Feb. 12, 1935. J. PONDELICEK 1,990,999

SELECTIVE SPEED CLUTCHING MECHANISM

Filed Feb. 13, 1932

Fig. 1.

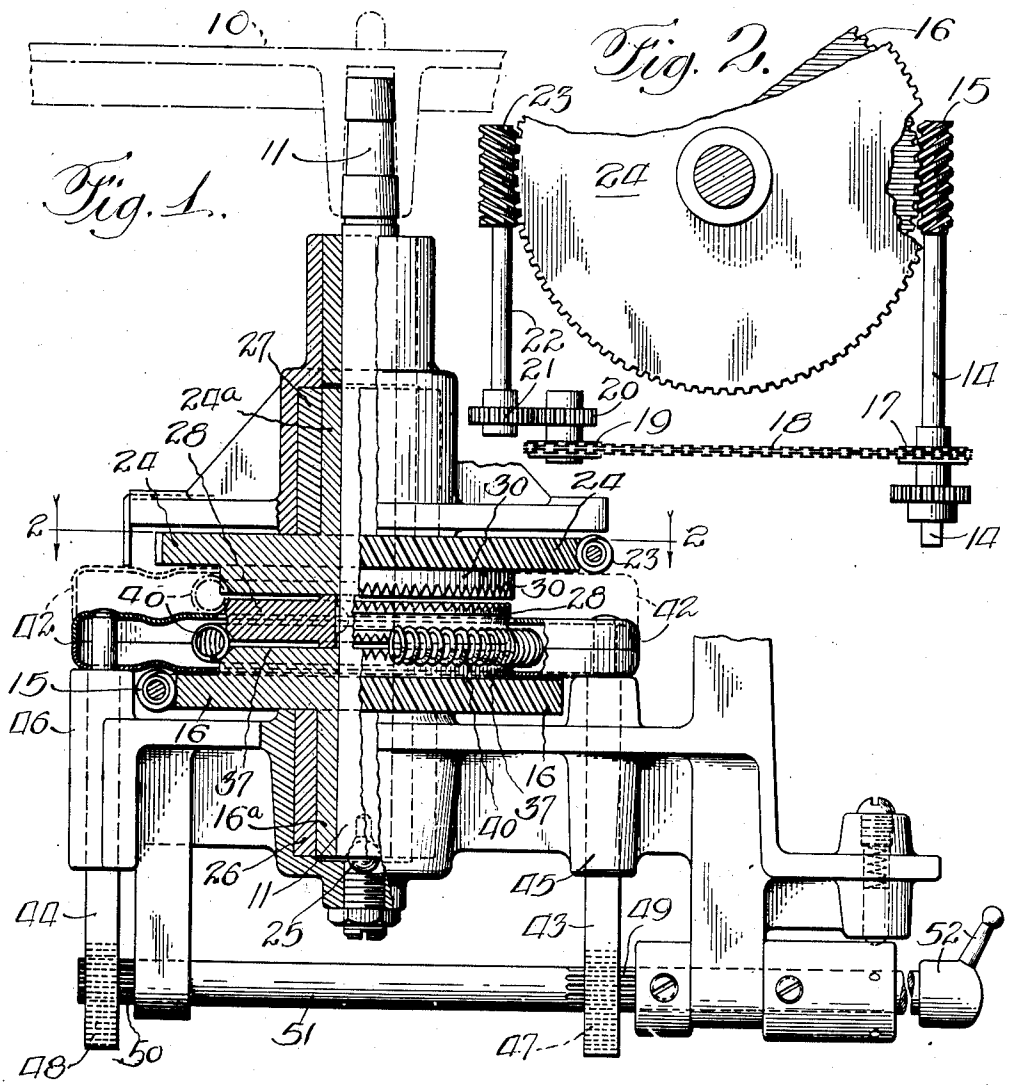
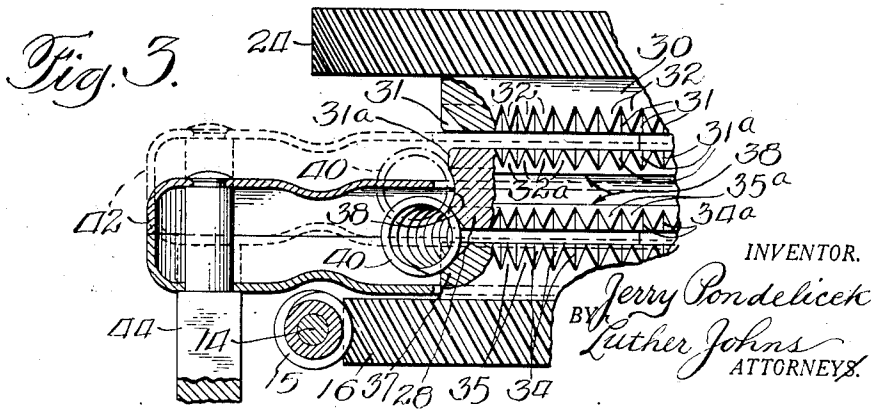


Fig. 2.

