June 14, 1966 D. R. GOOCH 3,255,538

READING RATE CONTROLLING MACHINES

Filed Aug. 9, 1963 2 Sheets-Sheet 1

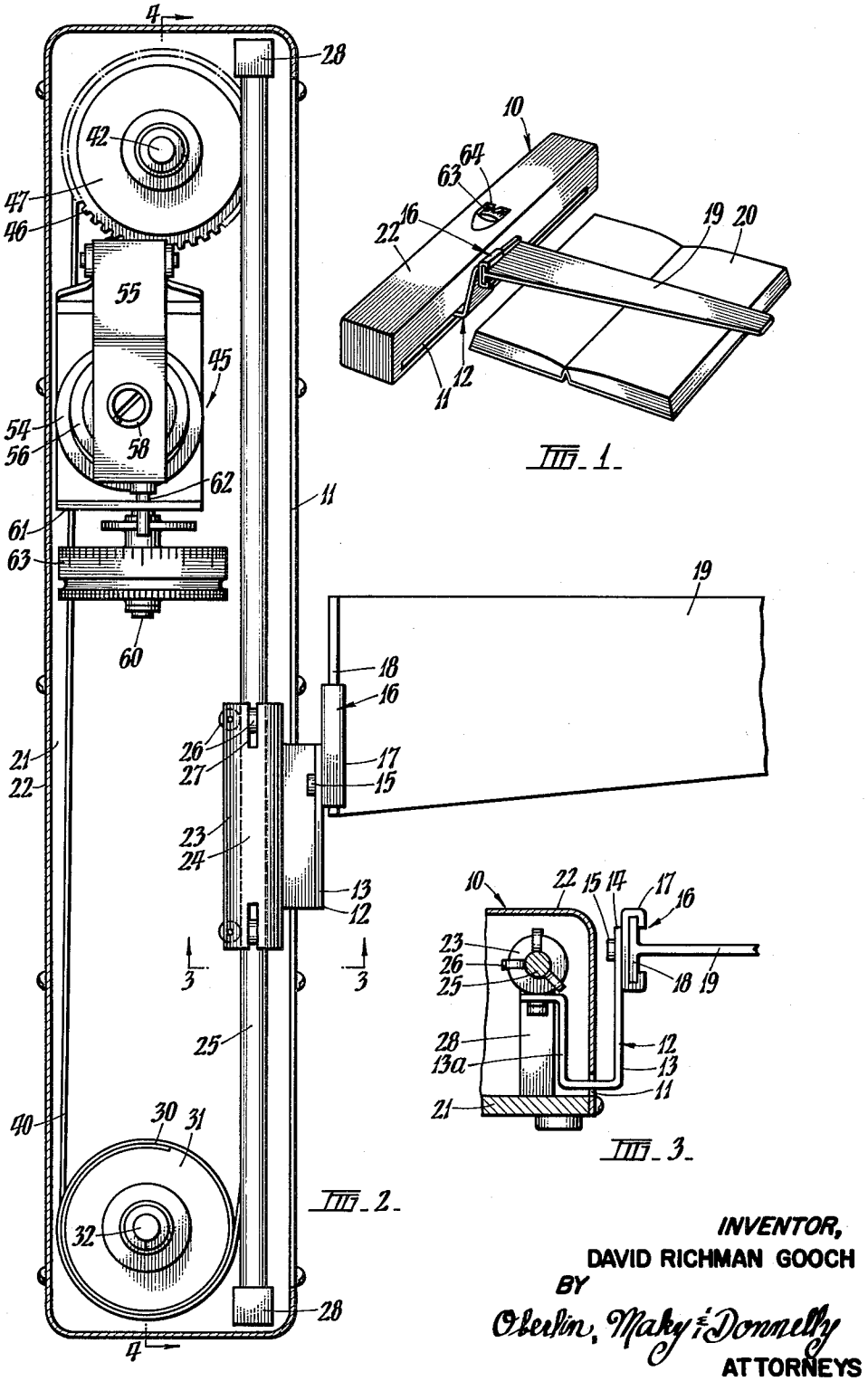


Fig. 2.

