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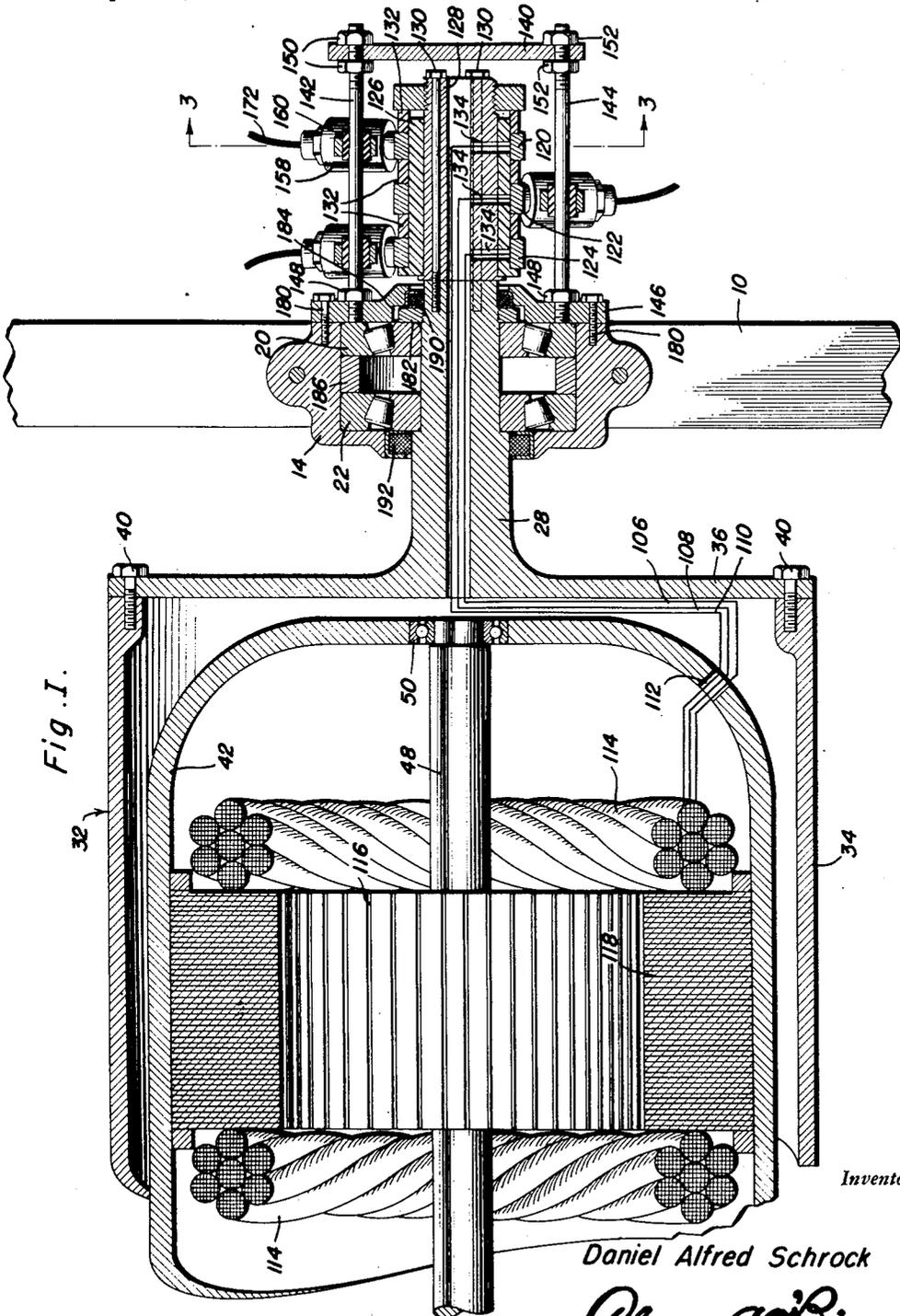
D. A. SCHROCK

2,548,399

PULLEY DEVICE

Filed Sept. 13, 1948

2 Sheets-Sheet 1



Inventor

Daniel Alfred Schrock

By *Clarence W. Brison*
and Harvey E. Jacobson
Attorneys

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Fig. 2.

