No. 700,773. Patented May 27, 1902.

G. C. HICKS, JR.

SPRING SHAFT COUPLING.

(Application filed Mar. 10, 1902.)

(No Model.)

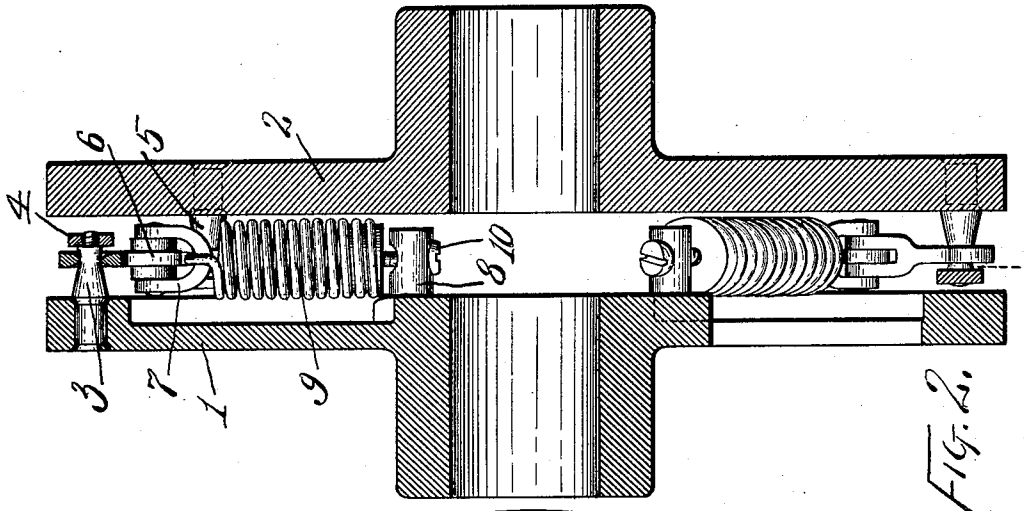


FIG. 2.

