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CARRIAGE DRIVE MEANS FOR BUSINESS MACHINES

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Fig. 1

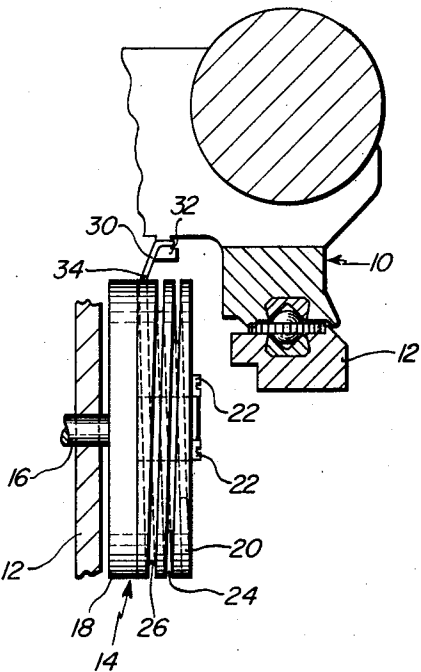
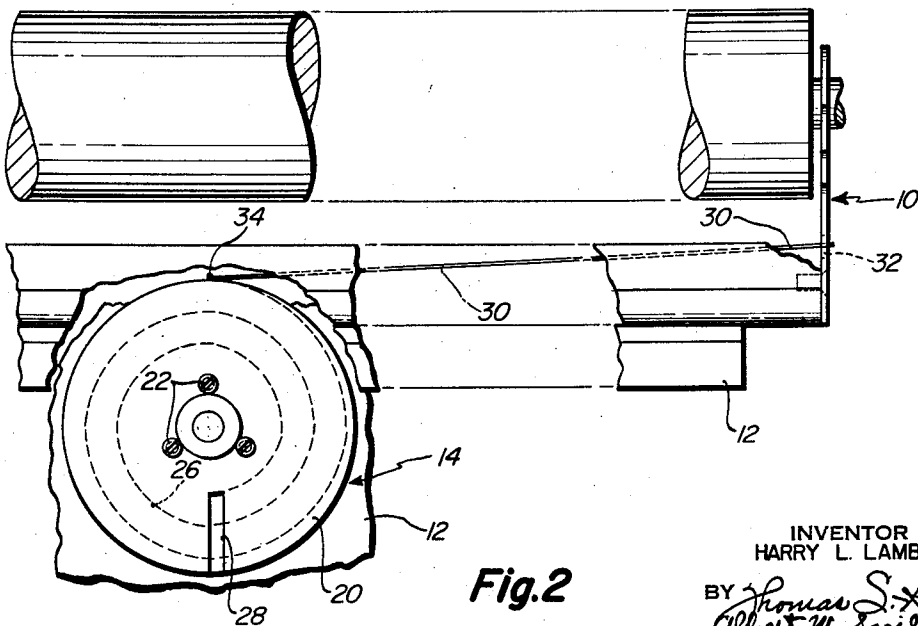


Fig. 2

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CARRIAGE DRIVE MEANS FOR BUSINESS MACHINES

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1 Claim. (Cl. 197—62)

This invention relates to an improved carriage drive means for typewriters and like machines and more particularly relates to a novel apparatus for applying to a typewriter carriage a letter feed driving force that is substantially constant in magnitude throughout the length of travel of said carriage.

In conventional types of carriage drive units a coil spring is employed to rotatably bias a cylindrical pulley on which is wound a belt or draw band that is connected to the typewriter carriage. In operation a return motion of the carriage serves to wind said coil spring in the usual manner and the wound coil spring is then capable of successively letter feeding the typewriter carriage to left during an ensuing typing operation. The long standing problem in this phase of typewriter functioning has been that the coil spring exerts a greater force on the carriage when fully wound than when nearly unwound which means that the letter feed driving force experienced by the carriage as it progressively moves to the left will become less and less. As a result when the typewriter carriage nears the left hand limit of travel the biasing force exerted by the partially "run down" coil spring may have decreased to a point where the intermittent letter feed motion of said carriage becomes sluggish and/or erratic. When this occurs the operational efficiency of the typewriter is reduced not only because the speed of typing must necessarily be decreased but also because the typed letters may become too closely or widely spaced due to the unpredictable extent of movement of the carriage during the letter spacing operations. In that the operational capacity of a typewriter and the design for various related mechanisms thereof are here respectively governed by the smallest forces available and/or applied to produce the letter feed movement of the carriage, it will be apparent that the ability to apply a substantially uniform and non-diminishing biasing force to a typewriter carriage, in an inexpensive, simple and practical manner, becomes very significant in increasing the overall operational efficiency of the machine.

