March 26, 1929. F. M. STADER 1,706,550

APPARATUS FOR TEACHING READING

Filed Oct. 4, 1926

Fig. 1.

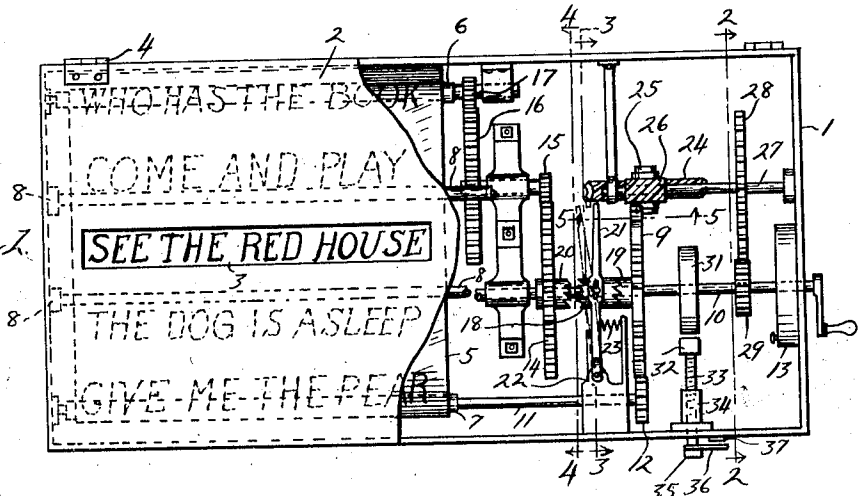


Fig. 4.

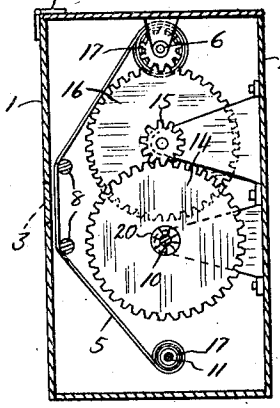


Fig. 3.

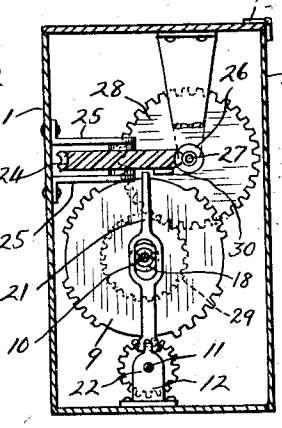


Fig. 2.

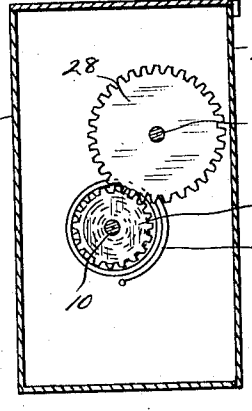


Fig. 5.

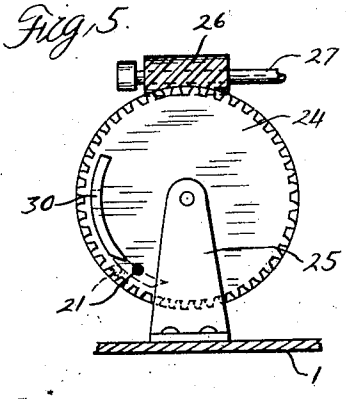
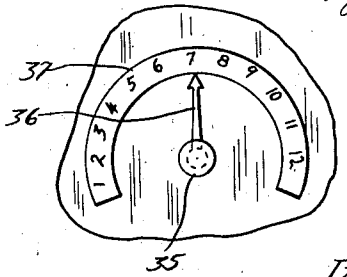


Fig. 6.



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UNITED STATES PATENT OFFICE.

FLORENCE M. STADER, OF PLYMOUTH, MICHIGAN.

APPARATUS FOR TEACHING READING.

Application filed October 4, 1926. Serial No. 139,447.

This invention relates to the teaching of reading and particularly relates to apparatus for such teaching.

It is an object of the invention to provide for automatically displaying to a pupil or a class of pupils a word, phrase or sentence for a brief interval of time and then automatically substituting a different word, phrase, or sentence, for the purpose of testing the speed and proficiency of the pupil or class in reading and comprehension.

Another object is to arrange a considerable number of words, phrases or sentences in a series upon a suitable web, and to provide means for effecting a periodic step-by-step advance of said web, for the purpose of individually displaying each line of reading matter for a suitable interval of time through a sight opening in a casing containing the web.

Still another object is to provide a suitable means for regulating the rate of intermittent travel of the web and to associate with said means an indicator which may be used in determining the proficiency grade of the pupil or class.

