Oct. 29, 1968 O. B. ECCHER 3,407,628

PARALLEL SHAFT COUPLING

Filed June 5, 1967

Fig. 2.

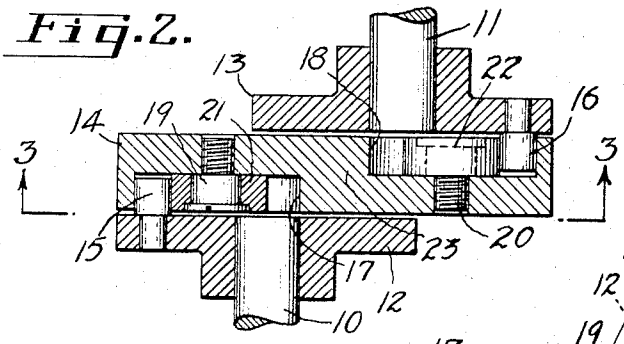


Fig. 3.

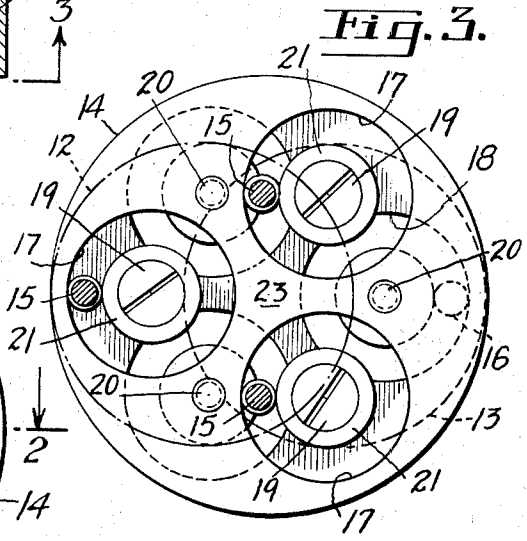


Fig. 1.

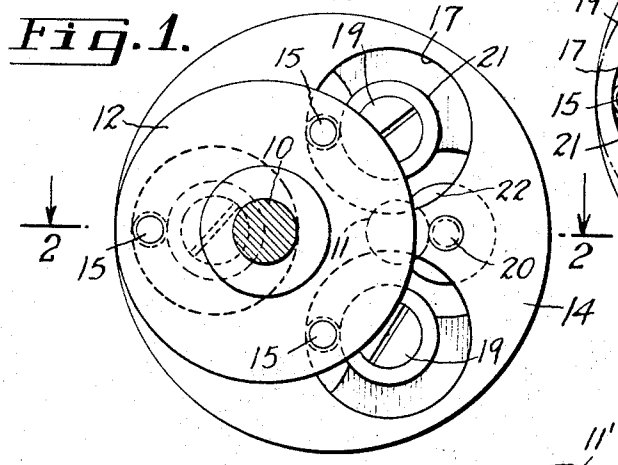


Fig. 5.

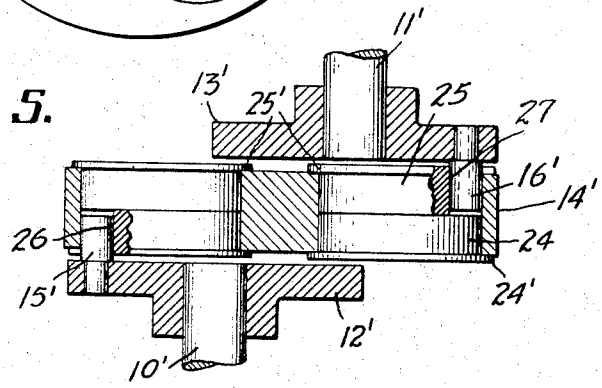
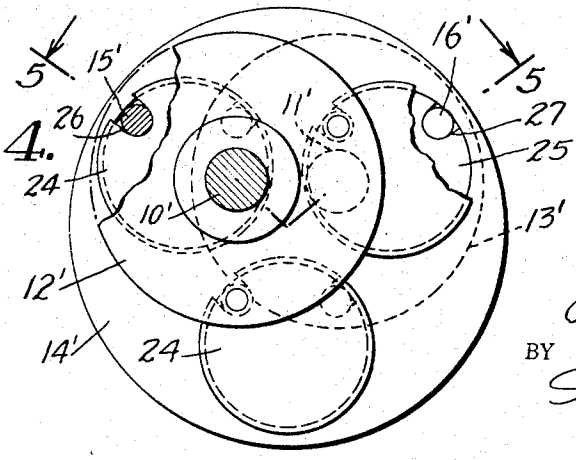


Fig. 4.



