No. 683,405. Patented Sept. 24, 1901.

F. W. JAEGER.

MECHANICAL MOVEMENT.

(Application filed Dec. 24, 1900.)

(No Model.)

Fig. 1.

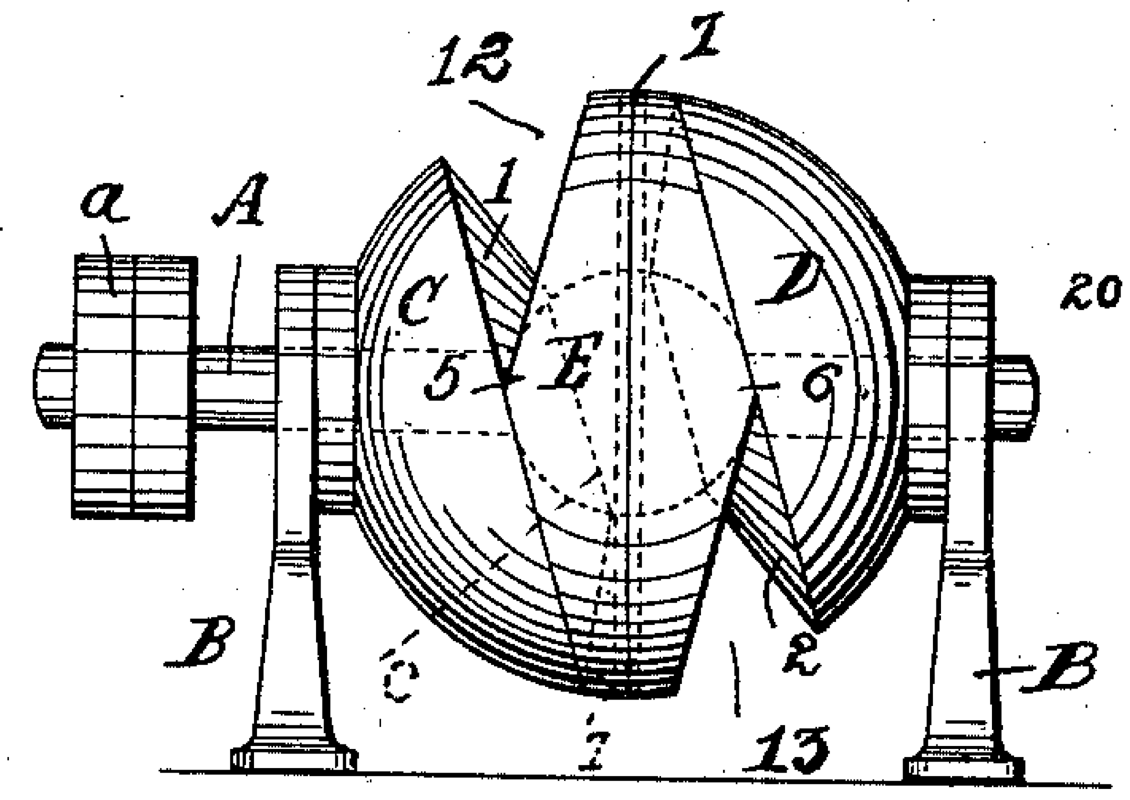


Fig. 2.

