April 5, 1932. A. CHOPIN 1,852,735

UNIDIRECTIONAL DRIVE

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FIG. 1.

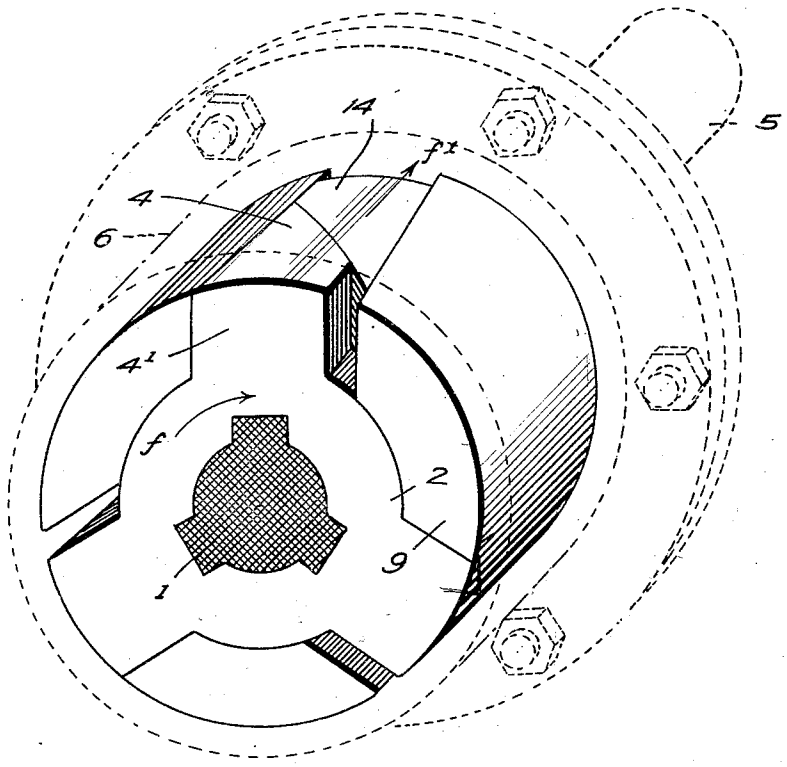

FIG. 4.

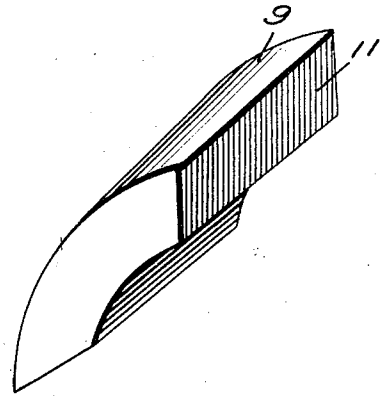

FIG. 5.

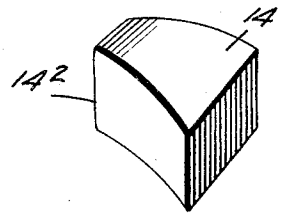

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FIG. 2.

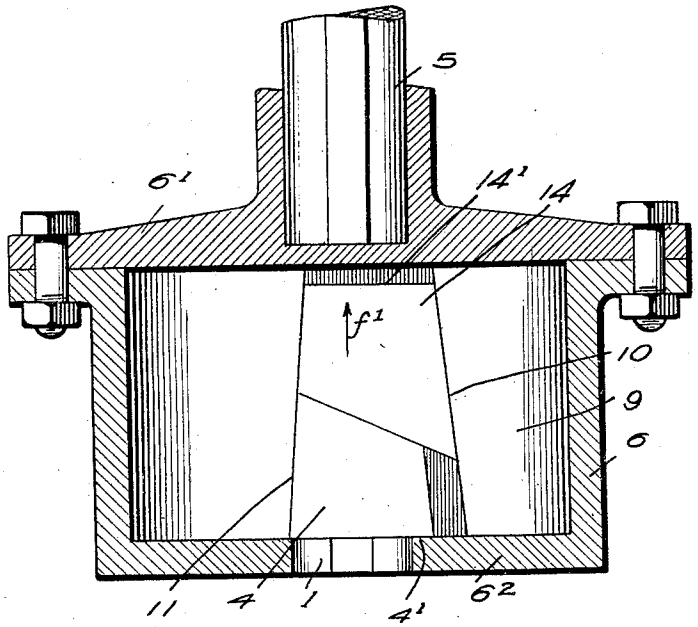
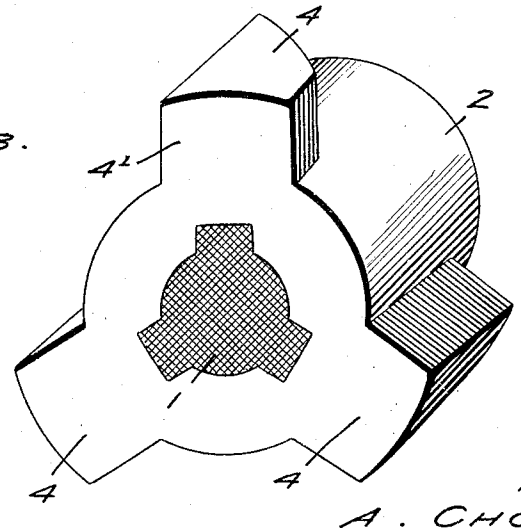


FIG. 3.



