(No Model.)

J. F. KING & N. BRYANT.

SPRING FRICTION CLUTCH.

No. 459,042. Patented Sept. 8, 1891.

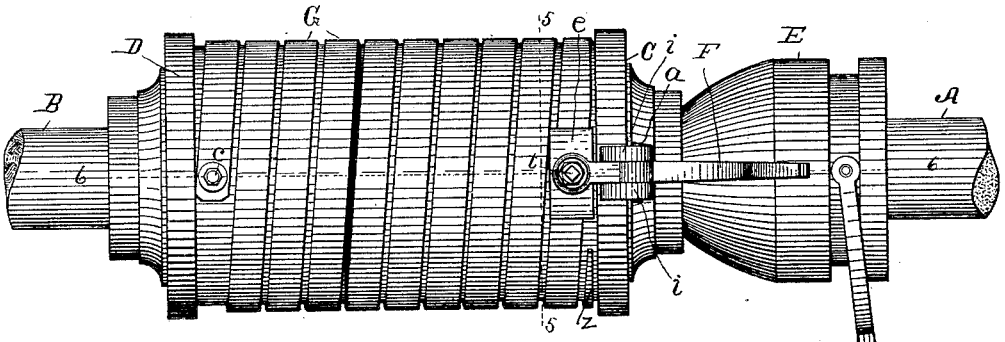

Fig. 1

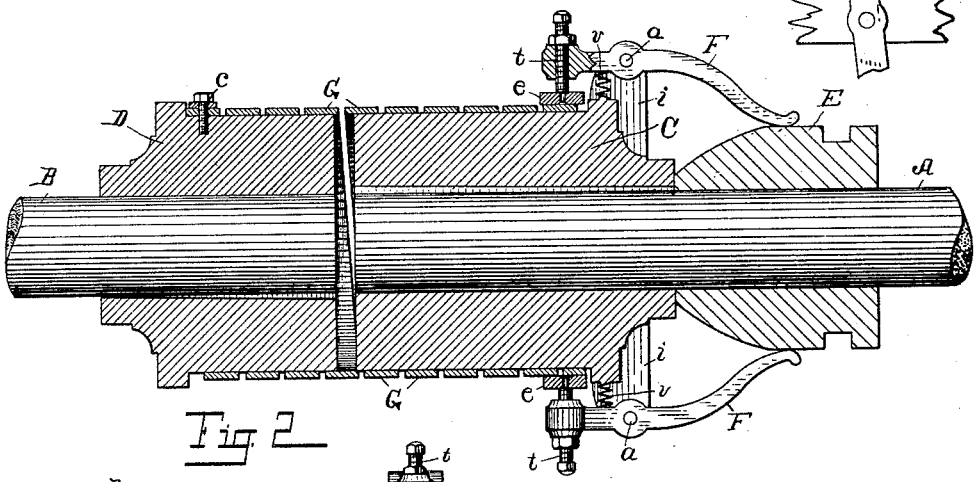

Fig. 2

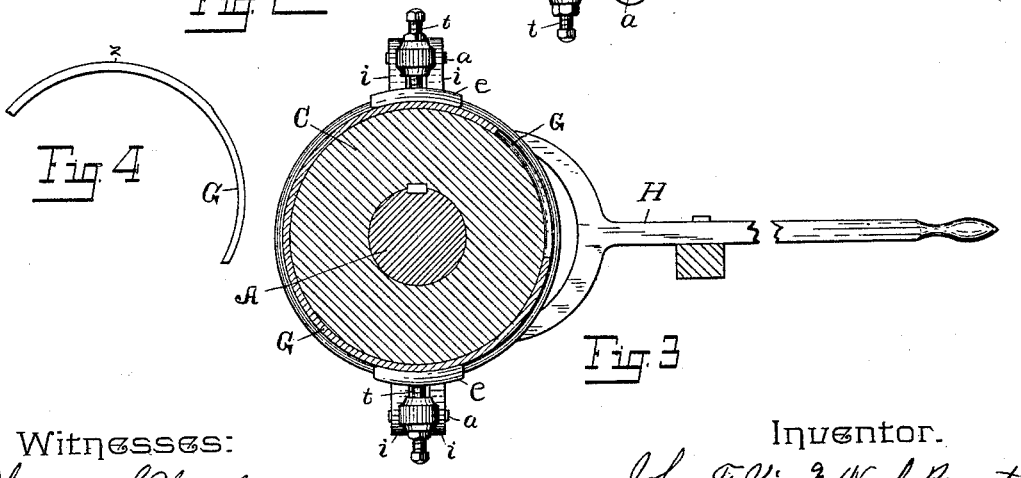

Fig. 4

Fig. 3

Witnesses:

Walter S. Hood

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Att'y.

UNITED STATES PATENT OFFICE.

JOHN F. KING AND NOAH BRYANT, OF OTSEGO, MICHIGAN.

SPRING FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 459,042, dated September 8, 1891.

Application filed May 25, 1891. Serial No. 393,929. (No model.)

