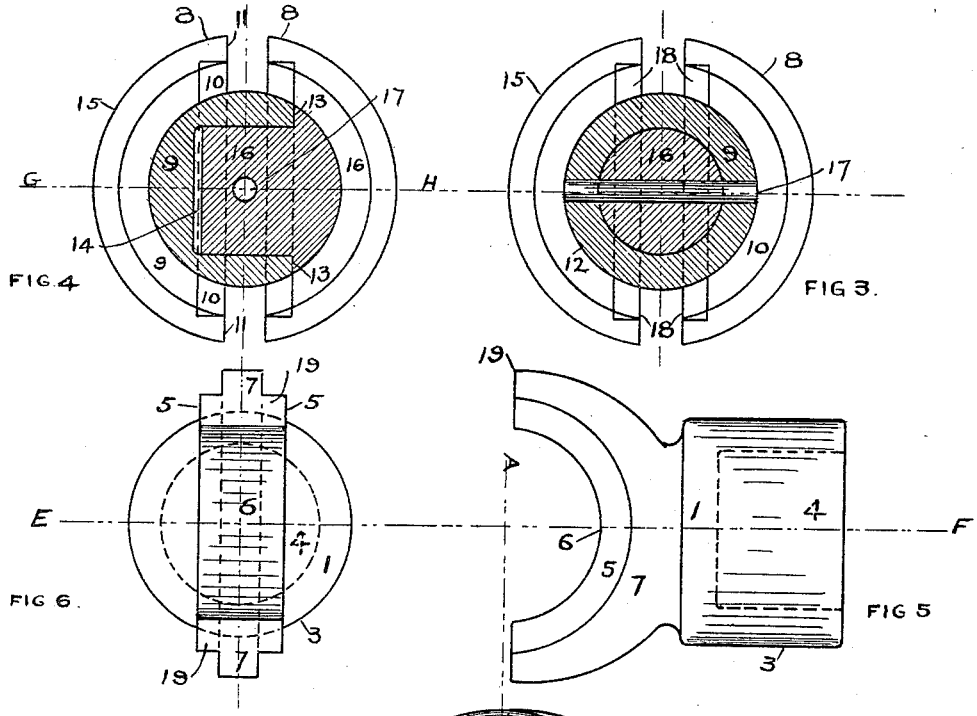
(No Model.) 2 Sheets—Sheet 1.

A. D. PENTZ.

FLEXIBLE COUPLING.

No. 433,304. Patented July 29, 1890.



WITNESSES

A. Vandenburk

Walter B. Angus

INVENTOR

Albert D. Pentz.

(No Model.) 2 Sheets—Sheet 2.

A. D. PENTZ.

FLEXIBLE COUPLING.

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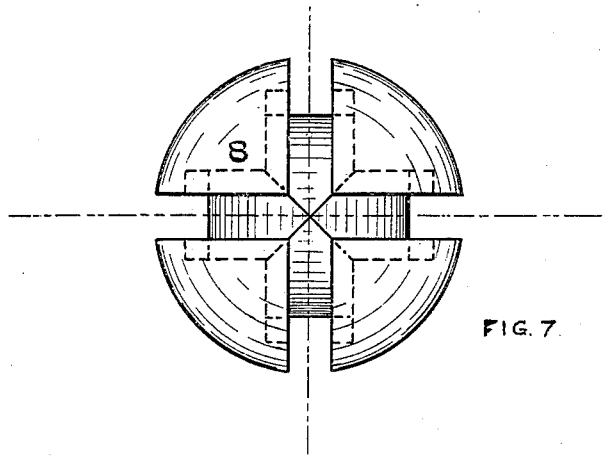

FIG. 7.

