Aug. 20, 1974 A. DAHLSTROM Re. 28,122

SPEED REDUCING MECHANISM

Original Filed Jan. 2, 1969 3 Sheets-Sheet 1

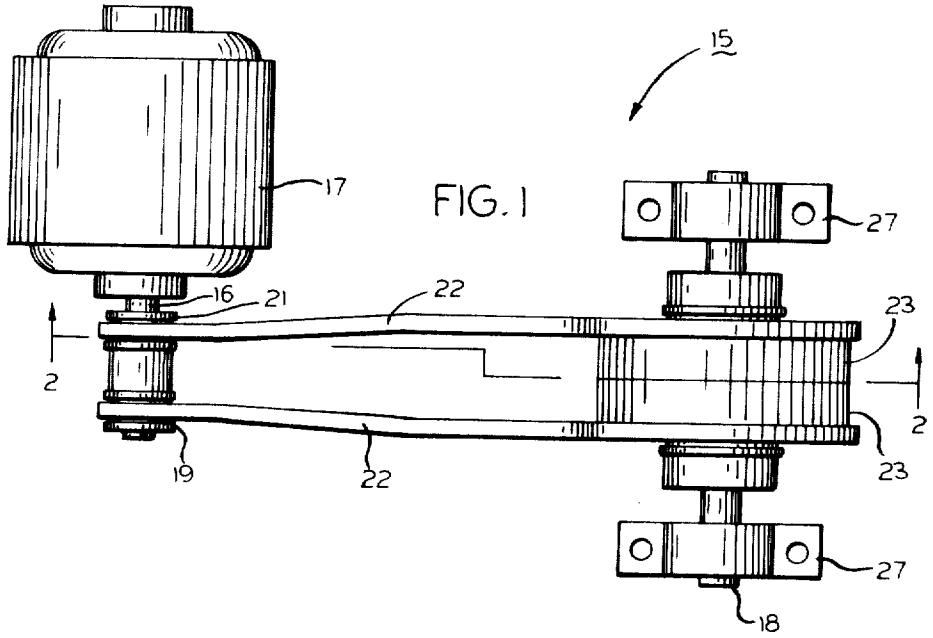


FIG. 1

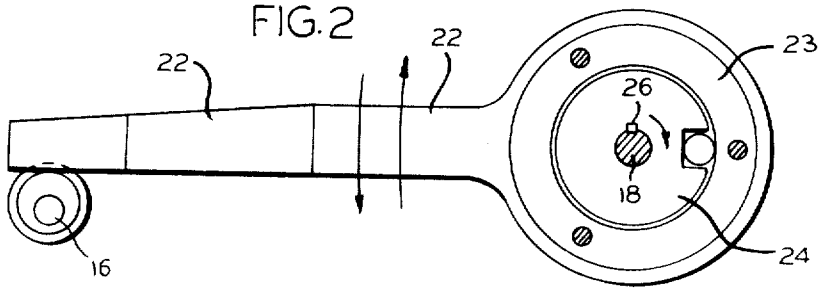


FIG. 2

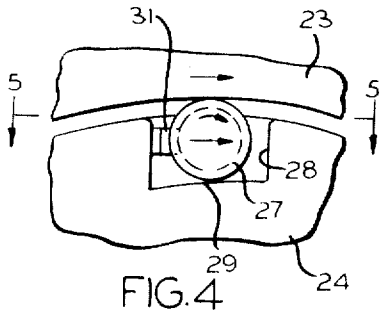