Fig. 1.

Fig. 3.

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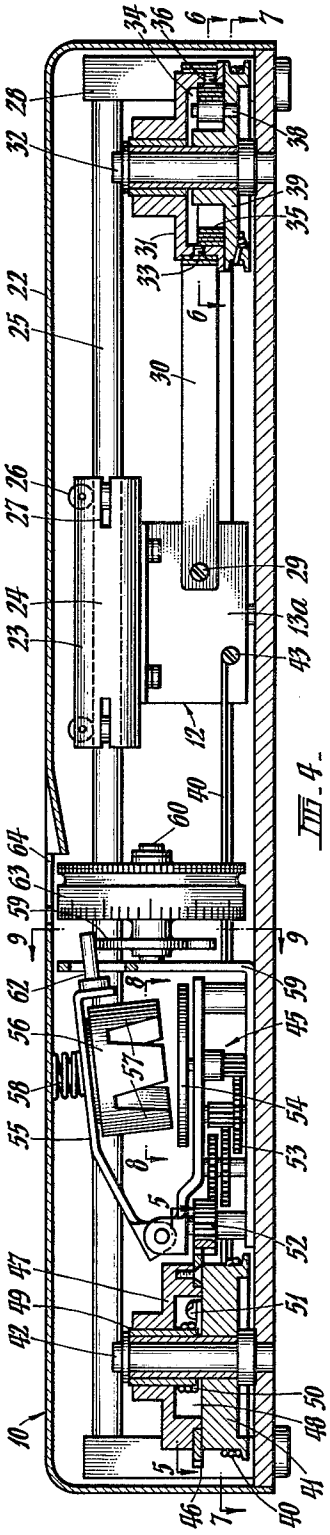


FIG. 4

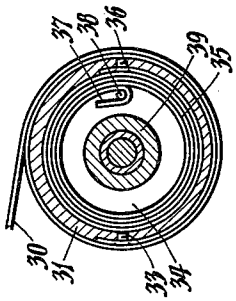
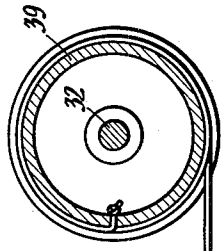


FIG. 6



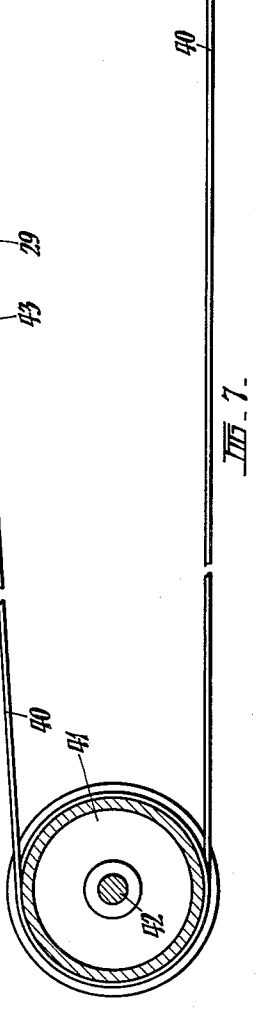


FIG. 7

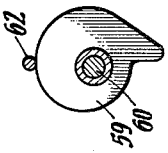


FIG. 9

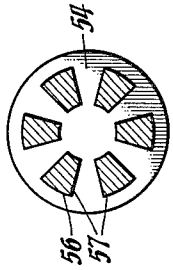


FIG. 8

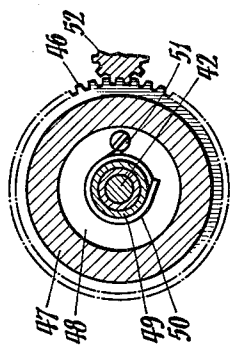


FIG. 5

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READING RATE CONTROLLING MACHINES

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Filed Aug. 9, 1963, Ser. No. 301,017
4 Claims. (Cl. 35—35)

This invention relates to reading rate controlling machines by the use of which persons may be trained to increase their rate of reading.