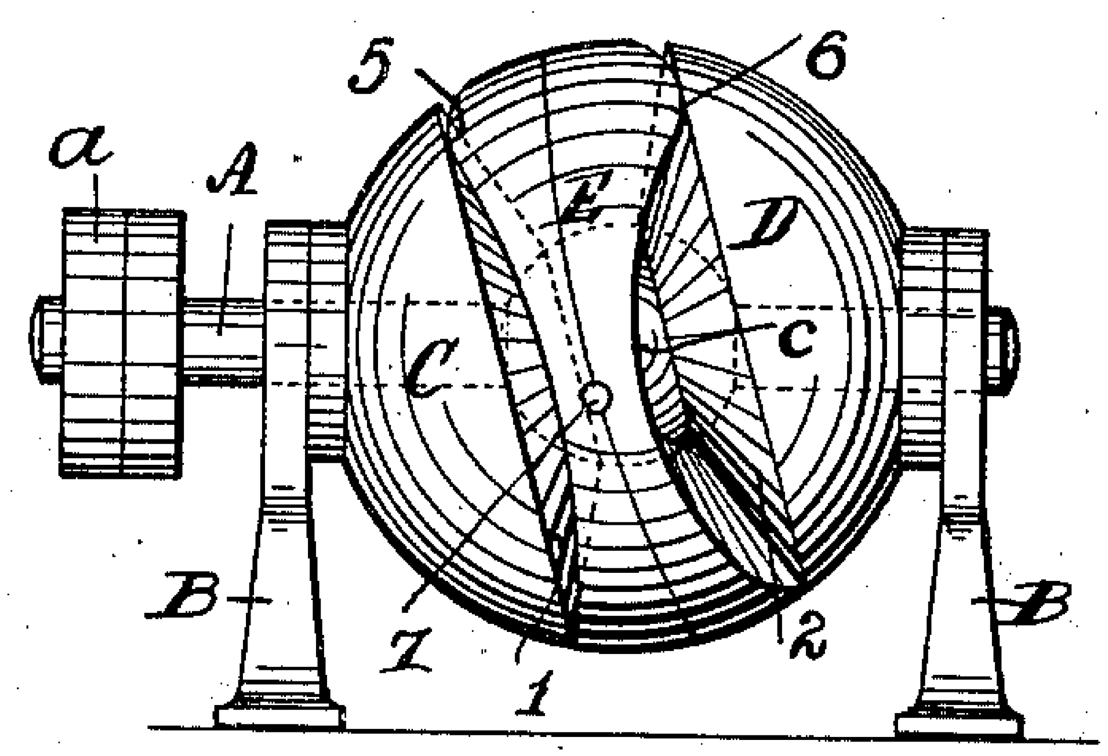


Fig. 3.