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Patented Apr. 5, 1932

1,852,735

UNITED STATES PATENT OFFICE

ALBÉRIC CHOPIN, OF PARIS, FRANCE

UNIDIRECTIONAL DRIVE

Application filed September 16, 1930, Serial No. 432,312, and in France September 18, 1929.

The present invention relates to unidirectional drives.

One of the objects of the invention is to provide means operative to establish a driving and driven relation between two rotatable elements, but only when the relative direction of rotation of said elements is a predetermined one.

Another object is to provide means operative to expand both radially and longitudinally to grip a casing of fixed dimensions when a shaft connected to said means is rotated in a predetermined direction.

Further objects will appear in the course of the detailed description now to be given with reference to the accompanying drawings, in which:—

Fig. 1 is a phantom view, in perspective, of one illustrative embodiment of the invention;

Fig. 2 is a plan of the structure shown in Fig. 1;

Fig. 3 represents, in perspective, the central driving shaft of the assembly;

Fig. 4 shows a floating frictional element; and

Fig. 5 is a perspective of a detached wedging element.

Referring to the various figures of the drawings, there is shown a driving shaft 1 driven by a motor, pulley, or other suitable mechanism, (not shown),—a partially cylindrical block 2 suitably keyed to shaft 1 and including bosses 4 limited at one end by a surface 4^1 at right angles to the axis of shaft 1, at the other end by oblique plane surfaces, and laterally by a pair of convergent plane surfaces whose function will be pointed out further on,—a driven shaft 5,—a cylindrical casing rigidly attached to shaft 5 and limited laterally, by a cylindrical wall 6, and longitudinally by a pair of parallel transverse walls 6^1 and 6^2,—a plurality of floating cylindrical segments or shoes 9 interposed between wall 6 and block 2, each shoe being limited by diverging lateral walls 10 and 11 having the same obliquity as the lateral portions of bosses 4,—and floating wedges 14 provided with one end surface 14′ adapted to coact with surface 6^1, a second end-surface 14^2, parallel to, and adapted to slide on one end of a boss 4, and convergent lateral surfaces having the same obliquity as surfaces 10 and 11.

The hereinabove described assembly functions as follows:

Assuming shaft 1 to be driven in the direction of arrow f (Fig. 1), the end oblique surface of each boss 4 will exert pressure on corresponding face 14^2 of each wedge 14 and force the latter in the direction of arrow f' (Figs. 1 and 2); however, because of the obliquity of lateral surfaces 10 and 11 of shoes 9, the latter will move radially outward and come into contact with internal cylindrical surface 6; at the same time, while corresponding ends of each shoe 9 move into forcible contact with surface 6^1, surface 4′ is thrust in the opposite direction into frictional contact with surface 6^2; bosses 4, shoes 9 and wedges 14 thus coact to simultaneously effect a locking action in both radial and longitudinal directions which insures very efficient coupling of shafts 1 and 5. When shaft 1 turns in the opposite direction, an inverse series of displacements occur and shafts 1 and 5 are completely uncoupled.

The use of a plurality of bosses, wedges and shoes permits easier centering of the assembly and their number may be varied at will.

The invention is particularly applicable to pneumatic hammers, to self-starters for automobile motors, elevators, aeroplanes, etc.

In French Patent No. 652,184, having délivré date October 22, 1928, to the same inventor, an apparatus was described for obtaining a unidirectional drive by means of a cam element exerting radial pressure only on a plurality of floating shoes. The present invention is an improvement on this prior device in that the radial effect is supplemented by a longitudinal locking action, thus increasing the total area of the frictional surfaces in contact and at the same time insuring a more perfect coupling of the driving and driven shafts.

What I claim is:

1. In combination, a driving shaft, a driven shaft, a casing having an internal cylindrical wall and an end wall, said casing being

rigidly attached to said driven shaft, a plurality of floating shoes interposed between the walls of said casing and the driving shaft, and a wedge mounted in driven relation to the driving shaft, said wedge being operative by the latter to force said shoes radially and longitudinally into contact with the internal cylindrical wall and an end wall of said casing.

2. In combination, a driving shaft, a driven shaft, a casing having an internal cylindrical wall and an end wall, said casing being rigidly attached to the driven shaft, means including a boss connected in driven relation to the driving shaft, said boss having an oblique surface formed thereon forming an angle with a plane at right angles to the axis of the driving shaft, a plurality of floating shoes interposed between said casing and the driving shaft, said shoes having convergent lateral surfaces, and a wedge having convergent lateral surfaces and an oblique end surface positioned to contact with the corresponding oblique surface of said boss, said wedge being positioned between said shoes and adjacent an end wall of said casing, whereby, rotation of said driving shaft will cause the oblique surfaces of the wedge and boss to slide over one another and bring the convergent lateral surfaces of the wedge and shoes in contact so as to force the lateral surfaces radially and longitudinally into contact with the internal walls of the casing.

In testimony whereof I have signed this specification.

ALBÉRIC CHOPIN.