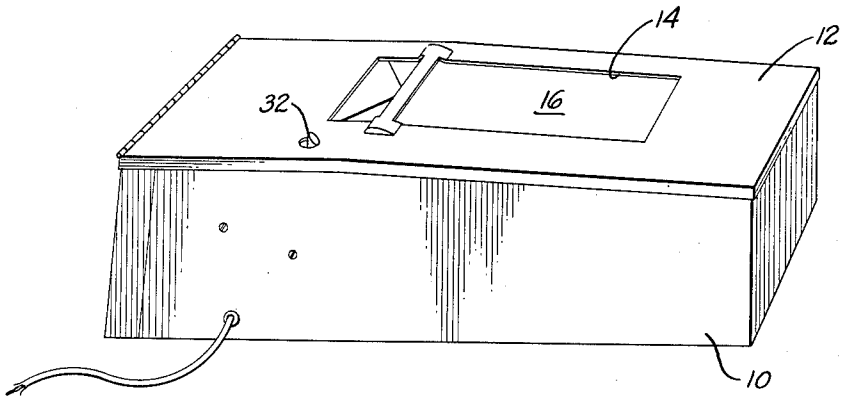
Nov. 8, 1955 E. V. ABBOTT 2,723,116

AUTOMATIC BUSINESS REGISTER

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FIG. 1



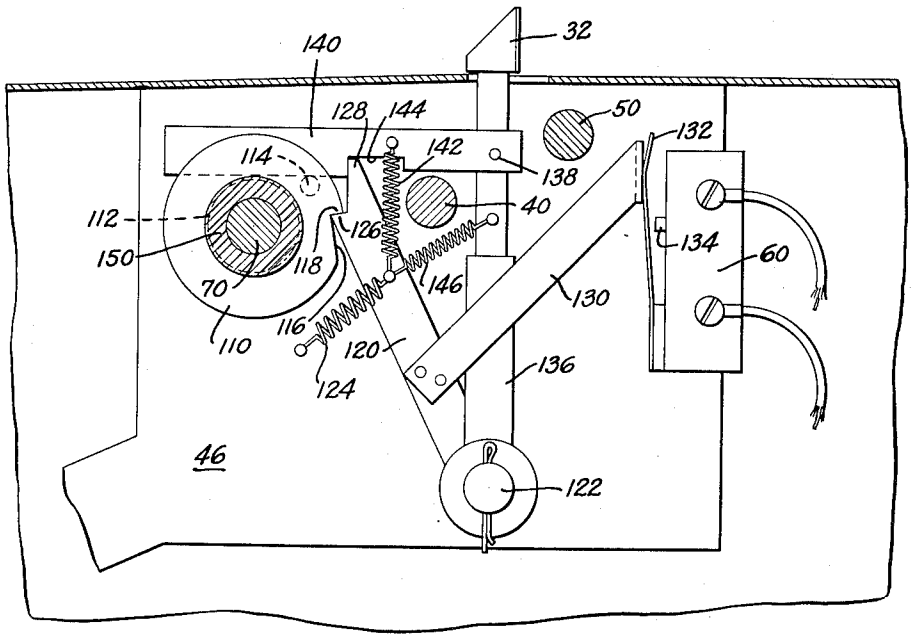


FIG. 5

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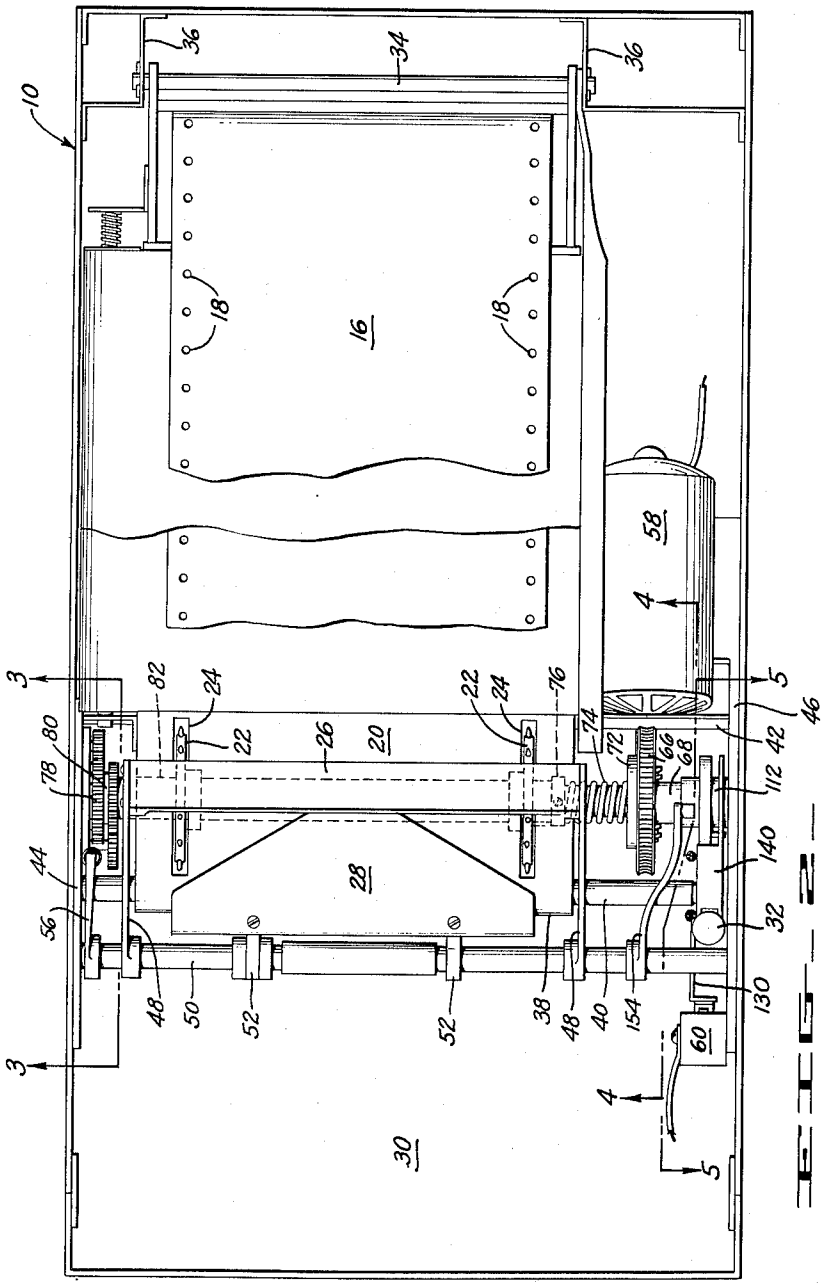