One object of the invention is to provide a novel arrangement for applying a spring biased force of substantially uniform magnitude to a typewriter carriage as the latter moves to the left during a normal typing operation.

Another object of the instant invention is to provide a simple means for compensating for the gradually diminishing torque afforded by a coil spring which is being unwound.

Another object of the instant invention is to provide an efficient, inexpensive and very simple means for decreasing the effective radius of curvature of the draw band take-up drum as the carriage progressively moves to left during a typing operation.

A further object of the invention is to provide a spring driven draw band take-up drum that is provided with a spiral type surface on which the carriage draw band is wound.

Still another object of the invention is to provide a spring driven drum having a spiral type draw band wind-

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ing surface that has a configuration such that the value of the torque applied at any time to said drum divided by the then effective radius of curvature of the said spiral surface is always substantially equal to a constant force value.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and wherein a preferred embodiment of the invention is shown.

Fig. 1 is a side elevational view in partial section showing the instant spring barrel and the associated draw band take-up drum.

Fig. 2 is a front elevational view of the apparatus of Fig. 1.

Unless otherwise indicated the various elements shown in Figs. 1 and 2 may be conventional in construction and operation and may be supported in the typewriter frame in any conventional manner.

A longitudinally movable carriage 10 is mounted on the typewriter frame 12 and is adapted to be intermittently driven to the left, as seen in Fig. 2, under the control of the usual carriage escapement mechanism. The means for driving said carriage comprises a conventional type spring barrel unit 14 which is rotatably mounted on the fixedly supported shaft 16. Said spring barrel unit is provided with the usual coil spring which is operatively connected in the usual manner between the shaft 16 and the spring barrel housing 18. A take-up drum 20 is secured to the said housing 18 by any suitable means, such as screws 22, and is provided with a helical peripheral groove 24 having a bottom which defines a continuous spiral type winding surface 26 of continually varying radius of curvature. The radial slot 28 in the end wall of drum 20 defines one end of the groove 24. One end of a string type draw band 30 is operatively connected, as at 32, to the carriage 10 while the other end of said draw band is connected by any suitable means to the drum 20 at a point 34, in the groove 24, having the largest radius of curvature as illustrated in Fig. 2. The draw band 30 is made from any suitable flexible material such as braided nylon or similar type cord.

In the operation of the instant apparatus when the carriage 10 is returned to its extreme right hand position, illustrated in Fig. 2, the unwinding of the draw band 30 from drum 20 will have wound up the coil spring in the spring barrel 14 to the desired extent. As the typewriter is operated the spring biased carriage will be intermittently driven to the left by said coil spring and under the control of the said carriage escapement mechanism. As carriage 10 is successively displaced to the left the draw band 30 will be progressively wound onto the said drum surface 26. It will be apparent that as the said coil spring unwinds, the driving torque that it will apply to the drum 20 will gradually decrease, however the existence and operation of the spiral type take-up or winding surface 26 will compensate for this decrease in the torque whereby the resultant linear biasing force exerted on the carriage 10 through draw band 30 will be uniform in magnitude throughout the travel of said carriage. Here the rate of decrease in the effective radius curvature of the winding surface 26 corresponds to the rate of decrease in the driving torque afforded by the said coil spring during the operational movement of the carriage; or, stated another way, the configuration of the surface 26 is such that at any time during the travel of the carriage, the value of the torque then being applied to drum 20 by the coil spring, when divided by the radius of curvature of that

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portion of said surface 26 which is then effective, will always be equal to a substantially constant or uniform force value.

In conventional devices for driving a typewriter carriage a cylindrical type winding or take-up drum is provided. In this type of arrangement the unavoidable decrease in the driving torque applied to the take-up drum by the coil spring, as the latter progressively unwinds, will cause a corresponding decrease in the linear driving or biasing force exerted on carriage. This effect results in the carriage feed movement being sluggish and oft times erratic near the end of its normal travel. In the instant case by providing the draw band take-up drum with a predetermined spiral type winding surface which acts in compensating cooperation with the diminishing driving action of the coil spring the above noted difficulties are overcome.

While there is in this application specifically described one form which the invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration only and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claim.

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The invention claimed is:

In a machine having a frame, a longitudinally movable member mounted on said frame, spring means mounted on said frame, a substantially cylindrical drum operatively supported by said frame and adapted to be rotatably driven by said spring means, a spiral winding surface formed in the periphery of said drum, the end of said winding surface having the smaller radius of curvature terminating in a substantially radial slot in the end wall of said drum, and a draw band operatively connected between said member and said drum and being adapted to be progressively wound onto the spiral surface of said drum during the operational movement of said member, said spiral surface having a changing radius of curvature which corresponds to the change in the torque applied by said spring means to said drum during said operational movement of said member.

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