FIG. 4

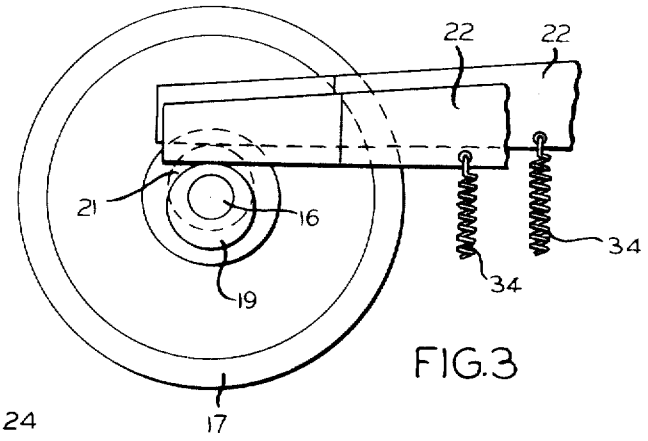


FIG. 3

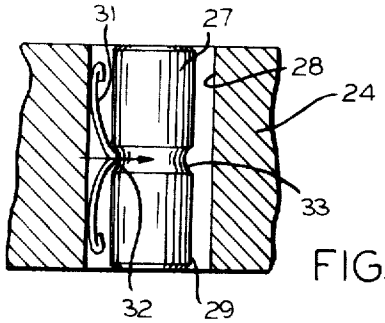


FIG. 5

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FIG.6

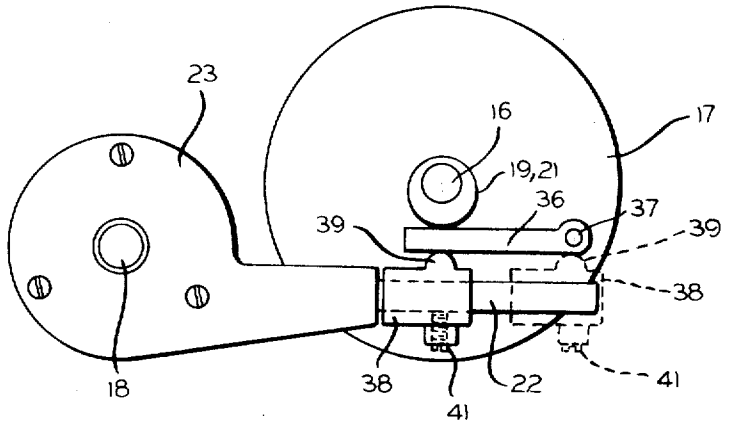
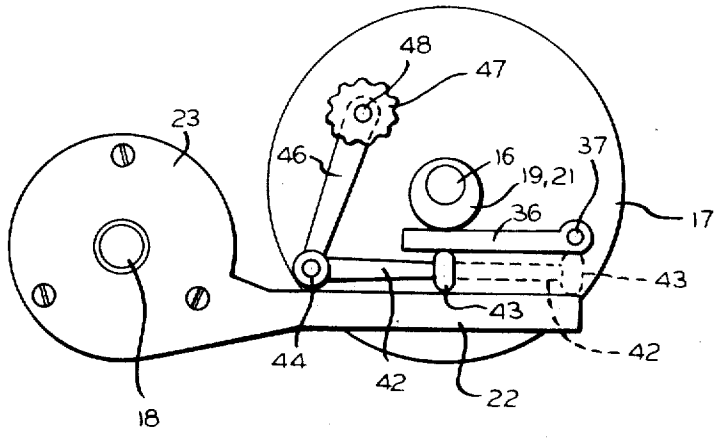