BY Naylor and Lasagne

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AUTOMATIC BUSINESS REGISTER

Filed Sept. 4, 1952 3 Sheets-Sheet 2



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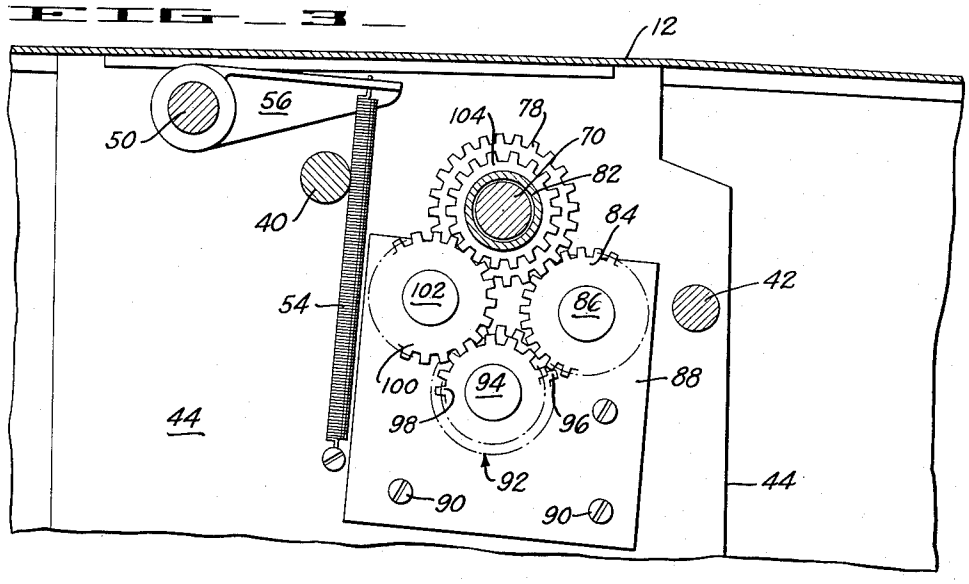
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AUTOMATIC BUSINESS REGISTER