A further object is to provide for utilization of the same motive power which drives a take-up roller to which the web is normally intermittently advanced to also drive a supply roller for the purpose of rewinding the web thereon, and to provide automatic means for transferring the application of power from one to the other of said rollers at the proper time.

These and various other objects the invention attains by the construction hereinafter described and illustrated in the accompanying drawing, wherein:

Fig. 1 is a front view of the casing of the improved apparatus, the front wall of said casing being shown partially broken away to disclose parts of the drive mechanism.

Fig. 2 is a vertical sectional view taken upon the line 2—2 of Fig. 1, showing the spring motor and a drive connection from the shaft of said motor to a counter shaft.

Fig. 3 is a vertical sectional view taken upon the line 3—3 of Fig. 1, showing the drive from the motor shaft to the shaft of the take-up roller and further showing an automatic clutch control.

Fig. 4 is a vertical sectional view taken upon the line 4—4 of Fig. 1, showing a provision for effecting a rewind drive of the delivery roller.

Fig. 5 is a sectional view taken upon the line 5—5 of Fig. 3, additionally illustrating the automatic clutch control means.

Fig. 6 is a fragmentary bottom view taken upon the line 6—6 of Fig. 1, showing the speed regulator and indicator.

In these views, the reference character 1 designates a casing, preferably rectangular, having in its front wall 2 a horizontally elongated sight opening 3. In the illustrated embodiment of the invention the front casing wall is employed as a door, being hinged to the casing top as indicated at 4. Within said casing an elongated web 5, formed of any suitable flexible material, is arranged to travel normally from a supply roller 6 in the top portion of the casing to a take-up roller 7 adjacent to the casing bottom. A portion of said web between said rollers is maintained in close proximity to the sight opening 3 by a pair of guide rods 8 arranged respectively above and below said opening. Upon the front face of said web is printed a series of sentences (or words or phrases), as best appears in Fig. 1, and the same are so spaced lengthwise of the web that they may be successively individually displayed through the opening 3 responsive to a step-by-step actuation of the web.

Describing now the drive to the take-up roller, 9 designates a mutilated gear loosely mounted upon a shaft 10 counter to the shaft 11 of the take-up roller and adapted to mesh with a pinion 12 fast upon the last-named shaft. The teeth of the gear 9 are distributed thereon in spaced groups, so that when said gear is constantly driven, its groups of teeth will act in succession to effect definite angular advances of the pinion 12 and corresponding linear advances of said web. In the intervals between such advances the web will remain stationary, these intervals being established by travel of the untoothed portions of the gear 9 past the pinion 12. A provision for clutching the gear 9 upon the main drive shaft 10 will presently be described. A motor of any suitable type may be employed to drive the shaft 10, as for example the spring motor 13, which as is best shown in Figs. 1 and 2 is arranged adjacent to an end wall of the casing.

For establishing a rewind drive to the supply roller 6 from the shaft 10, there is loosely mounted upon said shaft the initial gear 14 of a speed increasing gear train 14, 15, 16, 17, the final pinion 17 of said train being

mounted upon the roller 6. The ratios between the gears of said train is such as to drive the roller 6 through a large number of revolutions for each driving revolution of the shaft 10. It follows that the rewinding operation will be accomplished quite rapidly as compared to the step-by-step advance of the web to the take-up roller.