FIG.7



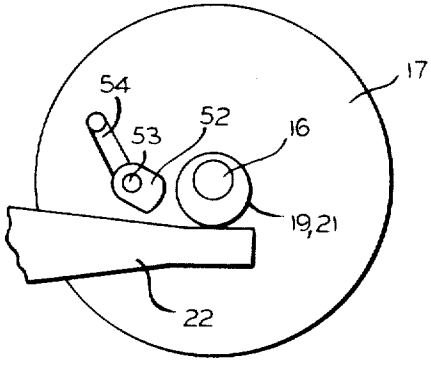


FIG.9

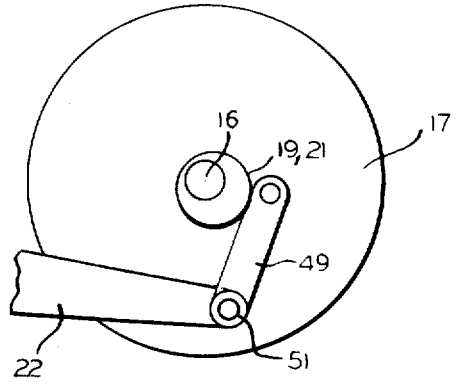


FIG.8

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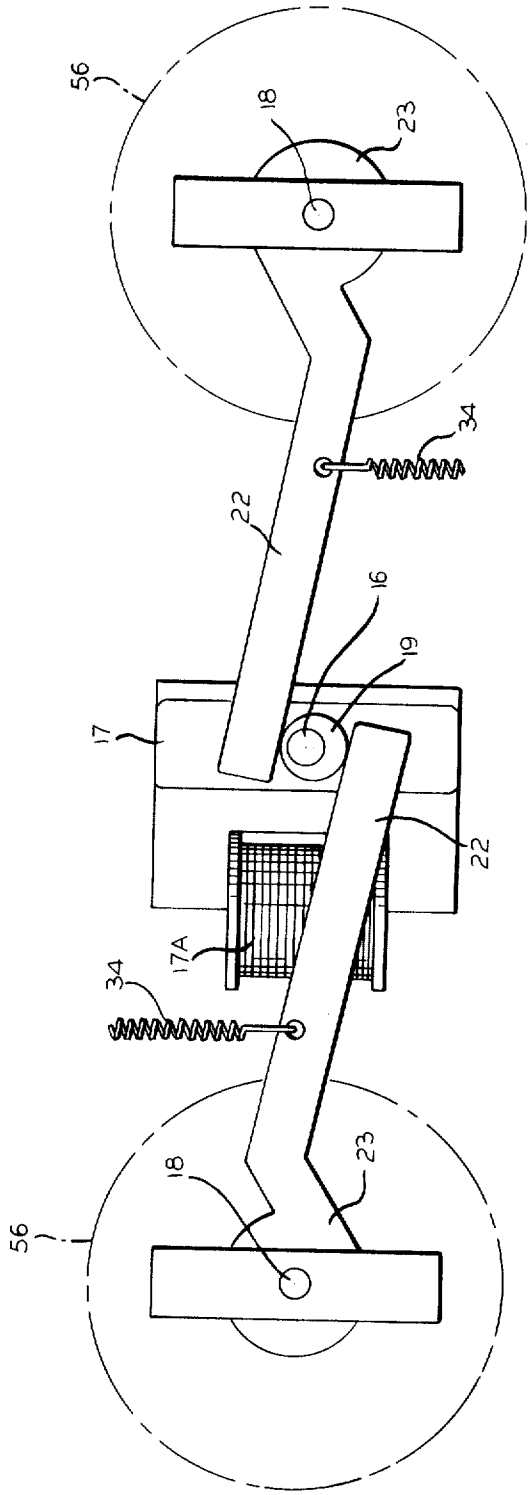


FIG. 10

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SPEED REDUCING MECHANISM

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Original No. 3,557,631, dated Jan. 26, 1971, Ser. No. 798,243, Jan. 2, 1969. Application for reissue Nov. 21, 1972, Ser. No. 308,506

Int. Cl. F16d *21/00*

U.S. Cl. 74—125.5 8 Claims

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

ABSTRACT OF THE DISCLOSURE

A speed reducing mechanism characterized by the absence of a gear train and comprising a driven shaft having an eccentric cooperating with a rock shaft connected through the medium of a one-way clutch to a driven shaft. In an embodiment of the invention the angular movement of the rock shaft can be varied from zero to a desired maximum. In a further embodiment of the invention the single drive shaft operates a pair of rock shafts each in turn connected through one-way clutch means to a driven shaft.

With the foregoing considerations in mind it is a principal object of the invention to provide an improved speed reducing mechanism characterized by the absence of a gear train.

Another object is to provide a speed reducing mechanism capable of variable adjustment from zero speed to maximum speed.

DRAWINGS

FIG. 1 is a plan view of a speed reducing mechanism embodying the improvements according to the present invention.

FIG. 2 is an elevational view looking in the direction of the arrows 2—2 of FIG. 1;

FIG. 3 is a detailed elevational view showing eccentrics mounted on a power shaft and rock arms cooperating therewith;

FIG. 4 is a detail of a one-way clutch employed with the structure of FIG. 1;

FIG. 5 is a view looking in the direction of the arrows 5—5 of FIG. 4;

FIG. 6 is an elevation view showing mechanism for adjusting the speed reduction ratio;

FIG. 7 is an elevation view showing another embodiment of mechanism for adjusting the speed reduction ratio;

FIG. 8 is an alternative view of a rock arm;

FIG. 9 is a view of mechanism for releasing driving connection with the speed reducing mechanism; and

FIG. 10 is a plan view of another embodiment of the invention.