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FIG. 3



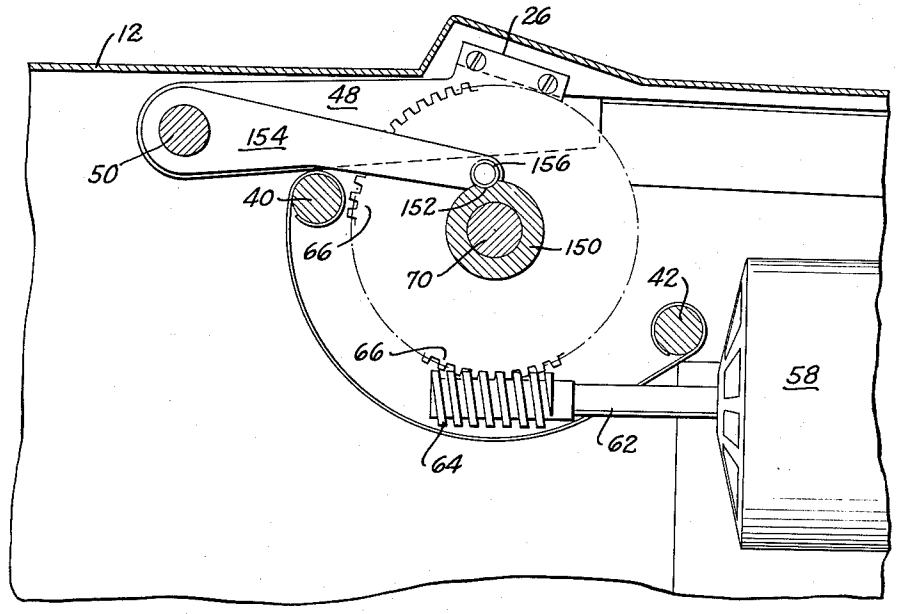


FIG. 4

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AUTOMATIC BUSINESS REGISTER

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Application September 4, 1952, Serial No. 307,770

5 Claims. (Cl. 271—2.4)

This invention relates to automatic business register machines of the type having a sprocket wheel drive system adapted to drive marginally apertured manifolded business forms through the machine in response to the actuation of an automatic control device, such as a push-button, or the like, and the invention particularly concerns a novel type of drive system adapting a machine embodying such a drive system for use with manifolded business forms of varying lengths.

The essential object of the invention is to provide a business register of the type described having a novel arrangement of parts in the business form drive system enabling the ready replacement of certain component elements thereof with other elements having different effective circumferential driving dimensions.

In business machines of the type to which this inventions appertains, the automatic drive systems for the manifolded business forms are conventionally arranged so that upon actuation of a manually controlled switch the sprocket wheels in driving relation with the interconnected business form units will rotate for a single revolution. It is desirable, of course, that the effective diametral dimensions of the driving sprockets be such that upon completion of this single revolution a particular business form unit will have been removed from the writing platform and replaced in proper position by a succeeding unit. Conventionally, these drive systems have not been flexible in the sense that they may be simply modified in the same machine so as to adapt the machine for use with business form units of varying lengths. Thus, if a particular business concern wishes to employ two sizes, or lengths, of manifolded business form units it is necessary for this concern to have two business machines, each of which has a drive system adapted to the particular length of the business form unit to be used in the machine. The present invention will make it possible for a single machine to be used with any desired length of business form unit.

Other objects and advantages of the invention will be apparent from the following description taken in conjunction with the drawings forming part of this specification, and in which:

Figure 1 is a view in perspective of an automatic business register machine embodying the invention;

Figure 2 is an enlarged top plan view of the machine of Figure 1 with the cover thereof removed;

Figure 3 is an enlarged detail view in section taken along lines 3—3 of Figure 2;

Figure 4 is an enlarged detail view in section taken along lines 4—4 of Figure 2; and

Figure 5 is an enlarged detail view in section taken along lines 5—5 of Figure 2.