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PARALLEL SHAFT COUPLING

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ABSTRACT OF THE DISCLOSURE

A parallel shaft coupling comprising discs fixed to each shaft with an intermediate disc disposed between the first named discs for transmitting drive from one shaft to the other shaft by employing three projecting pins on the first named discs operating in peripheral portions of three chambers on each side of the intermediate disc, with means in said chambers controlling the groove-like path of said pins.

Background of the invention

(1) The invention deals with shaft couplings employing a series of three discs, two of which are fixed to independent parallel drive and driven shafts, with the third disc disposed between the shafts and said first named disc, with a series of three equally spaced pins on each of the first named discs operating in a corresponding number of chambers on opposed surfaces of the third disc, thus providing a simple and economical coupling device where variations in the amount of the offset are made possible.

(2) Devices of the general type and kind in question are known in the art, as evidenced, for example, by the following United States patents: 1,862,220, Johnson, June 7, 1932; 2,343,244, Rose, Mar. 7, 1944; 3,063,265, Schmidt, Nov. 13, 1962.

To applicant's knowledge, the use of the three discs and the drive pins on the discs fixed to the shafts and operating in intermediate discs defines, in view of the art, a distinctly new type of coupling.

Summary of the invention

In devices of the character defined, the provision of cylinder-like chambers on opposed surfaces of what can be termed an intermediate coupling disc, together with means disposed in the cylinders or chambers retaining pins in peripheral portions of the cylinders in establishing drive from a drive shaft to a drive shaft presents a simple and economical coupling of the type and kind under consideration.

The novel features of the invention will be best understood from the following description, when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed and, in which, the separate parts are designated by suitable reference characters in each of the views and, in which:

FIG. 1 is a face view of the coupling with the shafts in a maximum offset position.

FIG. 2 is a section on the line **2—2** of FIG. 1.

FIG. 3 is a section generally on the line **3—3** of FIG. 2.

FIG. 4 is a view, generally similar to FIG. 1, showing another embodiment of the invention, with the shafts shown in an intermediate position of shaft offset; and

FIG. 5 is a sectional view on the offset line **5—5** of FIG. 4, with parts of the construction shown in elevation.

Considering FIGS. 1 to 3, inclusive, **10** and **11** are offset parallel shafts. In providing a drive between the two shafts, three discs are employed, namely the disc **12** fixed to the shaft **10**, the disc **13** fixed to the shaft **11** and an intermediate disc **14**.

Mounted in peripheral portions of each of the discs **12** and **13** are three pins **15** and **16**, respectively, which

project beyond the surfaces of the discs and operate in three round recesses or chambers **17** and **18** on each of the opposed surfaces of the disc **14**, as clearly noted in FIG. 2 of the drawing.

Mounted centrally in each of the chambers **17** and **18** are headed bearing screws **19** and **20**, respectively, on which are arranged rollers **21** and **22**, the diameters of which are less than the diameters of the chambers so that the pins **15** and **16** will fit snugly in the chambers and on the periphery of said rollers, as will clearly appear from the partical showing in FIG. 2 of the drawing, as well as in the illustration in FIG. 3 of the drawing.

Considering FIG. 3 of the drawing, it will be apparent that the chambers **17** on one surface of the disc **14** are arranged intermediate the chambers **18** on the opposed surface of said disc and the intermediate structure of the disc forms what might be termed Y-portions in crossed relationship to each other, which are integrally joined by the intermediate axis portion, shown in section in FIG. 2 at **23** and in elevation in FIG. 3.

The assemblage, as described, produces, in opposed surfaces of the disc **14**, what might be termed annular grooves, in which the pins **15** and **16** operate in providing a drive from one shaft to the other. Either shaft can be the drive shaft and the other can be the driven shaft, as will be apparent.

In drive between the two shafts, regardless of the axial spacing of these shafts, the disc **14** will at all times be rotated about an axis through its center **23** in transmitting rotation of the drive shaft to the driven shaft.

With the foregoing structure, it will be apparent that a simple and economical construction is provided, keeping in mind the duplication of like parts and a distinctly smooth and positive drive is maintained between the drive and driven shafts.

