universal joint, and for which I desire to secure Letters Patent, is—

1. The spherical cavity *a*, formed by the walls a^3 and a^4, and the flanges a' and a^2, constructed and arranged as and for the purposes substantially as set forth.

2. The center-piece C, provided with the annular grooves *c* and *c'*, concentric to a common center, as and for the purposes substantially as set forth.

3. The heads A and A', forming the cavity *a*, and provided with the flanges a' and a^2, in combination with the common center-piece C, as and for the purposes substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

EPHRAIM SHAY.

Witnesses:
G. E. HARRIS,
W. N. SEVERANCE.