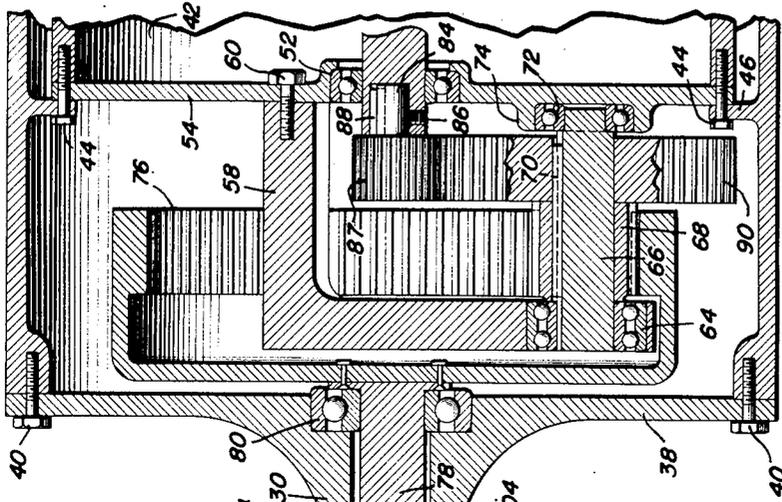


Fig. 3.

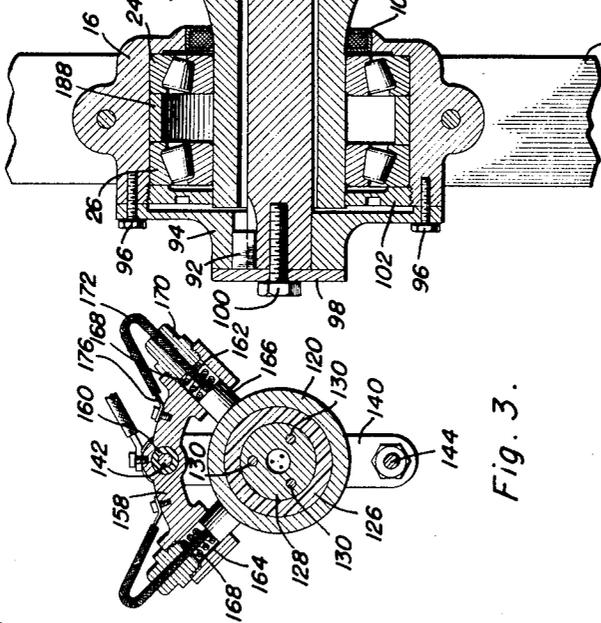
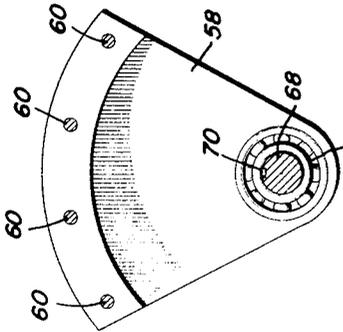


Fig. 4.



Inventor

Daniel Alfred Schrock

By

Clarence W. O'Brien
and Harvey B. Jacobson
Attorneys

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PULLEY DEVICE

Daniel Alfred Schrock, Boise, Idaho, assignor to
Idaho Sprocket and Machine Works, Boise,
Idaho, a copartnership

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2 Claims. (Cl. 172-36)

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This invention relates to novel and useful improvements in devices for use in machine shops, endless clothes lines, and in any environment wherein a rotative force is desired.

An object of this invention is to rotate a housing which may be readily attached through the medium of a bearing structure at each end thereof, to a suitable support, by means of applying electrical current through a collector ring assembly to an armature assembly, whereby rotation of a central shaft is effected, the rotation being reduced in so far as speed is concerned and then transmitted to a pulley housing.

Another object of this invention is to provide an extremely simplified device of the character to be described which lends itself well to commercial manufacture, which has utility in many environments and which is extremely effectual and convenient.

Ancillary objects and features of novelty will become apparent to those skilled in the art, in following the description of a preferred form of the invention, illustrated in the accompanying drawings, wherein:

Figure 1 is a sectional view of the preferred form of the invention;

Figure 2 is a fragmentary sectional view cooperating with Figure 1 to form a complete operative device;

Figure 3 is a sectional view taken substantially on the line 3-3 of Figure 1 and in the direction of the arrows; and,

Figure 4 is a sectional view illustrating details of construction.

The present invention teaches the construction and use of a device for driving belts, ropes and the like through the medium of a self-contained power unit. The preferred form of the invention is specifically designed for use with electrical current as a motive source.

In apartment houses and the like, it is often necessary or desirable to utilize an endless type clothes lines and the housekeeper generally has to lean forward through the window aperture in order to manually actuate the same. It is within the purview of the present invention to supply a small unit of the type illustrated in the drawings for such actuation. Many other uses in totally different environments may be found for the present invention and are not mentioned in detail.