Referring to the drawings, the business machine comprises a housing 10 having pivotally secured thereto a cover plate 12 provided with a rectangular opening 14 enabling the operator of the machine to write on a business form 16 disclosed within the opening. The business forms 16 which are provided with marginally located spaced driving apertures 18 are fed over a supporting plate 20 by sprocket wheels 22 extending through slots 24 formed in the plate. The interconnected business form units 16 are fed from a suitable magazine disposed beneath the plate 20 within the housing, over plate 20, beneath a paper hold-down bar 26, and beneath a plate 28 into the forward portion, or storage chamber, 30 of the housing. The sprocket wheels 22 rotate a predetermined degree each time the control button 32 is actuated, and in so doing the sprocket wheels remove a business form unit 16 from within the enclosure defined by the aperture 14 in cover 12 and replace this unit with a succeeding unit.

The plate 20 is pivotally attached to rod 34 which is supported by brackets 36 secured within the housing, while the forward end 38 of the plate 20 rests in engagement with rod 40, the latter forming along with rod 42 the means for securing plates 44 and 46 together. These plates 44 and 46 are in turn secured to the inner walls of the housing, and they constitute the means for supporting the drive and control systems for the machine hereinafter described. Bar 26, which is slotted at its underside to provide clearance for the sprocket wheels 22, is supported by arms 48 fixedly secured to shaft 50 journalled for rotation in plates 44 and 46, while plate 28 is secured to arms 52 which are freely sleeved on shaft 50. A spring 54 attached at its lower end to the housing 10 and at its upper end to arm 56 fixedly secured to shaft 50 causes bar 26 to press downwardly upon plate 28 into holding relation with the business form 16 when the drive system of the machine is not in operation. Means, hereinafter described, are provided to raise the bar out of holding relation with plate 28 during operation of the drive system of the machine.

The drive system for the sprocket wheels 22 is comprised of the following elements: an electric motor 58 mounted on plate 46 and under the control of a microswitch 60; a shaft 62 driven by the motor and having at its outer end a worm gear 64; a gear 66 integral with hub 68 which is freely sleeved on shaft 70 journalled for rotation in plates 44 and 46, said gear 66 being in mesh with worm gear 64; a friction clutch plate 72 keyed on shaft 70 and maintained in clutching relation with the face of gear 66 by compression spring 74 sleeved on shaft 70 between the clutch plate 72 and a reaction ring 76 adjustably secured on the shaft 70; a gear 78 having its hub 80 fixedly secured to shaft 70; a hollow shaft 82 sleeved on shaft 70 and having fixedly secured thereto the sprocket wheels 22; and a gear train drive between the terminal gear 78 of shaft 70 and hollow sleeve 82 comprising (Figures 2 and 3) gear 84 sleeved on stub shaft 86 carried by plate 88 secured by means 90 to plate 44, said gear 84 being in mesh with gear 78, a double gear wheel 92 mounted on stud shaft 94 carried by plate 88, with the outer gear section 96 of said wheel being in mesh with gear 84 and with the inner gear section 98 of said wheel being in mesh with gear 100 mounted on stub shaft 102 carried by plate 88, and gear 104 secured to the end of hollow shaft 82 in mesh with gear 100.

From the above description of the sprocket wheel drive system, it will be clear that as the motor 58 is intermittently operated by control means, hereinafter described, to limit the rotation of shaft 70 to one revolution for each time the motor is caused to operate that the driving connection between the motor and hollow shaft 82 is through the gear 78 to the gear system shown in Figure 3, and from the gear system to the hollow shaft. It will thus be seen that the plate 88 carrying the gear train may be removed in a relatively simple manner from the drive system, if it is desired that business form units of a different length dimension be used in the machine, and replaced with another plate and gear train, the gears of which are adapted during the

course of a single revolution of shaft 70 to move the business form web a distance equal to one unit thereof. The desired gear train-bearing replacement plate 88 may, for example, have its apertures for the screws 90 differently placed with respect to the body of the plate, so that the plate will have the proper degree of tilt, when secured to plate 44, to bring its gear wheels into mesh with gears 78 and 104. Or the plate 44 may be provided with slots to receive the fasteners for plate 88, thus allowing replacement plates to be properly oriented to connect their gear trains with gears 78 and 104.