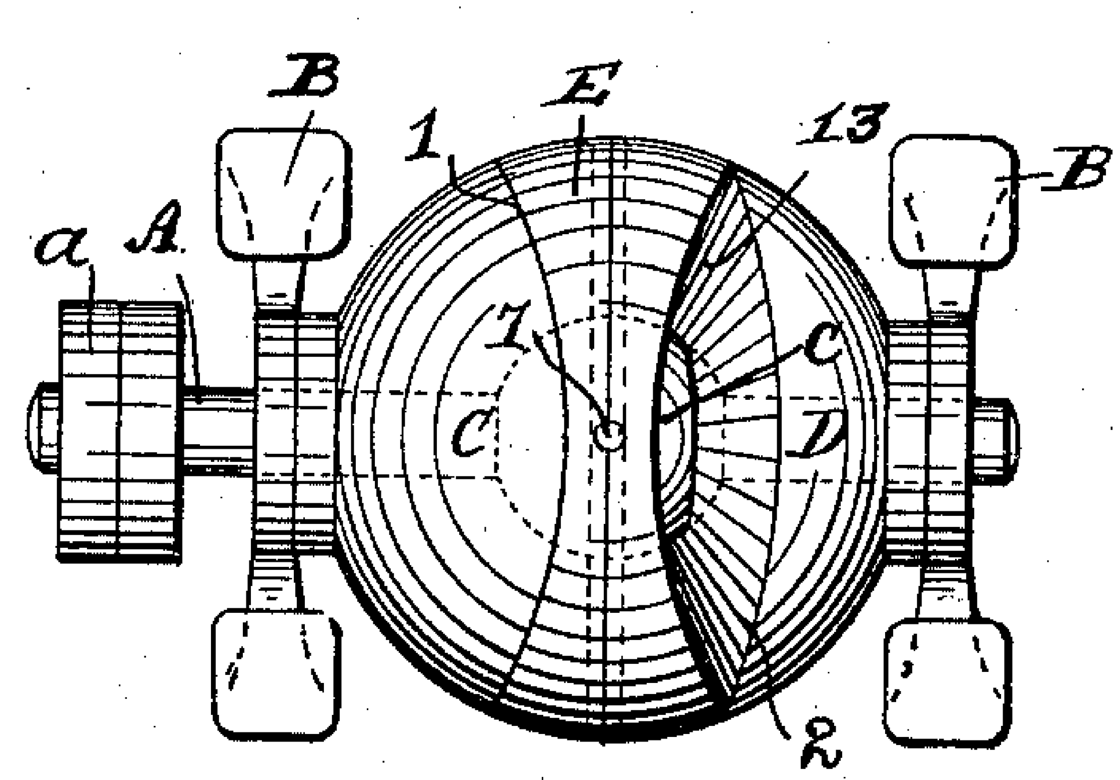
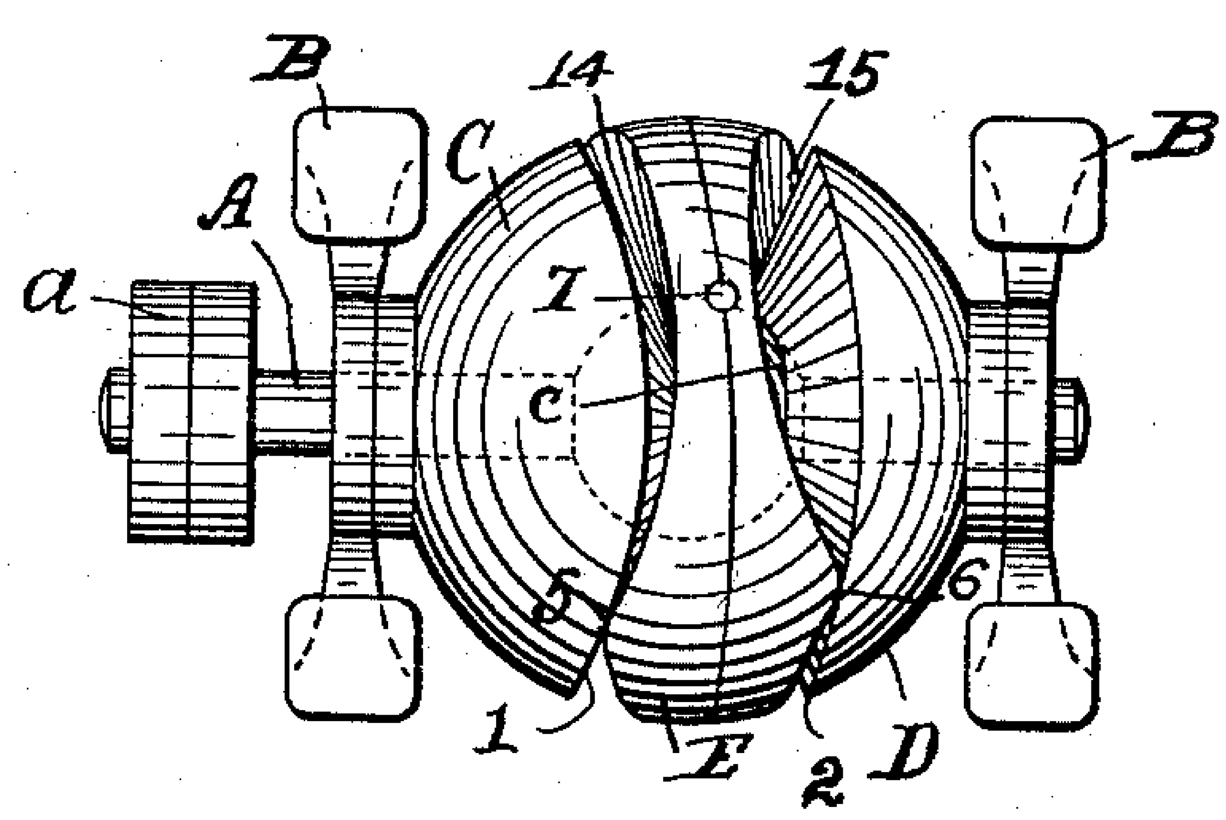


Fig. 4.