Machines of this type comprise a shutter or the like mechanically moved over reading matter at controlled or perdetermined rates. However, such machines at present are of relatively cumbersome construction and not conveniently portable and it is the principal object of the present invention to provide a reading rate controlling machine of convenient and compact construction and having a shutter mounting which enables the machine to be conveniently transported.

A further object of the invention is to provide a driving mechanism for the machine which will give accurate and adjusted control of the rate of movement of the shutter and a constant rate of movement of the shutter over the extent of its movement.

With the above stated objects in view a reading rate controlling machine includes a housing, a member arranged and supported relatively thereto, driving mechanism in said housing connected to said member to move the latter along the housing at a rate of movement controlled by said mechanism, and a shutter detachably and pivotally connected to said moving member, said shutter being adapted to pass over reading matter disposed adjacent the housing.

The moving member may comprise a bracket extending from the housing, the inner end being attached to the driving mecahnism, the outer end of the bracket having a clip rotatably mounted thereon and with said clip adapted to detachably receive the shutter and so that the shutter is pivotally movable about its own axis to thereby provide automatic adjustment of the advancing edge of the shutter to the heighth of reading matter located thereunder.

The driving mechanism for the shutter of a reading rate controlling machine includes a shutter supporting member mounted on a carriage arranged for guided linear reciprocal movement, a clock type spring connected to said carriage and arranged so that manual movement of the carriage in one direction extends the spring and movement of the carriage in the other direction is effected by return retraction of the spring, means to control the rate of movement of the carriage in said other direction, said control means comprising a rotatable nonmagnetic disc drive-coupled to said spring, a permanent magnet movably and adjustably mounted relatively to said disc to effect control of the rotational speed of the disc whereby adjustable control of the rate of movement of the carriage in one direction is effected.

The clock type spring referred to herein is one where each part or section of the spring is formed to the same radius so that when resting in the free state each part forming the helices tend to contract to the same radius whereby upon extension of the spring a constant tension is developed in its retracting operation.

In one arrangement the clock spring is fixed at one end to a drum on which the spring is wound and the other end fixed to the carriage, said spring drum being coupled to a drum on which is wound one end of a cord which passes around a second cord drum to be connected to the

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carriage, said second cord drum being drive coupled to the rotatable disc.

In order that the invention may be more readily understood reference will now be made to the accompanying drawings illustrating a practical embodiment of a reading rate controlling machine constructed in accordance with the present invention. In these drawings:

FIGURE 1 is a perspective view of the machine with the shutter in operative position over a book constituting the reading matter over which the shutter is traversed under control of mechanism embodied in the machine;

FIGURE 2 is an enlarged plan view of the machine with the casing in section to show the mounting of the shutter supporting bracket and the driving mechanism therefor;

FIGURE 3 is a detail section on line **3**—**3** of FIGURE 2.

FIGURE 4 is a section of the driving mechanism on line **4**—**4** of FIGURE 2;

FIGURE 5 is a detail section on line **5**—**5** of FIGURE 4 of drive and clutch mechanism between speed governing mechanism and the shutter supporting bracket;

FIGURE 6 is a section on line **6**—**6** of FIGURE 4 of compensating means connecting spring driving mechanism for the shutter supporting bracket and the speed governing mechanism;

FIGURE 7 is a detail taken on line **7**—**7** of FIGURE 4 showing drive connection between the spring driving mechanism of FIGURE 6 and the shutter supporting bracket and the mechanism of FIGURE 5;

FIGURE 8 is a section on line **8**—**8** of FIGURE 4 of part of the speed governing mechanism shown in FIGURE 4;

FIGURE 9 is a detail on line **9**—**9** of FIGURE 4 of the cam for regulating the speed governing mechanism.

As illustrated in FIGURES 1, 2 and 3 the reading rate controlling machine comprises a rectangular housing or casing **10** having along one side thereof adjacent the lower edge of a longitudinal slot **11** through which projects one side **13** of a U-shaped bracket **12**, the other and inner side **13***a* of which is fixed to driving mechanism, to be hereinafter described, in the housing to move the bracket **12** at a controlled rate of movement along the said slot **11**.