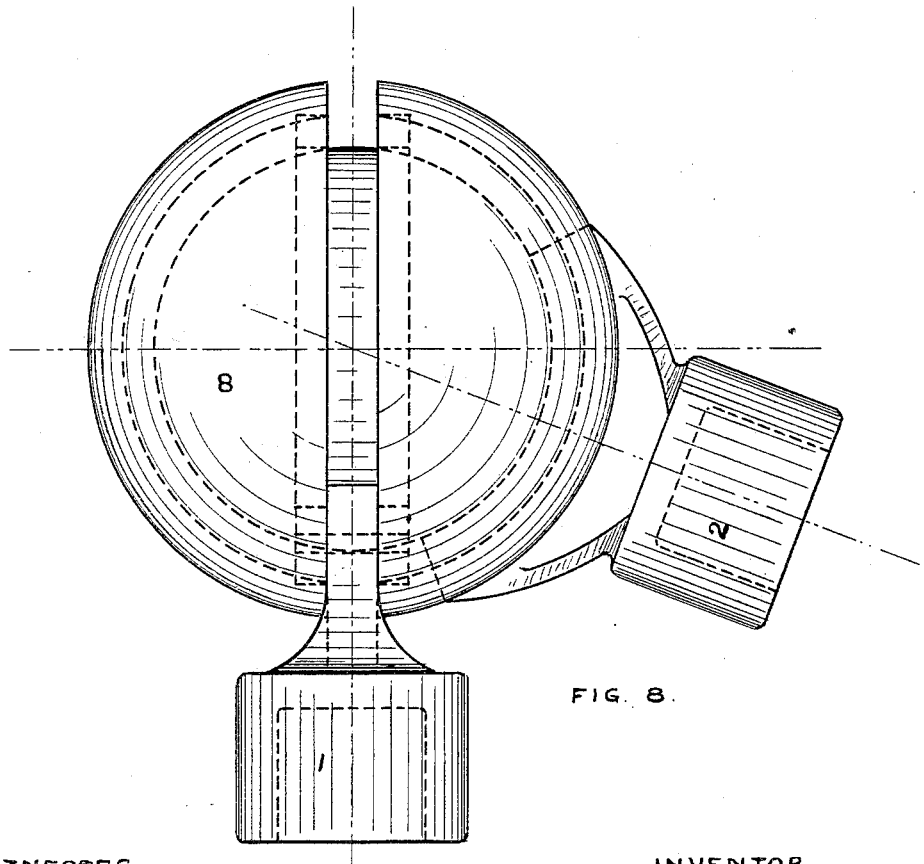

FIG. 8.

WITNESSES

Abm Vanderhoff

Walter R Angus

INVENTOR

Albert D. Pentz

UNITED STATES PATENT OFFICE.

ALBERT D. PENTZ, OF ELIZABETH, NEW JERSEY.

FLEXIBLE COUPLING.

SPECIFICATION forming part of Letters Patent No. 433,304, dated July 29, 1890.

Application filed April 4, 1890. Serial No. 346,580. (No model.)

To all whom it may concern:

Be it known that I, ALBERT D. PENTZ, a citizen of the United States, and a resident of Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Flexible Couplings, of which the following is a specification.

The object of this invention is to provide an improved coupling or universal joint of simple and durable form—first, by making the moving parts oscillate on arcs, instead of upon center points; secondly, by opposing to the strain parallel and substantial walls that are reliable and durable; thirdly, by constructing the whole compactly and neatly, without overhanging parts, screws, nuts, or other pieces liable to get out of order and to be easily cleaned and oiled; fourthly, by making all parts of such form that the whole device may be constructed from steel and hardened, thus adding materially to its durability and reducing the friction without much advance of cost.

I have reduced this invention to practice by constructing the mechanisms illustrated in the accompanying drawings, in which—

Figure 1 is a plan and Fig. 2 is a side view or elevation of the whole device. Fig. 3 is a section through A B; and Fig. 4, a section through the central part of C D, showing details of the ball. Figs. 5 and 6 show the construction of the sockets and indicate the method by which they are clipped into the ball. Fig. 7 shows the intersection of the channels within the central member and indicates, in connection with Figs. 3 and 4, the entire ball and all its details. Fig. 8 illustrates a method by which this joint or coupling can practically operate in acute angles.