To all whom it may concern:

Be it known that we, JOHN F. KING and NOAH BRYANT, citizens of the United States, residing at Otsego, county of Allegan, State of Michigan, have invented a new and useful Spring Friction-Clutch, of which the following is a specification.

This invention relates to that class of clutches in which a spiral spring is employed to transmit the motion from one shaft to another.

The object of this invention consists in a peculiar construction by which the shock caused by engaging a revoluble shaft with a shaft at rest is so neatly cushioned that scarcely any jar is perceptible.

In the drawings forming a part of this specification, Figure 1 is a side elevation. Fig. 2 is a section on line 6 6 in Fig. 1. Fig. 3 is a section on line 5 5 in Fig. 1, looking from a point at the left; and Fig. 4 is a broken lettered detail of the end of the spring.

Referring to lettered parts of the drawings, A is a power-shaft upon which is mounted a cone E, adapted to slide lengthwise on said shaft by means of a lever H in the ordinary manner.

End to end with shaft A and separated therefrom is a shaft B, to which motion is to be imparted by the spring friction-clutch. The shaft B has a collar D thereon and rigidly keyed thereto, and the shaft A has a collar C mounted thereon end to end with collar D and rigidly keyed to shaft A, Fig. 2. These collars C D really constitute enlargements of the shafts A B.

At G is shown the spiral spring surrounding the collars C D, as in Figs. 1 and 2. One end of this spring is rigidly attached at *c* directly to the collar D, and thus indirectly to the shaft B, the other end of the spring being left free to loosely surround the collar C when the shaft B remains at rest. Clamping-levers F are fulcrumed between their two ends at *a* to supports *i*. Two of these levers are employed on opposite sides of the shaft A, one end of said levers being adapted to engage the surfaces of the cone E and the other end of said levers being provided with friction-shoes *e* for engaging the free end of the spiral spring G. These friction-shoes *e* are adjustable by being attached in a swiveled manner to the lower end of pintles *t*, which are screw-threaded in the ends of the levers F, as in Fig. 2, by which means the desired pressure can be obtained in connection with the movement of the cone E. The friction-shoes *e* are disengaged from the spring G by means of springs *v*, which tilt the levers F when the cone E is moved outward, which would be toward the right hand in Figs. 1 and 2. If deemed practicable, the free end *z* of the spring G may be thickened up, as in Fig. 4, so as to cause a more positive or rigid engagement of the friction-shoe therewith. The main utility of this construction will be seen by reviewing the operation, as follows:

To illustrate the operation, Figs. 1 and 2 show the position of parts as when both shafts A and B are revolving, the free end of the spring G being clamped to the collar C by the clamp-arms F and their friction-shoes *e*. Prior to this action the cone E was in a position on the shaft A at the right of that which it now occupies, and of course the shaft A with its collar C was revolving, while the shaft B with its collar D and the clutch-spring G were at rest, it being understood, of course, that the shaft A connects with the driving-power and that the shaft B connects with the machinery to be driven. Now as the operator moves the cone E toward the left the engagement of the friction-shoes with the free end of the spring G is not sudden and rigid at the first point of contact, but is gradual over a portion of its surface until the clamping and contraction of the spring has become sufficiently tight to cause the spring to revolve with the shaft A, and thus of course imparting rotary motion to the shaft B. Owto this gradual clamping engagement and contraction of the spring G, and from the fact that said spring confines the ends of the two shafts, which are end to end and separated from each other, said spring being continuous over said separation, the shock is so nicely cushioned that the shaft B will commence to revolve with the same ease and smoothness of motion as though the power had been applied by a belt and pulley.

I claim—

1. In a spring friction-clutch, two revoluble

shafts end to end, their contiguous ends being separated from each other, in combination with a spiral spring surrounding the ends of said shafts, one end of said spring being rigidly attached to one of the shafts, the other end of the spring being left free, and means for clamping the free end of the spring to the shaft which it surrounds, said clamping means being brought in direct frictional contact with the outer surface of the spring, substantially as set forth.

2. The combination of a power-shaft and a machine-shaft, each end to end and separated from each other, the contiguous ends of said shafts having peripheral enlargements, a spiral spring confining said enlargements, one end of said spring being rigidly attached to the machine-shaft, the other end being left free around the power-shaft, the spring-actuated clamping-levers having the adjustable friction-shoes coming in direct frictional contact with the outer surface of the spring, and the sliding cone for operating said levers, substantially as set forth.

3. The combination of the two shafts end to end and separated from each other, the spiral spring surrounding the contiguous ends of said shafts, one end of said spring being rigidly attached to one shaft, the other end of the spring being made thicker at the end and left free around the other shaft, and means for clamping the free end of the spring by coming in direct frictional contact with its outer surface to cause it to contract and engage the periphery of the shafts, substantially as set forth.

In testimony to the foregoing we have hereunto subscribed our names in the presence of two witnesses.

JOHN F. KING.
NOAH BRYANT.

Witnesses:
FRANK H. MILHAM,
WALTER S. HODGES.