The upper end **14** of the outer and vertical side or arm **13** of the U-shaped bracket **12** has rotatably mounted thereon by means of pin **15** the female member **17** of a wedge clip **16** into which the male member **18** of the clip is inserted, said male member **18** being affixed to or forming part of the end of a shutter **19** in the form of a strip of sheet metal. The rotatable mounting of the clip **16** forms a pivot about which the shutter **19** may pivot on its longitudinal axis.

Reading matter such as the book **20** placed alongside the housing **10** and beneath the shutter **19** will be traversed downwardly by the shutter in its movement with the bracket **12** on which it is mounted, the axial pivoting of the shutter enabling it to adjust itself on reading matter of different heights, e.g., different books.

The shutter may be of any desired known form, viz: the strip type as above described or of wire, or transparent frame types.

The detachable wedge clip **16** mounting of the shutter **19** enables the machine to be stored or carried in a compact form and where the housing **10** dimensions are made 13½" x 2½" x 3½" the machine will accommodate the general range of reading matter.

The housing or casing **10** comprises a base **21** and cover

section 22 which encloses the driving mechanism for the bracket 12 and shutter 19 detachably connected thereto. The inner arm 13*a* of the bracket 12 is fixed to a carriage 23 which comprises a tubular member 24 surrounding a guide shaft 25. The member 24 is adapted to move along the shaft 25 on wheels 26 rotatably mounted in slots 27 formed in the member 24. The guide shaft 25 is supported on pillars 28 fixed at each end of the base 21.

The side or arm 13*a* of the bracket 12 has attached thereto at 29 one end of a driving clock spring 30, which is wound upon a drum 31 rotatably mounted on an axle 32 fixed to the base 21 at one end thereof. The arrangement is such that upon the carriage 23 being drawn along the guide shaft 25 to the other end of the base 21 the spring 30 will be unwound and extended and will in rewinding itself about the drum 31 rotate the latter and at the same time retract the carriage 23 to a position adjacent the spring drum 31. The inner end of the spring 30 is fixed to the drum 31 by screw 33.

The underside of the drum 31 is recessed as at 34 and receives a second clock spring 35 one end of which is fixed to the drum 31 by screw 36 and the other end is hooked at 37 to engage a pin 38 fixed to the cord drum 39 which is freely rotatable on the axle 32 below the drum 31. The spring 35 provides a connection between the drums 31 and 39 so that they will rotate together in a manner to be hereinafter described.

The cord drum 39 has fixed thereto one end of a cord 40 which is wound on said drum and extends to be wound upon a second cord drum 41 mounted for rotation on an axle 42 located at the other end of the base 21 adjacent the other pillar 28 supporting the guide shaft 25. The cord 40 upon being wound around the second drum 41 is fixed at its other end to the arm 13*a* of bracket 12 at 43.

The arrangement is such that upon the carriage 23 being drawn towards the second drum 41 to thereby extend the spring 30, the cord 40 being wound around the cord drums 41 and 39. Upon release of the carriage 23 the spring 30 will rewind itself upon the spring drum 31 thus drawing the carriage to a normal position adjacent the drum 31.

In order to control the rate at which the carriage 23 is returned to the normal position, a speed governing mechanism indicated generally at 45 and which comprises a gear 46 is carried on a drum 47 mounted for rotation on axle 42. The drum 47 is recessed on the underside at 48 and within the recess 48 is a sleeve 49 fixed to the drum 47 and about the sleeve 49 is disposed a helical spring 50 one end of which is fixed by screw 51 to the second cord drum 41. The arrangement is such that the spring 50 and sleeve 49 constitutes a one-way spring clutch coupling between the cord drum 41 and the gear 46 and is adapted to drive the gear 46 when tension is applied to the cord 40 by the spring 30 when the latter is drawing the carriage 23 by rewinding itself upon the spring drum 31. However, when the carriage is manually moved in the other direction the coupling between the spring drum 31 and cord drum 39 by spring 35 causes the second cord drum 41 to be wound in the other direction and the drum 41 is uncoupled by the one-way clutch spring 50 from the drum 47 carrying the gear 46.