In FIGS. 5 and 6 of the drawing, I have shown a modified arrangement, wherein shafts **10'**, **11'** have thereon discs **12'**, **13'**, similar to the discs **12** and **13**, the pins being shown at **15'**, **16'**. At **14'** is shown the center disc which is modified to the extent of having large diameter rollers **24** and **25** arranged in three bores or chambers **17'** opening through opposed surfaces of the disc **14**, the chambers being similar to the chambers **17**. A pair of rollers **24**, **25** fits snugly and freely in each of the chambers **17'**. The rollers **24** are disposed on one side of the disc **14'** and the rollers **25** on the opposed side of the disc. Outer surfaces of the rollers have rims **24'** and **25'** bearing upon the opposed surfaces of the disc **14'**. The rollers **24** have, in the periphery thereof, recesses **26**; whereas, the rollers **25** have recesses **27**. Note FIG. 5. The pins **15'** operate in the recesses **26**; whereas, the pins **16'** operate in the recesses **27**. These recesses or cut-out portions of the rollers **24** and **25** may be of any desired contour, as long as the depth thereof is such to maintain the pins **15'** and **16'** at the periphery of the chambers **17'**. Thus, the pins **15'** and **16'** will travel in circular paths in the chambers **17'** in the operation of the coupling.

The basic difference between the structure shown in FIGS. 4 and 5 and that illustrated in FIGS. 1 to 3 is in the fact that the pins operate in the rollers and rotate the rollers in the chambers; whereas, in FIGS. 1 to 3, inclusive, the rollers **21** and **22** simply form in the chambers annular grooves in which the pins rotate.

In referring to **12**, **13** and **12'**, **13'** as discs, it will be understood that this is to identify elements providing supports for the three drive pins employed, in other words, would be three radial supports extending from an axis centrally between the three pins. Thus, the peripheral contour of these discs could vary considerably, the round contour being shown for simplification in the illustration.

For purposes of description, the discs fixed to the drive and driven shafts in both forms of construction may be

said to comprise first and second discs; whereas, the intermediate or third disc can be said to be a coupling element. It will be apparent that a very smooth and positive drive is provided between the first and second discs and said element by providing in the chambers of cylinder portons of said element means positioning the drive pins at peripheral portions of said chambers or cylinder portions. Here, it is also to be kept in mind that, with the structure shown in FIGS. 1 to 3, the portions of the drive pins extending into the chambers or cylinder portions could and, in many instances, are provided with rotatable elements or bearings, as is well-known in the art. No attempt, however, is being made to show such bearings in order to simplify such illustrations.

At this time, it is also to be kept in mind that the recesses **26** and **27** in the rollers **24** and **25** can be of any contour and can be increased in number than the one shown to reduce surface engagement of the rollers with the walls of the chambers or cylinder portions. However, if more recesses are employed, it will be understood that the pins or the bearing portions thereof will operate only in one of such recesses, as illustrated in the drawing.

In the coupling described herein, the rotary motion of the drive shaft is exactly duplicated by the driven shaft (i.e., uniform rotary motion of the drive shaft will result in uniform rotation of the driven shaft), for all positions of offset and said rotary motion is unaffected by relative motion of the two shafts parallel to their axes of rotation. In operation, whereas, the amount of offset of the drive and driven shafts can be varied, the amount of offset between each shaft and the center of the intermediate disc remains constant and is equal to one-half the maximum offset of the drive and driven shafts.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A coupling of the character defined comprising three discs, namely a first disc coupled with a drive shaft, a second disc coupled with a driven shaft parallel to and axially offset with respect to the drive shaft and a third disc arranged intermediate said first and second discs, the first and second discs having three equally spaced members projecting from adjacent spaced surfaces of said discs at peripheral portions thereof and operatively engaging spaced chambers on opposed side surfaces of said third disc, and said third disc having means controlling

operation of the projecting members in said chambers in the drive of the driven shaft by said drive shaft.

2. A coupling as defined in claim **1**, wherein said members of the first and second discs comprise pins having bearings portions operating in said chambers.

3. A coupling as defined in claim **1**, wherein said last named means comprises rollers smaller in diameter than the diameter of said chambers to define in the chambers annular passages in which said members operate.

4. A coupling as defined in claim **3**, wherein the support of the rollers in the third disc comprises bearing screws.

5. A coupling as defined in claim **1**, wherein said last named means comprises rollers rotatably mounted in said chambers, and the periphery of each of said rollers having a recess in which the members of the first and second discs operate.

6. A coupling as defined in claim **5**, wherein said rollers are of a diameter common to the diameter of said chambers, and outer surfaces of said rollers having rims engaging opposed surfaces of said third disc.

7. A coupling as defined in claim **5**, wherein said members comprise pins having bearing portions operating in said chambers.

8. A coupling as defined in claim **3**, wherein said members comprise pins having bearing portions operating in said annular passages.

9. A coupling as defined in claim **5**, wherein both sets of rollers have adjacent abutting surfaces.

10. A coupling as defined in claim **1**, wherein the central portion of the third disc between the chambers in said disc defines an axis portion.

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