SPECIFICATION

The improved speed reducing mechanism according to a first embodiment of the invention is denoted by the reference numeral **15** and includes a power shaft **16** driven by a prime mover **17** in the form of an electric motor. The latter is adapted by the structure according to the present invention to drive a driven shaft at a greatly reduced speed without the instrumentality of a gear train.

The speed reducing mechanism includes a pair of eccentrics **19** and **21** fast on the power shaft **16**. These are phased 180° apart. Each eccentric is contacted by a rock arm **22** terminating in a clutching member **23** concentric with the driven shaft **18** and cooperating with a clutched member **24** fast by a key **26** to shaft **18**.

The latter is supported in pillow blocks **27** at each end thereof. It will be understood that driven shaft **18** has a load, not shown, connected thereto, so that power is transmitted from prime mover **17** to driven shaft **18**, the latter having a very small speed as compared to the speed of prime mover **17**.

The clutching connection between clutching member **23** and clutched member **24** is achieved by a roller sprag **27** held in a slot **28** in clutched member **24**. Slot **28** has an inclined ramp surface **29** which is inclined as seen in FIG. 4. The pitch if the ramp surface **29** is exaggerated in FIG. 4, but clockwise movement of each rock arm **22** causes its clutching member **23** to roll the roller sprag **27** "up" the ramp surface to create a clutching connection with clutched member **24** by pinching roller sprag **27** between members **23** and **24**.

Roller sprag **27** is additionally urged in a clutching direction by an leminiscate shaped spring **31** having its apex **32** engaged in an annular slot **33** in roller sprag **27**.

On counter clockwise movement of arm **22** the clutching action is relieved. It will thus be seen that the two arms **22** alternate in their action to move driven shaft **18** through a small angle of rotation. The two arms and the clutches thus impart rotation to shaft **18** at a very small speed as compared to the speed of the power shaft **16**.

Each rock shaft **22** is connected to a tension spring **34** in turn connected to a spring abutment, not shown, to hold the rock shafts **22** against their respective eccentrics **19** and **21**.

Structure is provided for varying the speed reduction ratio, and as seen in FIGS. 6 and 7, an intermediate rock arm **36** is pivoted at **37** to the prime mover **17** and contacts the eccentrics **19** or **21** as the case may be.

In FIG. 6 rock arm **22** is provided with a slide **38** having a protuberance **39** thereon engageable with intermediate rock arm **36** through its length. The position of slide **38** on rock arm **22** is locked by a set screw **41** threaded thereinto. When protuberance **39** is opposite eccentric **19** or **21** the speed reduction ratio is smallest, the ratio increasing as the slide is opposite pivot point **37**, when no motion is transmitted to driven shaft **18**.

In FIG. 7 there is shown another arrangement for varying the speed reduction ratio. Parts common with the form seen in FIG. 6 are referred to by the same reference numeral. In this embodiment adjustment rod **42** having an arm contacting shoe **43** at the end thereof is movable between the positions shown to vary the speed reduction ratio in the manner seen with respect to FIG. 6.

Rod **42** is pivotally connected at **44** to an adjusting arm **46** which can be rocked to a desired setting by a control knob **47**, arm **46** and knob **47** having a turning center at **48**.

Referring now to FIG. 8, there is shown an embodiment where the rock arm **22** contacts eccentric **19** or **21** through arm **49** rigidly connected at **51** to rock arm **22**.

In FIG. 9 there is shown an arrangement whereby the driving connection between power shaft **16** and driven shaft **18** can be interrupted by throw out member **52** turning on shaft **53** by lever **54** to move member **52** against rock arm **22** to rock the same out of contact with eccentric **19** or **21**.

In FIG. 10 there is shown a form of the invention especially suited for a moving advertising display. In this form of the invention the prime mover **17** may be in the form of a shaded pole motor having a driving coil **17A**. In this form of the invention two driven shafts **18** are disposed on opposite sides of power shaft **16**, each rock arm **22** having a clutching connection with a driven shaft in the manner previously described. Each driven shaft **18** may drive a turntable **56** or some other device having movement.