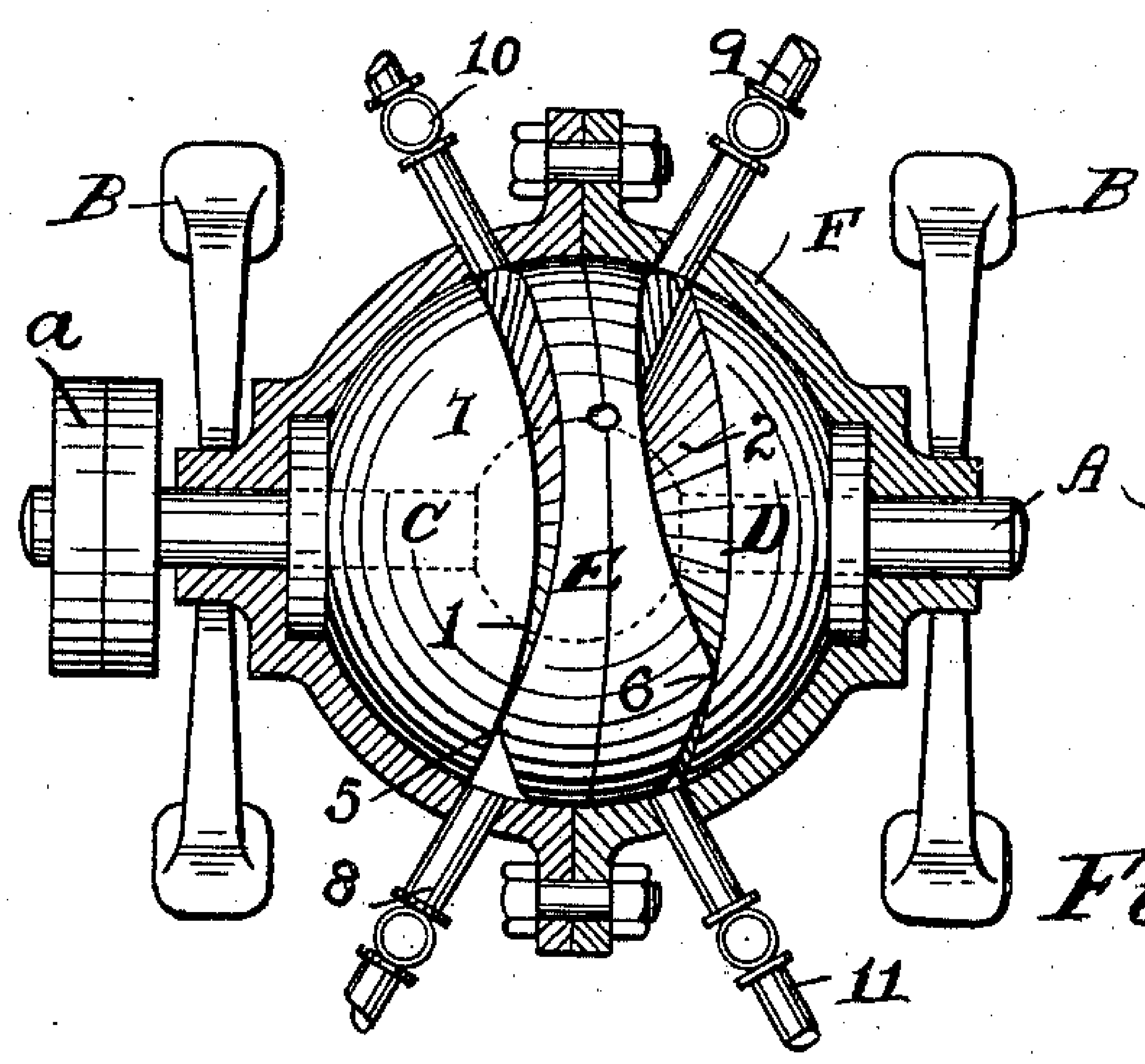


Fig. 6.