Turning now to Figures 2 and 5 for a description of the control system for the machine, this system is comprised of the following elements: a control wheel 110 having a hub 112 fixedly secured to shaft 70, said wheel having a pin 114 disposed at its outer face and having a peripheral undercut 116 defining a dog 118; a rocker arm 120 pivotally mounted on stub shaft 122 and urged by spring 124 into engagement with wheel 110, said rocker arm having at its upper end dog elements 126 and 128 and having rigidly connected thereto an arm member 130 in control relation with the switching elements 132 and 134 of motor control micro-switch 60; control button 32 integral with rocker arm 136 pivotally secured to shaft 122, said rocker arm 136 having pivotally secured thereto at 138 arm 140 having a spring connection 142 with rocker arm 120 normally urging the free end of arm 140 into engagement with hub 112 of wheel 110; a notch 144 formed in the underside of arm 140 and cooperatively related with dog 128 of rocker arm 120; and a spring 146 interconnecting rocker arm 120 and 136.

This control system operates in the following manner. When it is desired to rotate shaft 70 to cause drive sprockets 22 to move a succeeding business form unit 16 into place on plate 20, button 32 is manually moved to the right, as viewed in Figure 5, to rock arm 136 in the same direction. Arm 140 is thus caused to move to the right, and the engagement between notch 144 and dog 128 pivots rocker arm 120 in a clockwise direction against the action of spring 124 to free dog 126 from blocking relation to dog 118 of wheel 110. This forced pivotal movement of rocker arm 120 causes arm 130 carried thereby to move the spring-type switch element 132 into pressing relation with the other micro-switch contact 134. Motor 58 is thus energized to drive the shaft 70 and thus move the dog 118 past dog 126. The engagement of dog 126 with the normal periphery of wheel 110 prevents the rocker arm 120 from moving back from a switch closing position after manual pressure is released from button 32.

As the wheel 110 reaches the end of a full revolution, pin 14 raises arm 140 against the action of spring 142 to free dog 128 from notch 144 and allow dog 126 to snap into engagement with dog 118, thus stopping the rotation of shaft 70 and the elements of the drive system connected thereto. As the wheel 110 is brought to an abrupt stop, the pin moves out of the path of arm 140 allowing the notch 144 to be cooperatively related by spring 142 with dog 128. As dog 126 engages dog 118 to stop the rotation of shaft 70, the arm 130 moves away from the spring switch element 132, thus allowing the opening of the normally open micro-switch 60. As the shaft 70 comes to an abrupt stop in the described manner, shock to the motor 58 is avoided by virtue of the fact that the clutch connection between gear 66, which is freely sleeved on shaft 70, and clutch plate 72 allows the motor shaft to come to a braking halt rather than an abrupt halt. By moving retainer ring 76 either toward or away from clutch plate 72, the clutching force may be varied to vary the degree with which the gear 66 is frictionally connected to shaft 70.

Wheel 110 is provided with a second hub 150 which in turn is provided with an arcuate notch 152. As is shown in Figure 4, the shaft 50 is provided with an arm

154 fixedly secured thereto and this arm carries at the free end thereof a roller member 156 which normally resides within the notch 152. When the roller member 156 is so disposed within notch 152, spring 54 is effective to maintain the paper holding bar 26 and holding plate 28 in pressing relation with the business form unit. As shaft 70 begins to rotate after actuation of control button 32, arm 154 is cammed upwardly to a slight degree and maintained in this upward position as roller member 156 rides the normal periphery of hub 150. As the shaft 70 completes one revolution and is brought to a stop in the manner described, roller member once again becomes disposed within notch 152 to bring paper holding elements 26 and 28 into engagement with the business form web under the action of spring 54.

It will be seen that the instant invention provides simple and novel means for adapting the single automatic business register of the type described for use in business form units of varying lengths. While a specific embodiment of the invention has been shown and described, it is to be understood that all substantial equivalents thereof are within the scope of the invention.