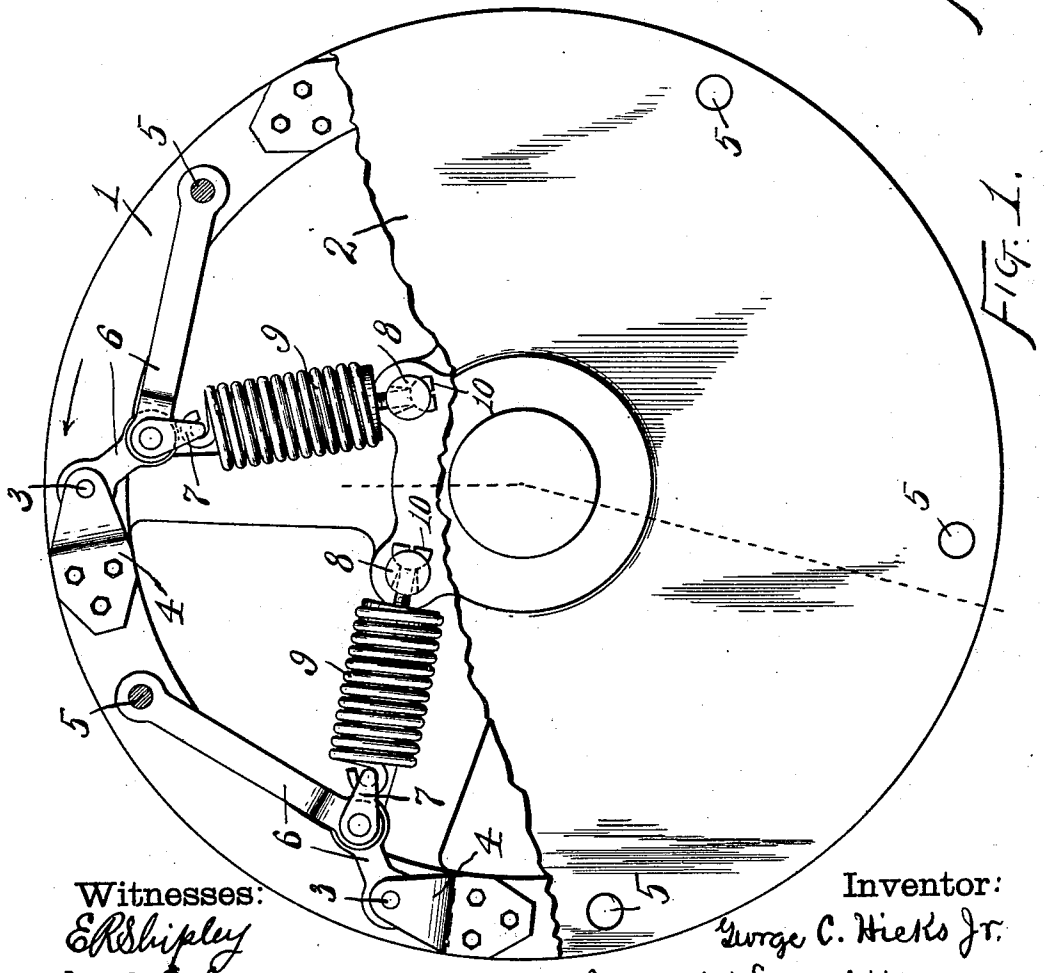


FIG. 1.

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UNITED STATES PATENT OFFICE.

GEORGE C. HICKS, JR., OF CONNERSVILLE, INDIANA.

SPRING SHAFT-COUPLING.

SPECIFICATION forming part of Letters Patent No. 700,773, dated May 27, 1902.

Application filed March 10, 1902. Serial No. 97,525. (No model.)

To all whom it may concern:

Be it known that I, GEORGE C. HICKS, Jr., a citizen of the United States, residing at Connersville, Fayette county, Indiana, have invented certain new and useful Improvements in Spring Shaft-Couplings, of which the following is a specification.

This invention, pertaining to improvements in spring-couplings for rotary shafts, will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a face elevation of my improved coupling, a part of one of the flanges being broken away to expose the connecting mechanism between the flanges; and Fig. 2, a vertical transverse section of the same. In Fig. 1 the view is as of from the right in Fig. 2, and in Fig. 2 the view is as of from the left of Fig. 1.

In the drawings, 1 indicates a flange adapted to be secured to one of the pair of shafts to be coupled; 2, a flange adapted to be secured to the other shaft of the pair, the inner faces of the two flanges standing at some distance apart; 3, a circular series of studs secured in flange 1, concentric to its center and projecting toward the other flange, the exemplification providing for five of these studs; 4, brackets secured to the face of flange 1 and engaging the free extremities of studs 3 and serving to stiffen those studs; 5, a series of studs projecting from the face of flange 2 toward the other flange, these studs 5 corresponding in number with the studs 3 and being disposed at substantially the same radial distance from the axis of the coupling as studs 3, studs 5 therefore alternating with studs 3 in a conjoint series; 6, toggles with members of unequal length arranged in circular series and having one of their ends engaging studs 3 and their other ends engaging studs 5, the toggles flexing inwardly, so that their intermediate pivots lie within the circle of studs 3 and 5; 7, a bail mounted upon the intermediate pivot of each of the toggles and projecting inwardly therefrom; 8, a circular series of studs fixed in the face of one of the flanges and projecting toward the other flange, these studs being equal in number to the toggles and being arranged upon a much smaller circle than studs 3 and 5, the illustration showing these studs 8 as being mounted in flange 1; 9, a series of helical springs, one for each toggle, the outer ends of these springs being connected with the intermediate pivots of the toggles through the medium of bails 7 and the inner ends of the springs being attached to the studs 8, the springs acting tensionally and tending to urge the toggles to greater flexure, and 10 adjusting-screws engaging the studs 8 and the inner heads of the springs and serving as means by which the tension of the springs may be altered or equalized.