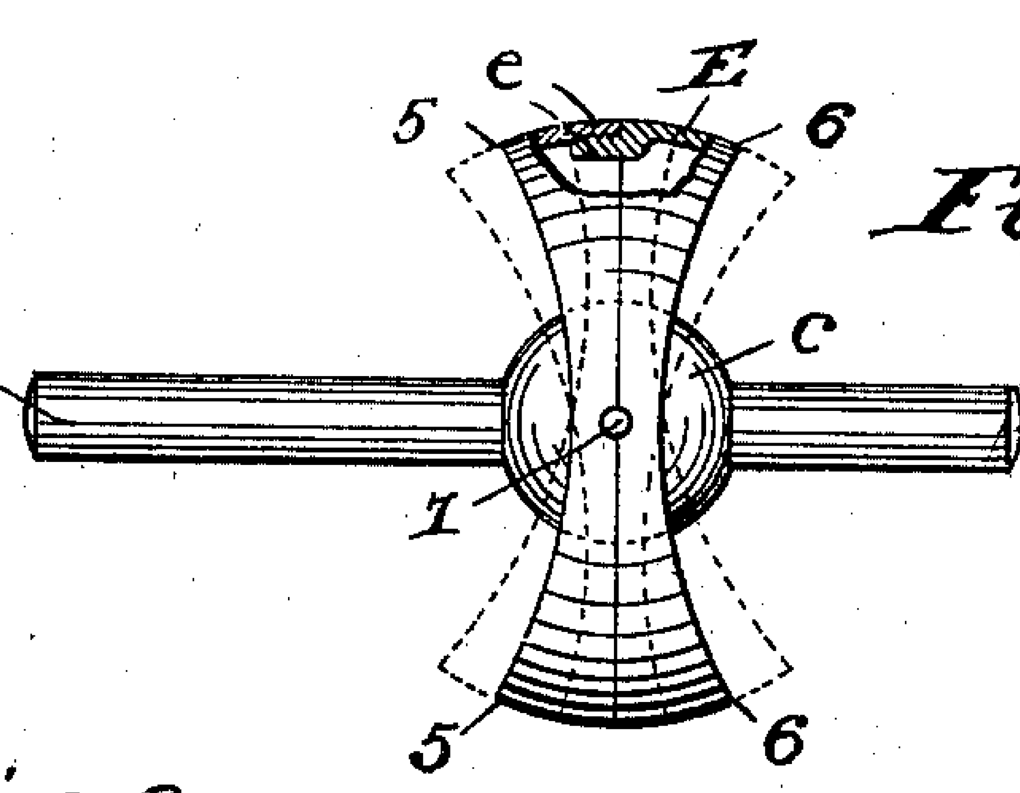


Fig. 5.

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UNITED STATES PATENT OFFICE.

FREDERICK WILLIAM JAEGER, OF NEW YORK, N. Y.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 683,405, dated September 24, 1901.

Application filed December 24, 1900. Serial No. 40,856. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK WILLIAM JAEGER, a citizen of the United States of America, residing at the borough of Manhattan, New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification.

My invention has reference to mechanical movements, and has for its object the conversion of a rotary movement—such, for instance, as that of a shaft—into a rotary and laterally vibratory or oscillatory movement, generally termed a "movement of nutation."

To this end my invention consists, essentially, in a mechanical movement comprising a rotary shaft, an abutment surrounding said shaft and having a coned surface located at an angle to said shaft, and a disk having a projecting nosed surface on its side engaging with the coned surface of the abutment, and said disk being mounted to rotate with said shaft, but free to vibrate laterally about the same.

The nature of my invention will best be understood when described in connection with the accompanying drawings, in which—

Figure 1 represents a side elevation of a mechanical movement embodying my invention. Fig. 2 is a similar view showing the shaft turned through an angle of about forty-five degrees from the position shown in Fig. 1. Fig. 3 is a bottom view of Fig. 1. Fig. 4 is a bottom view of Fig. 2, but showing the piston in a different position. Fig. 5 is a detail view showing the manner of applying and securing the disk to the shaft. Fig. 6 is a sectional plan view showing the movement applied to a pump.

Similar letters and numerals of reference designate corresponding parts throughout the several views of the drawings.