What is claimed is:

1. In an automatic register of the type described, a driving system for a marginally apertured business form web comprising a rotatable shaft, a hollow shaft sleeved on said rotatable shaft and rotatably disposed thereon, said hollow shaft being shorter in length than said rotatable shaft, spaced sprocket wheels fixedly carried by said hollow shaft, means for driving said rotatable shaft comprising a motor and a friction clutch connection between said rotatable shaft and motor disposed at one side of said hollow shaft, and a driving connection between said shafts disposed at the other side of said hollow shaft comprising gears carried by the ends of said shafts, and a gear train connection between said shaft gears.

2. In an automatic register of the type described, a driving system for a marginally apertured business form web comprising a pair of plate members, means securing said plate members in oppositely disposed and parallel relation, a first shaft journalled for rotation in said members, a second shaft sleeved on said first shaft and rotatably disposed thereon, means positioning said second shaft on said first shaft between the ends of the latter, spaced sprocket wheels fixedly carried by said second shaft adapted to drive said business form web, a gear fixedly carried at one end of said first shaft, a gear fixedly carried at one end of said second shaft in adjacently disposed relation to said first-menticned gear, a gear train connection between said gears operable to rotate said second shaft in the direction in which said first shaft rotates, and means for rotating said first shaft.

3. In an automatic register of the type described, a driving system for a marginally apertured business form web comprising a pair of plate members, means securing said plate members in oppositely disposed and parallel relation, a first shaft journalled for rotation in said members, a second shaft sleeved on said first shaft and rotatably disposed thereon, means positioning said second shaft on said first shaft between the ends of the latter, spaced sprocket wheels fixedly carried by said second shaft adapted to drive said business form web, a gear fixedly carried at one end of said first shaft adjacent one of said plate members, a gear fixedly carried at one end of said second shaft in concentrically and adjacently disposed relation to said first-mentioned gear, another plate member removably connected to that plate member to which said gears are adjacently disposed, and a gear train carried by said other plate member in interconnecting relation between said shaft gears.

4. In an automatic register of the type described having a motor driven rotatable shaft, support means therefor and a switch-responsive control system therefor operable to energize and de-energize the motor and to limit

the rotation of the shaft to a predetermined degree of revolution for each operation of the switch; the provision of a driving system for a marginally apertured business form web comprising a hollow shaft rotatably sleeved on said rotatable shaft, means positioning said hollow shaft on said rotatable shaft against endwise movement thereon, spaced sprocket wheels on said hollow shaft adapted to drive said business form web, a gear fixedly carried at one end of said rotatable shaft adjacent the support means therefor, a gear fixedly carried at one end of said hollow shaft in concentrically and adjacently disposed relation to said rotatable shaft gear, and a gear train interconnecting said shaft gears, said gear train being carried by support means separate from but removably connected to said support means for said rotatable shaft, whereby said gear train and support means can be readily removed from said rotatable shaft support means for replacement by another gear train and support means adapted to provide a different gear ratio between said shaft gears.

5. In an automatic register of the type described having a motor driven rotatable shaft, support means therefor and a switch-responsive control system therefor operable to energize and deenergize the motor and to limit the rotation of the shaft to a predetermined degree of revolution for each operation of the switch; the provision of a driving system for a marginally apertured business form web comprising a hollow shaft rotatably sleeved on said rotatable shaft, means positioning said

hollow shaft on said rotatable shaft aaginst endwise movement thereon, spaced sprocket wheels on said hollow shaft adapted to drive said business form web, a gear fixedly carried at one end of said rotatable shaft adjacent the support means therefor, a gear fixedly carried at one end of said hollow shaft in concentrically and adjacently disposed relation to said rotatable shaft gear, and a gear train interconnecting said shaft gears, said gear train consisting of a first gear wheel in mesh with said rotatable shaft gear, a third gear wheel in mesh with said hollow shaft gear, and a second or intermediate, gear wheel in mesh with said first and said third gear wheels, said gear train being carried by support means separate from but removably connected to said support means for said rotatable shaft, whereby said gear train and support means can be readily removed from said rotatable shaft support means for replacement by another gear train and support means adapted to provide a different gear ratio between said shaft gears.

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