Fig. 3.



INVENTOR.
BY Jerry Pondelicek
Luther Johns
ATTORNEYS.

Patented Feb. 12, 1935 1,990,999

UNITED STATES PATENT OFFICE

1,990,999

SELECTIVE SPEED CLUTCHING MECHANISM

Jerry Pondelicek, Berwyn, Ill., assignor, by mesne assignments, to International Projector Corporation, New York, N. Y., a corporation of Delaware

Application February 13, 1932, Serial No. 592,702

8 Claims. (Cl. 192—67)

These improvements relate to selective speed clutching devices. An important application of the present device is in connection with phonographs when it is desired to rotate the turntable at various rates relative to a constant rate of rotation provided by the prime mover.

The chief object of the invention as a clutch device is to provide a simple and effective form of clutch which is compact and occupies but small space and according to which two members rotating closely side by side on a common axis may be readily interlocked in driving and driven relation; and to provide an organization having the same advantages and characteristics when formed as a double clutch whereby one may obtain an output at different rates of speed from driving members rotating at different speeds, the organization being such also that an output of different constant speeds may be obtained from a prime mover operating at a constant speed. Another object is to provide a phonograph device having a turntable which can be rotated at different substantially constant speeds from a prime mover operating at a substantially constant speed. A feature of the present clutch is a certain resiliency or yield between the clutched members through the intermediate member, while maintaining positiveness in the drive connection. Another advantage is in the fact that the two members become connected substantially instantly, thus avoiding lost motion, and which prompt connection is highly important in a phonograph having a record for sound synchronized with a picture. Other objects and advantages will appear hereinafter.

In the drawing Figure 1 is a partly medial vertical sectional view and partly an elevational view of a highly advantageous embodiment of the present invention;

Fig. 2 is a horizontal sectional view partly broken away, as on the line 2—2 of Fig. 1 and showing the drive for the two driving members of Fig. 1; and

Fig. 3 is a fragmentary elevational enlargement of parts of Fig. 1, with fragments in medial vertical section.

Fig. 1 shows by dotted lines a turntable 10 mounted at the upper end of a shaft 11. In my practice it is desired to rotate the turntable at a normal speed for playing ordinary commercial records, and at another speed for special records the music or speech of which has been synchronized with a motion picture being projected concurrently with the playing of such record. The mechanism illustrated herewith is part of a machine in which there is a projector synchronized with sound and designed for use in the home where it is also desired to use a phonograph with the usual commercial records.

In order that the synchronized sound record may rotate in synchronism with the picture projection I employ a single motor (not shown) operating both the phonograph and the picture projector mechanisms. Such motor drives shaft 14 (Fig. 2) at a substantially constant speed. A worm 15 on that shaft meshes with gear 16 which, as shown by Fig. 1, has a collar or sleeve 16*a* loosely mounted on shaft 11. Through a sprocket 17 (Fig. 2) chain 18, sprocket 19, pinions 20 and 21 and shaft 22 a worm 23 is rotated at the same rate of speed as that of worm 15. Worm 23 meshes with gear 24 (Fig. 2) which, as shown by Fig. 1, has a sleeve 24*a* also loosely mounted on shaft 11. These sleeves 16*a* and 24*a* are mounted in bushings 26 and 27 respectively carried by the frame of the machine. Shaft 11 has an adjustable end thrust ball bearing at 25 in the frame.

Rigidly secured to shaft 11 is an intermediate or inner disc-like driven clutch member 28. If driving power be communicated to intermediate clutch member 28 by either driving member 16 or 24 shaft 11 will be rotated. We have seen that these driving members 16 and 24 are being constantly rotated, and in the same direction, by the prime mover and are rotating freely on turntable shaft 11.

Gear 24 carries a coaxial cylindrical projection 30 on its inner side having a plurality of recesses 31 cut at the peripheral edge thereof, in the form of triangular-shaped notches and providing a plurality of projections 32 between the adjacent recesses and making a toothed structure. Gear 16 has a similar disc-like cylindrical extension 37 having exactly the same kind of V-shaped recesses 34 cut in its peripheral edge and producing similar teeth 35 between the adjacent recesses.