Like numerals indicate like parts in the several views.

The parts marked 1 and 2 are socket-pieces, and are identical with the exception of a slight modification (marked 3) for clearance in both sides of part 2. These parts 1 and 2 are made of the same piece of material to insure uniformity, and are separated at 19, when finished in other particulars. It is essential that they be concentric to and equidistant from the line D C and E F in every measurement of one side from the other, the different sides of the same features comparing each to each. They are cylindrical about one-half their length, (marked 3,) and are bored out within these cylinders a safe depth, as a socket (marked 4) to receive the shafts they are designed to couple. On the bifurcated end of each of these socket-pieces there are semicircular flanges, (marked 5,) having an arc common with the intervening surface, (marked 6,) making their concave features identical. These flanges are about square in section. Their convex surfaces are parallel to their concave surfaces. Their sides are parallel to each other and of equal height from the web, (marked 7.) This web 7 has flat parallel sides and serves to connect the flanges 5 with the cylinders 3.

The ball (marked 8) is made from two pieces. The female half (marked 9) is made from material furnished with a tang, or it may be cut from a bar concentric with line G H, which serves to support it in a chuck during manufacture. This tang or bar is cylindrical and of dimensions to firmly hold the part in the making of it, and it is cut off at the end of the first operation. While held in the chuck, the part 9 receives a recess (marked 10) to fit a flange 5 on the socket-pieces 2; the face (marked 11) to receive the web 7; the convex surface (marked 12) to receive the concave surface 6; the face (marked 13) a distance from the bottom of recess 10 equal to the thickness of the web 7, added to the flanges 5 5, Fig. 6. The pocket (marked 14) is bored at this operation, and the hemispherical shape (marked 15) completed so nearly that the cross-groove cuts away the small shank left from the tang. The male half of the ball 8 (marked 16) is made in the same manner as the female half 9, fitted to 9 within the pocket 14, and fastened by the pin 17. The ball is then turned in a lathe on forked drivers, and the cross-groove 18, identical to the one already made between and within 9 and 16, is cut around through the surfaces of both 9 and 16, the two grooves crossing at right angles and having a common spherical center.

To assemble this coupling, slide the flanged part of the socket-pieces 2 into the groove 18 in the hemisphere 9, lay a flange 5 of the socket 1 into the recess 10 of the same hemisphere, attach the hemisphere 16, and secure it by the pin 17. The coupling thus made

has an angular capacity to about one hundred and five degrees before the leverage becomes impractically great. It has also the novel and valuable feature of being capable of being placed at an angle of ninety degrees or less by shortening the ends 19 of the socket-pieces 1 and 2. At ninety degrees the coupling would not operate to transmit motion; but one member could be freely revolved and the other would be securely locked. At angles of less than ninety degrees the conditions will be like the conditions between that angle and one hundred and eighty degrees, and a coupling thus modified will operate at angles of seventy-five degrees and less. The differential motion in this coupling is similar to all others of its kind, and is neither more nor less at equal angles. The strength and durability are infinitely greater, and when the device is made from steel and hardened its reliability is unquestionable. It is not impracticable to make the ball 8 of one piece and insert the arcs 5 6 through openings opposite to the ordinary location; but it is not, in my view, the best way to make my invention.

I claim substantially as shown and described—

1. A flexible coupling composed of a central member having two circular channels cut around it, intersecting and crossing each other at right angles, these channels having a common spherical center, to which all their parts are symmetrical, and recesses to secure the extensions within them, two bifurcated extensions symmetrical to a center line, having flanges to fit the recesses within the channels of the central member, and means by which the two bifurcated extensions may be assembled with and removed from the central member and secured firmly.

2. A flexible coupling composed of the described socket-pieces 1 and 2, the described hemispheres 9 and 16, and the key 17.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 31st day of March, 1890.

ALBERT D. PENTZ.

Witnesses:
A. VANDEDUCK,
WALTER P. ANGUS.