

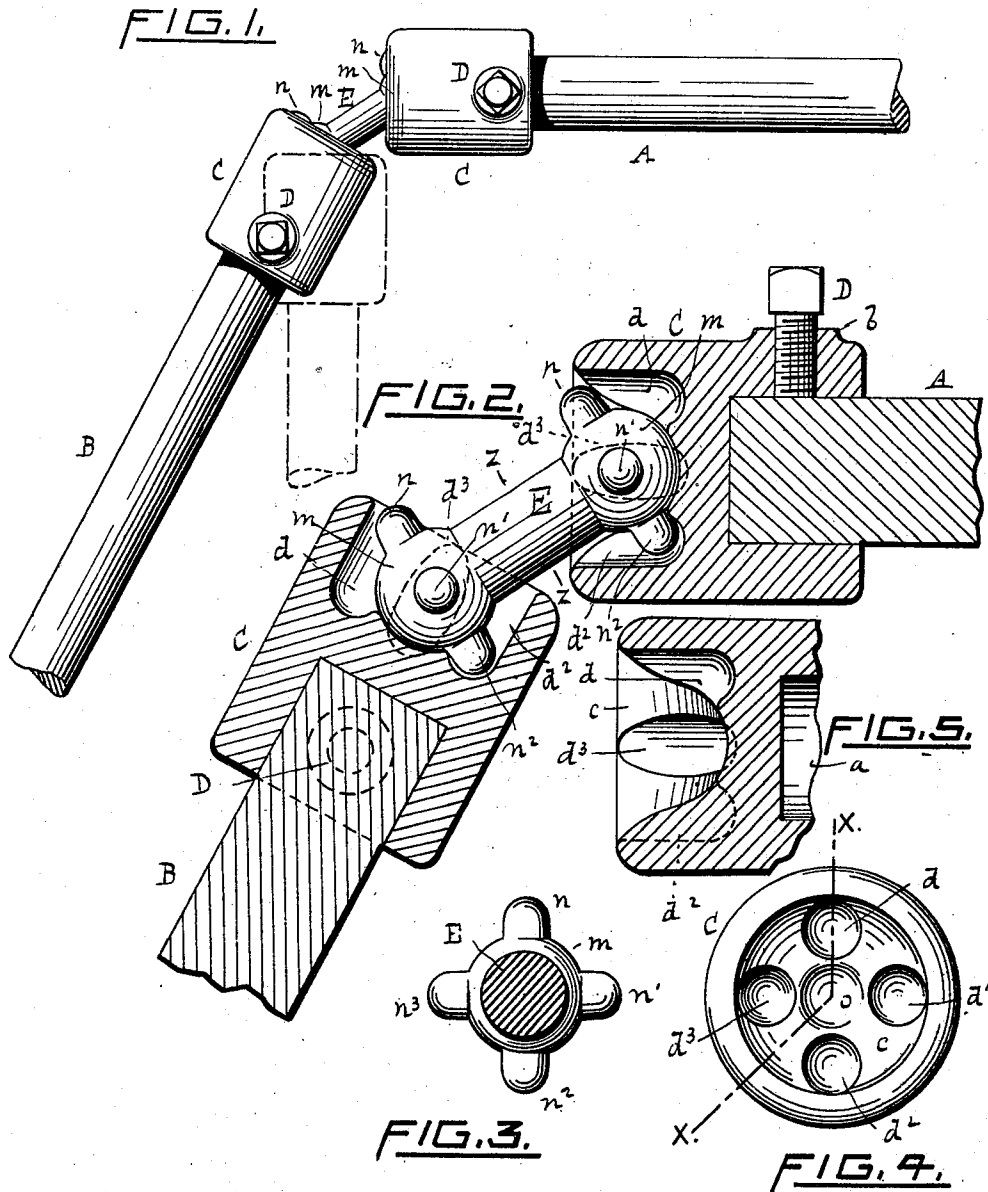
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Patented Jan. 1, 1901.

T. E. CARPENTER.
ANGULAR SHAFT COUPLING.

(Application filed May 21, 1900.)

(No Model.)



WITNESSES.

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THOMAS E. CARPENTER, OF PROVIDENCE, RHODE ISLAND.

ANGULAR SHAFT-COUPLING.

SPECIFICATION forming part of Letters Patent No. 665,175, dated January 1, 1901.

Application filed May 21, 1900. Serial No. 17,468. (No model.)

To all whom it may concern:

Be it known that I, THOMAS E. CARPENTER, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Angular Shaft-Couplings, of which the following is a specification, reference being had therein to the accompanying drawings.

Like letters indicate like parts.

Figure 1 is a side elevation of two sections of shafting set at an angle with each other and connected by my improved coupling device. Fig. 2 is a central longitudinal section of said shafting and of the two couplers or shells, together with the coupling-bar, the latter being shown in side elevation. Fig. 3 is a view of the coupling-bar, partly in section on line $z z$ of Fig. 2 and partly in elevation as seen on the section-line $z z$ in Fig. 2. Fig. 4 is a front end elevation of one of the couplers or shells. Fig. 5 is a section of the same as seen on section-line $x x$ of Fig. 4.

My invention relates to angular shaft-couplings; and it consists of the novel construction and combination of the several elements, as hereinafter particularly described, and specifically set forth in the claims.