Shown in Figures 1 and 2 is a pair of support members 10 and 12, respectively, which are representative of any suitable anchorage. It will be noted that each anchorage element has a boss

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14 and 16, respectively, attached thereto by any suitable, conventional means such as screws, bolts or the like. Conventional bearings, generally indicated at 20 and 22, 24 and 26, respectively, are positioned in the respective bosses 14 and 16 in order to rotatively journal a pair of shafts 28 and 30, respectively.

A housing, generally indicated at 32, is composed of an annular or cylindrical member 34 having end plates 36 and 38, respectively, detachably secured thereto through the medium of suitable, conventional bolts 40. These end plates 36 and 38 have the shafts 28 and 30, respectively, formed integral therewith or, if desired, rigidly secured thereto. It is now apparent that the said housing 32 is rotatively journaled through the medium of the bearing structure and other pertinent mechanism described previously.

A case 42 is positioned on the interior of the housing 32 and is rigidly attached to the cylindrical portion 34 thereof through the utility of conventional screws 44. The screws extend through flanges 46 supplied on the interior surface of the cylindrical member 34 specifically for this purpose.

A central or inner shaft 48 is journaled in the case 42 at one end through the medium of a conventional ball-bearing assembly 50 and adjacent but not at the other end through the medium of a second ball-bearing assembly 52. Of course, suitable apertures are provided in the ends of the case in order to accommodate the ball-bearing assemblies. For manufacturing and assembling purposes the end 54 of the inner case 42 may be formed as a detachable plate maintained in position through the medium of the above-mentioned screws 42.

Reduction gearing is supplied in the housing 32 and may be seen best in Figure 2. A substantially L-shaped member 58 is attached to the plate 54 through the medium of a plurality of screws 60 or may be otherwise secured thereto. An end of the L-shaped member 58 is supplied with an aperture in order to accommodate an anti-friction bearing structure 64. This anti-friction bearing structure journals a stub shaft 66 which is keyed to a pinion 68 through the use of a conventional key 70. The opposite end of the said stub shaft 66 is journaled in a suitable anti-friction bearing 72 which is received within a suitable boss 74 formed on the said plate 54.

An internally toothed ring gear 76 has a shaft 78 projecting therefrom and may be detachable in nature or formed as a single unit. This last-

mentioned shaft 78 is journaled in an anti-friction bearing 80 supplied in the end plate 38 and the shaft 78 extends through a bore formed in the above-described shaft 30.

The center shaft 48 has a pin 84 at one end thereof maintained in place by means of an Allen screw or the like 86. Keyed to this pin 84 is an outer pinion 87, maintained immovable relative to the pin 84 through the means of a conventional key 88.

Also, keyed to the stub shaft 66 through the medium of the key 70 is another gear 90 which is enmeshed with the pinion 87. It is now appreciated that upon rotation of the shaft 48 and, consequently the pinion 87, the gear 90 will be rotated, thereby turning with it the shaft 66 and the pinion 68. Since the shaft 66 is journaled in the L-shaped bracket 58 which is, in turn, secured to the case 42 and the case is secured to the drum 32, the rotative movement of the pinion 68 will be transmitted to rotative movement of the entire drum structure in the event that the shaft 78 and the internally toothed ring gear 76 is maintained relatively stationary.

Means for maintaining the shaft 78 stationary is provided. This means is seen in Figure 2 as a key 92 provided in a suitable key-way in the end of the said shaft 78 and also provided in a suitable slot in an end plate 94. The end plate is rigidly attached to the boss 16 by means of screws 96 or by any other suitable, conventional means. Also, an end cap 98 is attached to the said shaft 78 by means of a single central screw 100. In order to maintain the anti-friction bearings 24 and 26 in the assembled relation, a plate 102 is screwed or otherwise adjustably positioned in the boss 16 operatively engaging one of the races of the anti-friction bearing structure 26. An oil seal, conventional in nature, 104 is supplied at the opposite end of the boss 16 to serve its usual and conventional function.

The shaft 28 is hollow in order to allow a plurality of conductors schematically shown at 106, 108 and 110, respectively, to extend there-through. An opening 112 is provided in the case 42 in order to allow the conductors 106, 108 and 110 to proceed to field coil windings, generally indicated at 114. The shaft 48 has the armature structure or assembly associated therewith which is generally indicated at 116 and which is conventional in motors. The usual core 118 is provided about the internal periphery of the case 42 and the field coils, generally indicated at 114, are positioned adjacent this core. Thus, an electric motor is provided.

A plurality of collector rings 120, 122 and 124, respectively, are mounted on an insulating sleeve 126 which is, in turn, mounted on a metallic sleeve 128. This metallic sleeve abuts the end of the shaft 28 and is maintained in position through the medium of the stay bolts 130. Suitable insulating spacers 132 are supplied in order to electrically insulate each collector ring from the other.