I claim:

1. In a speed reducer mechanism, a power shaft, a driven shaft, spaced from said power shaft, means for drivably connecting said power shaft to said driven shaft whereby said driven shaft is driven at a speed greatly less than the speed of said power shaft, said means comprising;

(a) an eccentric mounted on said power shaft;

(b) one-way clutch means including a clutched member mounted on said driven shaft;

(c) a rock arm extending between said power shaft and said driven shaft and cooperating with said eccentric, having a clutching member mounted thereon cooperating with said clutched member to rock said clutched member upon rocking movement in one direction of said rock arm and to impart an increment of angular movement to said driven shaft, and to release connection with said clutched member upon rocking movement in another direction;

(d) and means for varying the amplitude of movement of said rock arm to vary the increment of angular movement imparted to said clutched member comprising;

(i) an intermediate rock arm having a fixed pivot point;

(ii) said intermediate rock arm contacting said eccentric;

(iii) a member movable along said first named rock arm and contacting said intermediate rock arm;

(iv) said member being positionable along said first named rock arm at a point opposite said eccentric to give maximum angular movement to said first named rock arm, and being;

(v) movable to a position opposite said fixed pivot point to give zero amplitude of movement to said first named rock arm.

2. A speed reducer according to amended claim 1 wherein said member is adjustably mounted on said first named rock shaft.

3. A speed reducer mechanism according to amended claim 1 wherein structure is provided for adjusting said member to positions between those of maximum and zero amplitude of said first named rock arm.

4. A speed reducer mechanism for drivably connecting a rotating power shaft to a driven shaft comprising an

eccentric means coupled to a power shaft, first and second rock arms operatively coupled to the eccentric means for effecting intermittent rocking movement of the rock arms upon rotation of the power shaft,

said rock arms being pivoted mounted about an axis coaxial to the longitudinal axis of a driven shaft, said first and second rock arms having first and second clutch members respectively lie in confronting relationship to each other in concentric relationship to the longitudinal axis of the driven shaft.

a clutched member coupled to the driven shaft in operative relation to said first and second clutch members, and

connection means operatively imposed between the said first and second clutch members and the clutched member to alternately transmit motion in a predetermined direction from the first and second clutch members to the clutched member for rotating the driven shaft at a reduced speed.

5. The speed reducer mechanism of Claim 4 wherein the first and second clutch members each includes an inner cylindrical surface that surrounds in spaced relation the outer cylindrical peripheral surface of the second clutched member.

6. The speed reducer mechanism of Claim 5 wherein the connection means is mounted for reciprocal movement on an inclined surface provided on the periphery of the clutched member wherein the connection means contacts either the first or second clutch member and transmits motion to the clutched member at one position of the connection means along the inclined surface.

7. The speed reducer mechanism of Claim 6 wherein the connection means comprises a roller sprag.

8. A speed reducer mechanism for drivably connecting a rotating power shaft to a driven shaft comprising an

eccentric means coupled to a power shaft,

rock arm means operatively coupled to the eccentric means for effecting intermittent rocking movement of the rock arm means upon rotation of the power shaft,

said rock arm means being pivoted mounted about an axis coaxial to the longitudinal axis of a driven shaft,

clutch means operatively connecting said rock arm means and the driven shaft to transmit intermittent motion thereto,

said clutch means including a first clutch member connected to the rock arm means for intermittent movement therewith and a second clutch member connected to the driven shaft,

connection means operatively imposed between the first clutch member and the second clutch member to transmit motion in a predetermined direction from the first clutch member to the second clutch member for intermittently rotating the driven shaft,

said first and second clutch member are mounted concentrically of the longitudinal axis of the drive shaft,

the first clutch member includes an inner cylindrical surface that surrounds in spaced relation the outer cylindrical peripheral surface of the second clutch member,

the connection means is mounted for reciprocal movement on an inclined surface provided on the periphery of the second clutch member wherein the connection means contacts the first clutch member and transmits motion to the second clutch member at one position of the connection means along the inclined surface,

said connection means including a roller sprag having a slot, and

an elongated spring having a bent portion inserted in said slot and urging the roller sprag up the inclined surface.

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U.S. Cl. X.R.

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