In the drawings, A B represent two shafts which are to be coupled. They are mounted in proper supports and at an angle with each other. Said shafts are held from longitudinal or endwise movement in any suitable manner. On the end of each bar is a coupler head or shell C, cylindrical in its surface and having a concentric socket a , into which the end of the shaft is inserted, as seen in Fig. 2. The coupler head or shell C has on one side a boss b , tapped for the insertion of the set-screw D, whose inner end bears against the shaft within the socket a , as shown. Said head or shell C has in its outer end a socket c of the peculiar shape shown in section in Figs. 2 and 5 and in front end elevation in Fig. 4, in which figures it will be seen that said socket is circular crosswise and of diminishing diameter inwardly and has a rounded concaved bottom and a flaring mouth. On the sides of the socket c and opening therein are four round sockets d, d', d^2 , and d^3 , ninety degrees apart, somewhat deeper than the socket c , and each having its axial line par-

allel with the cylindrical surface of the head or shell C, all as plainly illustrated in Figs. 2, 4, and 5. A coupling-bar E is used in this device and consists of a cylindrical central portion with spherical or ball-shaped ends m . On each of the spherical ends m of said bar are four knobs or projections n, n', n^2, n^3 , arranged radially ninety degrees apart in that diametrical plane which is at a right angle with the longitudinal axis of said bar. These knobs n have hemispherical ends, as shown, and they either may be integral with the spherical ends m or may be pins inserted in the spherical ends m . When the parts are assembled as illustrated in Figs. 1 and 2, the bar E has its two spherical heads m in contact with the central concave seat o of the socket c , and the knobs or pins n, n', n^2 , and n^3 are in the sockets d, d', d^2 , and d^3 , respectively, as shown. When the parts are thus assembled and the shafts A B are set at an angle and mounted in proper supports, so that they are capable of rotation, but not of any endwise movement, the rotary movement of one of the shafts is communicated to the other by means of the angle-coupling hereinbefore described. The coupling-bar E is seated by its spherical heads m in the central concavities o of the sockets c of the coupler heads or shells C and turn therein, and the knobs or pins n, n', n^2, n^3 of the spherical heads m of the coupling-bar E bear against the sides of the sockets d, d', d^2, d^3 of the socket c of the coupler heads or shells C and have vibratory movement longitudinally in the sockets in which they severally and respectively work. Thus the rotation of one of the shafts rotates the coupling device C E C, which communicates said rotation to the other shaft extending angularly from the first shaft and accomplishes this result without any lost motion.

My improved angular coupling device accomplishes the same result as do bevel-gears, and whereas bevel-gears must have their engaging gear-surfaces exactly fitted and adapted to the particular angle at which the shafts are mounted relatively to each other and cannot operate if the shafts are at any other angle my said coupling device is adapted to rotate shafts set at ninety degrees or at any other less angle with each other without any change or adaptation. The dotted lines in Fig. 1

show the shaft B at a right angle with the shaft A.

This coupling device if made of small dimensions, is especially useful in connecting the angularly-arranged companion main and conical rollers of cigar-machines, but is adapted for use in connecting any shafts for the transmission of power, such as mill-shafting, machine-shafting, and the like. The comparative cheapness of its construction, its noiseless operation, and its great range of adaptability make it a very useful and desirable improvement in angular shaft-couplings.

It is evident that instead of having four knobs or pins extending radially from each of the spherical ends of the coupling-bar to engage with the four recesses or sockets in the sides of the central hemispherical socket of each of the coupler heads or shells, as described, I may use any other desirable number of such knobs or pins entering, engaging, and operating, respectively, in a corresponding number of such side recesses or sockets of the coupler heads or shells; but such a variation of number of said parts or elements would be equally within my invention.

I claim as a novel and useful invention and desire to secure by Letters Patent—

1. The angular shaft-coupling herein described, consisting of the combination with two shafts at the adjacent ends thereof, of two couplers or shells mounted and fastened on said shaft ends, respectively, and each having in one of its ends a socket for the reception of said shaft ends and in its opposite end a hemispherical socket with an outwardly-flaring mouth and also having four sockets or recesses opening into the socket last aforesaid at the sides thereof and located ninety degrees apart, and a coupling-bar having two spherically-formed ends, which are adapted to be seated in the bottom of the hemispherical sockets of said couplers or shells, respectively, and also having four knobs or pins extending radially from each of said spherical ends ninety degrees apart in a diametrical

plane which is at a right angle with the longitudinal axial line of said coupling-bar, which knobs or pins of each spherical end of said coupling-bar are inserted and operative in said four sockets or recesses of the hemispherical socket of the adjacent coupler or shell, substantially as specified.

2. In shaft-couplings adapted to connect the ends of two rotatable shafts which are mounted at an angle to each other, the combination of said two shafts, a coupling-bar having rounded ends and a plurality of radial knobs or pins, extending radially near each end of said bar at right angles with the longitudinal axial line of said bar and arranged in equidistant spaces, and two coupler heads or shells provided with sockets for the reception of said two shaft ends which are fastened therein and also having each a central hemispherical socket adapted to receive one of the rounded ends of the coupling-bar and a number of recesses or longitudinal sockets equal in number to the number of said knobs or pins, which recesses or longitudinal sockets open into said central hemispherical socket and in which, respectively, said knobs or pins are inserted and operative, substantially as shown.

3. In shaft-couplings adapted to connect the ends of two rotatable shafts which are mounted at an angle to each other, the combination of said two shafts, a coupling-bar having radially-arranged knobs or pins extending therefrom at right angles and two coupler heads or shells secured upon said shaft ends and each having a socket with radial recesses therefrom which are adapted to receive said knobs or pins of the coupling-bar, substantially as described.

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

THOMAS E. CARPENTER.

Witnesses:

WARREN R. PERCE,
MABEL FOSTER.