Intermediate or driven clutch member 28 has the same recess-and-tooth formation at its outer marginal edges, the recesses on one side being marked 31*a* and the teeth being marked 32*a*, these being adjacent to the recesses 31 and teeth 32, and on the other side the recesses are marked 34*a* and the teeth 35*a*. Between the two rows of recesses or teeth on the intermediate member 28 the surface is recessed at 38 to provide a shallow groove forming a seat for the endless coiled spring 40 when that spring is in its neutral position shown by dotted lines in Fig. 3.

This resilient ring 40, in its preferred form, is an endless spring formed of continuous turns of spring wire, and it hugs that seat 38. The spring is short enough so that when it is expanded and rests in the seat 38 there is space between the adjacent turns. The spring is stretched or extended somewhat and under tension when in the seat 38, and the turns are spaced apart the same distance as that between the adjacent recesses in the series respectively marked 31, 31*a*, 35 and 35*a* on the several members. The number of turns of the spring is exactly the same as that of the recesses in any of the series, the number of such recesses being the same on each of the members. To illustrate, if we should assume that there are 100 of the recesses 31, 31*a*, 35 and 35*a* respectively, then spring 40 would have 100 turns.

The diameter of the cylindrical extensions 30 and 37 is the same, and that of the intermediate member 28 is substantially the same as that of the elements 30 and 37, as well shown in Fig. 3.

If we were to move spring 40 out of its dotted-line position into its full-line position in Fig. 3 its turns would simultaneously enter the oppositely-disposed recesses 34 and 34*a*, and this would put driving member 16 into driving relation with intermediate member 28, and the turntable would be rotated at a speed corresponding to that of gear 16, which as will be observed, is of a smaller diameter than that of gear 24. On the other hand, if ring 40 were moved out of its dotted-line position so that its turns will enter the recesses 31 and 31*a* driving member 24 will be put into driving relation with the turntable through the intermediate member 28.

Means for shifting spring 40 from its neutral position in either direction and back again are shown as a housing or casing 42 open centrally so that the adjacent one of its sides may pass over the toothed element 30 or 37, as the case may be, but which sides are in close association with the ring 40 so that the ring will be moved in either direction when the encompassing housing 42 is so moved. This housing is carried by a pair of shafts 43 and 44 mounted respectively in frame parts 45 and 46 so as to slide therein, the outer ends of these shafts being provided with teeth at 47 and 48 respectively forming racks, which racks are engaged by the pinions 49 and 50 on operating shaft 51 having a manually operable member 52. By turning this member 52 in either direction shaft 51 is turned and the spring-shifter or housing 42 is moved to occupy respectively the several dotted-line positions of it shown.

The construction is such that the clutching action is quite positive within all of the requirements. At the same time the connection is a yielding one, and if it should happen that too great resistance were applied to the turntable the clutch elements would slip, the spring being simply pushed away and out of engagement with the teeth. This is a feature of considerable importance in various applications of clutch devices. Owing to the large number of teeth and turns in the spring the distance between the teeth is quite small in actual practice in a device such as shown, so that the turntable is picked up substantially instantly when the spring is shifted, which is a feature of importance where the movements of the turntable are synchronized with those of a picture projector. The clutch is also noiseless in operation, and the wear upon the parts is negligible.

I contemplate as being included in these improvements all such changes, variations and departures from what is thus specifically illustrated and described as fall within the scope of the appended claims.

I claim:

1. A clutch device comprising a pair of members on a common axis close to each other and mounted for rotation independently of each other, each of said members having an annular gripping surface on the common axis, said gripping surfaces being adjacent to each other and of substantially the same diameter, and a resilient endless ring having lateral parts thereof simultaneously engaging said surfaces respectively, with means for moving said ring in lateral directions out of and into engagement with said surfaces.

2. The device of claim 1 hereof in which said ring is an endless coil of springy wire.

3. The device of claim 1 hereof in which said ring is an endless coil of springy wire and said gripping surfaces include notches into which the turns of said coil extend.

4. The device of claim 1 hereof in which said ring is an endless coil of springy wire and said gripping surfaces incline inwardly toward each other forming substantially an annular channel, and said ring is in said channel, and said surfaces have projections adapted to enter between turns of the ring.

5. The device of claim 1 hereof in which said surfaces incline inwardly toward each other forming substantially an annular channel, and said ring is in said channel.

6. The device of claim 1 hereof in which one of said members has an annular seat for holding said ring out of contact with the other one thereof.

7. The device of claim 1 hereof in which one of said members has an annular seat on the periphery thereof for holding said ring out of contact with the other of said members.

8. The device of claim 1 hereof in which said ring has slipping engagement with at least one of said members under undue strains.

JERRY PONDELICEK.