The gear 46 engages a pinion 52 which is drive-coupled through a gear chain 53 which drives a copper disc 54. Mounted on a pivot arm 55 and disposed above the disc 54 is a multipole circular permanent magnet 56. The pole pieces 57 of the magnet 56 are directed towards the disc 54 as shown in FIGURE 8. The pivot arm 55 and magnet thereon are urged towards the disc 54 by a spring 58 disposed between the arm 55 and casing cover section 22. The distance between the magnet 56 and the disc 54 is controlled by a cam 59 rotatably mounted on a shaft 60 carried on a bracket 61, the cam 59 engaging a projection 62 on the pivot arm 55. The cam 59 is connected to a graduated finger wheel 63, a portion of which is accessible for actuation through an opening 64 in the casing cover section 22. Upon actuation of the finger wheel 63 and cam 59 the distance between the magnet 56 and the disc 54 may be adjusted so that the speed of rotation of the disc is controlled in known manner to thereby adjustably control the rate of return movement of the carriage 23 and the shutter 19 carried thereon.

The spring drum 31 and cord drums 39 and 41 are of equal diameter and it will be apparent that the spring 30 during its rewinding onto the spring drum the diameter of the drum increases and consequently the rate of revolution of the drum 31 will decrease as the linear speed of the extended portion of spring 30 is maintained at the same rate which is the same as the linear speed of the cord 40 passing over the cord drum 41. However, if the drum 39 is rotated at exactly the same speed as the associated spring drum 31, the release of cord from the drum 39 would not be sufficient. The helical or clock spring connection 35 between spring drum 31 and cord drum 39 allows for relative compensating movement between the two drums, that is, the drum 39 may rotate at a relatively faster rate than the spring drum 31 as the speed reduces as the spring 30 rewinds thereon at the constant linear speed as controlled by the speed governing mechanism 45 acting through drum 41 to release the cord 40 passing therearound.

The machine as above described is of a convenient and compact construction and upon detachment of the shutter may be packed in a convenient carrying case (not shown).

What I claim is:

1. A driving mechanism for the shutter of a reading rate controlling machine comprising a base, a carriage mounted on said base for reciprocal movement therealong, a shutter mounted on said carriage, a clock-type spring connected at one end to said carriage, a drum rotatably mounted on said base, the other end of said clock-type spring connected to said drum whereby said spring is adapted to wind about said drum, a first cord drum mounted on said base coaxial with said spring drum and adapted to freely rotate relative to said spring drum, a cord wound on said cord drum and having one end fixed thereto, a second cord drum rotatably mounted on said base around which said cord is wound, said cord having its opposite end fixed to said carriage, a gear wheel mounted on said base coaxial with said second cord drum, a one-way drive coupling between said second cord drum and gear wheel adapted to release the coupling when the carriage is moved in one direction, adjustable speed control means coupled to said gear wheel, and a second clock spring mounted on said base having one end connected to said spring drum and the other end connected to said first cord drum to permit relative rotational movement between said spring and cord drums and thereby compensate for variation in rotational rates of said drums.

2. Driving mechanism for the shutter of a reading rate controlling machine as claimed in claim 1 and wherein the carriage carrying the shutter supporting member comprises a tubular member movable along a supporting guide rod, and with rollers on said tubular member to engage the guide rod.

3. Driving mechanism for the shutter of a reading rate controlling machine as claimed in claim 1 and wherein the clock-type spring drum and first cord drum are mounted for rotation on a common axle, a recess in one face of the spring drum to receive the second clock spring which is fixed at one end to the spring drum and the other end fixed to the cord drum.

4. Driving mechanism for the shutter of a reading rate controlling machine as claimed in claim 1 and wherein the second cord drum and gear wheel are mounted for rotation on a common axle and the one-way drive coupling therebetween comprises a helical spring having one end

fixed to the said cord drum and the body of the spring embraces a sleeve forming part of the gear wheel.

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