Assume the device to be in the position indicated in Fig. 1 and in a state of rest and practically free from strain and assume that flange 1 represents the driving member of the pair and that the coupling is to turn in the direction of the arrow. If now flange 1 be started into motion in the direction of the arrow, the first effect of its angular motion relative to flange 2 is to tend to straighten the toggles and cause them to act as direct-tension elements, tending to pull forward on studs 5 and urge flange 2 to accompany flange 1 in its angular motion; but springs 9 elastically resist this straightening of the toggles, and the consequence is that when the springs have by the straightening motion of the toggles been put under sufficient tension the resistance of the toggles to further straightening exceeds the resistance of flange 2 to motion, and consequently flange 2 takes up angular motion and accompanies flange 1, the forward motion of flange 1 exerting itself upon flange 2 through the medium of studs 5 and upon the springs. If the resistance of driven flange 2 preponderates over the resistance offered by the springs, then the springs will yield and the toggles will straighten still further and studs 3 will increase their angular advance over studs 5, and the motion of flange 2 relative to that of flange 1 will be retarded. Again, if the effect of the springs preponderates over the resistance of the driven flange the toggles will become further flexed, and flange 2 will have its motion relative to that of flange 1 accelerated. The transmission of motion from the driving-flange to the driven flange is thus an elastic one. The greater the driving power transmitted the straighter will become the toggles and the greater will become

the tension of the springs, the action of the toggles modifying the normal action of the springs, so that the increase in the effect of the springs as the power transmitted increases is greater than that due to the arithmetical law applicable to springs under strain. If flange 2 be employed as the driving member of the pair, then the motion should be in the direction opposite to that of the arrow. There may be as many of the toggles and their appurtenances as the given situation is judged to call for, it being manifest that the greater the number of the toggles the lighter may be their structural elements, the work of transmission being divided between them, and, if desired, all but one may be dispensed with in case of light transmissions. The flanges may be flanges in fact, with complete webs, or they may find their full equivalents in such functional portions as are necessary to carry the studs of the system.

I claim as my invention—

1. In a spring-coupling for shafts, the combination, substantially as set forth, of a driven and a driving member arranged for angular motion upon a common axis, a flexed toggle having one of its extremities connected with one of said members and its other extremity with the other member and serving as the means by which angular motion is transmitted from the driving to the driven member, and a spring connected with said toggle and serving to elastically resist the change of flexure of the toggle under the influence of the driving strain.

2. In a spring-coupling for shafts, the combination, substantially as set forth, of a driving and a driven flange, a stud projecting from the driving-flange toward the driven flange, a stud projecting from the driven flange toward the driving-flange, a normally flexed toggle having its extremites pivoted at said studs, and a spring connected with said toggle and serving to elastically resist the change of flexure of the toggle under the influence of the driving strain.

3. In a spring-coupling for shafts, the combination, substantially as set forth, of a driving and a driven flange, a stud projecting from the driving-flange toward the driven flange, a stud projecting from the driven flange toward the driving-flange, a normally flexed toggle having its extremities pivoted at said studs, and a helical spring having one of its ends attached to the intermediate pivot of the toggle and having its other end attached to one of said flanges, said spring serving to elastically resist the change of flexure of the toggle under the influence of the driving strain.

4. In a spring-coupling for shafts, the combination, substantially as set forth, of a first flange, a second flange, a circular series of studs projecting from the first flange toward the second one, a circular series of studs, alternating with the first-mentioned studs and projecting from the second flange toward the first one, a series of inwardly-flexed toggles disposed between said flanges and having their forward extremities pivoted to studs of the first flange and their rearward extremities pivoted to studs of the second flange, a third circular series of studs carried by one of the flanges in a circle within the series of toggles, and helical springs having their inner ends attached to said third series of studs and having their outer ends connected to the intermediate pivots of the toggles.

5. In a spring-coupling for shafts, the combination, substantially as set forth, of a first flange, a second flange, studs projecting from the first flange toward the second flange, brackets carried by the first flange and engaging the outer projections of said studs, studs carried by the second flange and projecting toward the first flange, inwardly-flexed toggles with one of their extremities pivoted to said last-mentioned studs and their other extremities pivoted to the first-mentioned studs between the first flange and the brackets, inner additional studs carried by one of said flanges, and helical springs having their inner ends connected with said inner studs and having their outer ends connected with the intermediate pivots of said toggles.

6. In a spring-coupling for shafts, the combination, substantially as set forth, of a first flange, a second flange, studs projecting from the first flange toward the second flange, studs projecting from the second flange toward the first flange, inwardly-flexed toggles having members of unequal length and having one of their extremities attached to the first-mentioned studs and their other extremities attached to the last-mentioned studs, inner studs carried by one of said flanges, and helical springs having their inner ends attached to said inner studs and having their outer ends attached to intermediate pivots of said toggles.

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Witnesses:
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