Referring to the drawings, the letter A designates a shaft mounted to turn in suitable bearings in a frame B, which latter may be of any suitable shape or form, according to the application of the movement. A movement of rotation is imparted to this shaft by a pulley *a* or by any other well-known means. Rigidly attached to the frame B or forming part of the same are two abutments C and D, each of which is provided with a coned surface 1 2. The planes of the bases of the coned surfaces are arranged at an angle to the shaft, and in the present instance I have shown the said bases lying in parallel planes. The shaft passes loosely through the abutments C and D or may have its bearings therein, and upon the same and between said abutments is mounted a circular disk E, having projecting nosed surfaces on its opposite faces. In the present instance I have shown the disk provided on each face with two diametrically opposite noses 5 5 and 6 6, and the surfaces between the two noses are so coned out as to fit or correspond with the coned surfaces 1 and 2 of the abutments C and D, although this coning out is not essentially necessary, but depends on the use to which the movement is to be put. The disk is connected with the shaft in such a manner as to participate in the rotary movement of the latter; but at the same time it is free to be vibrated, rocked, or oscillated laterally. This connection with the shaft may be accomplished by forming the shaft with a sphere or ball *c* or attaching the latter to the shaft and driving a pin 7 diametrically through the disk and ball. This secures the disk to the shaft and at the same time permits the disk to turn about the pin. As shown in the drawings, the noses 5 5 and 6 6 are adapted to ride, respectively, upon the coned surfaces 1 and 2 of the abutments C and D.

In Fig. 5 I have shown in detail the method of forming the disk E and its attachment to the shaft A. The disk is made in two halves, which may be provided with overlapping flanges *e*, so that it can be slipped over the ball *c*. The vibratory or rocking movement of the disk is indicated in this figure by dotted lines.

Assuming the parts to be in the position shown in Fig. 1, if the shaft is turned in the direction of the arrow 20 the nose 6 at the front of Fig. 1 rides upwardly and the nose 6 at the back of Fig. 1 rides downwardly on the coned surface 2 of the abutment D, while the one nose 5 rides upwardly and the other downwardly on the coned surface 1 of the abutment C, thus forcing the disk to rock laterally with respect to the pin 7. When the disk has been turned through a quadrant, the one nose 6 rides downwardly and the other upwardly on the opposite side of the coned surface of abutment D, while the one nose 5 rides downwardly and the other upwardly on the coned surface of the abutment C, thus turning the disk over laterally in the opposite direction. This movement is repeated through each half-revolution, and consequently the disk makes one complete oscillation for each rotation of the shaft. This motion of nutation of the disk may be used for many purposes. In the present example I have shown the parts embodied in a rotary pump. The construction is the same as before; but the disk and abutments are inclosed in a casing F, in which the shaft A has its bearings, and to which casing are connected the inlet-pipes 8 and 9 and the outlet-pipes 10 and 11 for the water. The construction of the abutments C D and the disk E form chambers gradually enlarging and contracting. When the parts are in the position shown in Fig. 1, two chambers 12 and 13 are formed, and these chambers are of the maximum size possible. When the shaft is turned in the direction of arrow 20, these chambers gradually decrease in volume, while new chambers 14 and 15 are being formed—for instance, as shown in Fig. 4. If water is introduced into the chambers when at their maximum volume through the inlet-pipes 8 and 9, respectively, or while the chambers are being formed, the water will be compressed by the diminution of the volume of the chambers and forced out through the outlet-pipes 10 and 11, respectively.

It is of course to be understood that the same movement of the disk E can be produced by the use of but one abutment—as, for instance, the abutment C—if a spring is used to press the disk E against the same. Therefore I do not wish to restrict myself to the use of two abutments. It is also evident that the mechanical movement shown can be operated in other ways. For instance, if one of the stationary abutments is turned the disk E will also be turned, together with the shaft A, but at only one-half the speed of the abutment, and the movement will then serve as a means for reducing rotary motion.

It is evident from the foregoing description that the projecting noses in following the conical or coned surfaces of the abutments cause the disk to oscillate about the pivot as a center and that all points of said disk move in an arc with said pivot as a center while following the surfaces of the abutments.

What I claim as new is—

A mechanical movement comprising a sphere, a projecting abutment placed on each side of said sphere, and a double-nosed oscillating disk pivotally mounted on said sphere and having its projecting noses engaging with the coned surfaces of the abutments, whereby all points of said disk move in an arc with the pivot as a center while following the surfaces of the abutments, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

FREDERICK WILLIAM JAEGER.

Witnesses:
EUGENIE P. HENDRICKSON,
FRED HACHENBERG.