Bores 134 are provided in the sleeves 126 and 128 and these bores 134 are used in order to allow the conductors 106, 108 and 110 to contact the respective commutator rings 120, 122 and 124.

A bracket 140 is maintained in a fixed position relative to the sleeve 128 by means of end threaded bolts 142 and 144, respectively. One pair of ends of the bolts 142 and 144 are threadedly received in a facing plate 146 and are maintained in place by means of nuts 148. The opposite ends of the end threaded bolts 142 and

144 have pairs of nuts 150 and 152, respectively, on each in order to lock the plate or bracket 140 in a firm, predetermined position. The nuts 150 and 152, respectively, engage opposite faces of the bracket 140, thereby maintaining it in place.

The bolts 142 and 144 are used for the purpose of maintaining brushes thereon. These brushes are each substantially identical in character and include a rocker arm 158 having a central aperture. An electrically insulating collar 160 is provided in the central aperture in order to engage one of the end threaded bolts 142 or 144. At opposite ends of the said rocker arm 158 there is supplied a pair of bores 162 and 164, respectively. Each bore is provided with identical structure. The structure includes a carbon (or other suitable equivalent material) brush 166 normally urged against one of the commutator rings through the utility of a coil spring 168 or other equivalent means. An insulating plug 170 having a central aperture is threadedly received in the bores in order to provide a bearing surface for the spring 168 and also to adjust the effective compression of the springs. A conductor 172 extending from the brush 166 projects through the central bore of the plug 170 and terminates in a clip or jack 176 which is attached to the rocker arm 158. It will be noted that any suitable number of such brush assemblies as is practical may be used in order to lead current from an outside source through the collector ring assembly to the armature and field assemblies.

The said face plate 146 is attached to the boss 14 by means of screws 180 or the like. The screws may be provided in appropriate positions in order to firmly attach the face plate in position. A threaded collar 182 is provided within an annular recess 184, which engages one of the races of the anti-friction bearing assembly 20, maintaining this assembly in position and a spacer ring 186 is used for maintaining the other anti-friction bearing assembly 22 in place. A similar spacing ring 188 is used in conjunction with the anti-friction bearing assemblies 24 and 26.

Conventional oil seals 190 and 192, respectively, are provided in the end plate or face plate 146 and in the boss 14 in order to prevent lubricant from leaking from the anti-friction bearing assembly chamber provided in the boss 14.

From the foregoing the operation of the invention is deemed apparent. Current is supplied to the collector rings through the medium of the brush assembly and conducted to the armature and field assembly within the case 42. Torque is then applied to the shaft 48 which rotates the reduction gearing assembly about the ring gear 76 as an anchor. This rotation is transmitted at a reduced speed to the outer housing (and inner case 42) 32 in order that a motive force may be supplied.

Having described the invention, what is claimed as new is:

1. A self-contained power operated pulley comprising an outer housing which forms a drum, a case fixed in said drum, an armature shaft having an armature rotatively mounted in said case, a field coil disposed in said case and cooperating with said armature, a first shaft projecting from said drum to mount said drum for rotation, a second shaft aligned with said first shaft and projecting from said drum, a collector ring assembly secured to said second shaft as an extension thereof, a plurality of stay bolts, a bearing disposed on said second shaft having said

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stay bolts projecting therefrom, means connecting for electrical communication said field coil and said collector ring assembly, brushes pivotally mounted on said stay bolts and contacting said collector rings, an external bearing mounted on said first shaft, said first shaft having a passage therethrough and a fixed shaft disposed in said passage, means securing one end of said fixed shaft to said external bearing to anchor said fixed shaft, a ring gear secured to the other end of said fixed shaft whereby said ring gear is movable with respect to said drum, a planet gear assembly with a structural member fastening said planet gear assembly to said case, a gear secured to said armature shaft, and said planet gear assembly being operatively connected with said gear and said fixed ring gear so as to operate said drum at a speed different from the speed of rotation of said armature shaft.

2. A self-contained power-operated pulley comprising a first and a second bearing, said bearings being spaced from each other, a drum disposed between said bearings, said drum having open ends, end plates secured to said drum covering said open ends, a shaft extending from each plate to support said drum in said bearings, one of said shafts being hollow and having an inner shaft concentrically arranged therein, means including a key and keyway in said inner shaft for holding said inner shaft stationary, a

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motor operatively connected with said drum and having a motor shaft disposed in said drum, gearing located within said drum and drivingly connecting said motor shaft and said drum including a stub shaft, means including bearings mounting said stub shaft in said drum, two gears fixed to said stub shaft, a motor shaft supported gear engaging one of said two gears, a ring gear, and the other of said two gears being in engagement therewith.

DANIEL ALFRED SCHROCK.

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