There will now be described a provision for automatically cutting off the drive to the take-up roller when winding of the web thereon has been completed, and for, at that time, establishing a rewind drive to the delivery roller. Upon the main drive shaft 10, between the two loosely mounted gears 9 and 14, there is splined a double acting clutch member 18 both ends thereof being toothed to provide for alternative driving engagement of said member with clutch elements 19 and 20, respectively rigidly carried by said gears 9 and 14. A substantially upright shift lever 21, the mid portion of which operatively engages said clutch member 18, has its lower end pivoted upon a bracket 22 in the lower portion of the casing (see Fig. 1), and a coiled spring 23 acts upon said lever to normally maintain engagement of said clutch member with the clutch element 19 which is carried by the gear 9. The lever 21 terminates at its upper end below and close adjacent to the rim portion of a worm-wheel 24 journaled in a pair of bearings 25 projecting from the rear wall of the casing 2, the axis of said worm-wheel being preferably vertical. Said worm-wheel has driven engagement with a worm 26 fast upon a shaft 27 counter to the drive shaft 10, and a continuous drive from the latter shaft to said counter-shaft is established through a pair of gears 28 and 29. Since there is a speed reducing ratio between the gears 28 and 29 and since the worm in driving the worm-wheel effects a very considerable speed reduction, it follows that a great many revolutions of the shaft 10 will be required to effect a single revolution of the worm-wheel. The arrangement is such that the shaft 10, in producing one revolution of said worm-wheel, makes a sufficient number of turns to accomplish a complete winding of the web upon the take-up roller and to subsequently accomplish the relatively high-speed operation of rewinding the web upon the supply roller. Upon the under face of the worm-wheel, adjacent to its periphery, there is carried a circumferentially extended cam member 30, which is adapted, through turning of the worm-wheel, to encounter the upper end of the lever 21, and to shift said lever from the full line positions shown in Fig. 1 to the dash line position shown in said figure. The lever when thus actuated slides the clutch member 18 to the right, as seen in Fig. 1, cutting off the driving connection from the shaft 10 to the gear 9 and establishing such a connection to the gear 14. The timing is such that shifting of the lever 21 by the cam member 30 occurs just as the normal or take-up travel of the web is completed, and the circumferential extent of such cam is such that it releases the lever only when the high-speed drive through the gear train 14, 15, 16, 17 has been prolonged sufficiently to fully rewind the web upon the supply roller 6. Immediately upon release of said lever by the cam member 30, the spring 23 returns the lever to its normal right-hand position (see Fig. 1), reestablishing the drive to the take-up roller.

A suitable provision is made for selectively regulating the rate of periodic advance of the web to the take-up roller. As one exemplification of such a provision, there is mounted fast upon the shaft 10 a brake drum 31 which is engageable by a brake shoe 32 carried upon the upper end of an adjusting screw 33 having engagement with a feed nut 34 interiorly secured to the bottom of the casing. Said screw has its lower portion projecting below the casing and is terminally provided with an actuating knob 35 or the like. It is preferred to mount upon said knob a pointer 36 which travels below an arcuate scale of figures 37, coacting with said scale to form an indicator of the speed of travel of the web. By applying a sufficient braking force to the drum 31 through the shoe 32, the shaft 10 may be held stationary.

In using the described apparatus, the spring 13 having been wound up the shoe 32 is sufficiently withdrawn from the brake drum 31 to establish a travel of the web 5 toward its take-up roller at a speed suitable to the proficiency of the pupil or class using the apparatus. As each sentence is briefly displayed through the sight opening 3, the pupil or class may be required to recite said sentence or possibly to copy the same in writing. As from day to day the pupil or class becomes more proficient, the speed at which the web is advanced may be correspondingly increased, so as to shorten the periods of display of each sentence. The indicator comprised by the pointer 36 and the scale 37 will enable the instructor to accurately and definitely determine the speed of the motor, upon which speed the length of periods of display of the reading matter depends.

While the use of a motor of one form or another is to be preferred, it is evident that the essentials of the described machine might also be embodied in an apparatus depending upon a manual application of power. The invention is submitted as covering such an alteration and any other such modifications as come within the scope of the appended claims.

Either or both of the rollers 6 and 7 may

be made removable to facilitate the interchangeable use of webs 5 carrying differing reading matter.

Alternative gears 9 may be provided also differing as to the spaced relation of their groups of teeth and consequently adapted through their selective use to vary the time interval between successive advances of the web.

It will be noted that the sentences on the web are shown so spaced as to provide for the appearance of a blank portion of the web opposite the sight opening after each display of a sentence. This provides for the use of action sentences such as "close the door," the pupil having opportunity after display of such a sentence, to perform the action when the sentence suggests.

What I claim is:

1. The combination with a pair of rollers and a web mounted upon said rollers and adapted to wind from either thereof to the other, of a common actuating member for said rollers, means for establishing a periodic step-by-step drive from said actuating member to one of said rollers, and means for alternatively establishing a continuous drive from said actuating member to the other roller.

2. The combination with a pair of rollers and a web mounted upon said rollers and adapted to wind from either thereof to the other, of a common actuating member for said rollers, a step-by-step drive connection to one of said rollers from said actuating member, a speed-increasing drive connection to the other roller from said actuating member, and a clutch member adapted to selectively establish either of said drive connections.

3. The combination with a pair of rollers and a web mounted upon said rollers and adapted to wind from either thereof to the other, of a common actuating member for said rollers, a drive connection from said actuating member to one of said rollers, a connection for driving the other roller from said actuating member at a relatively high speed, a clutch for alternatively establishing either of said drive connections, means normally holding said clutch yieldably in a position establishing the first mentioned drive connection, a rotary member adapted during a portion of each revolution thereof to establish the relatively high-speed drive connection through said clutch, and a speed-reducing drive connection to said rotary member from said common actuating member.

4. The combination with a pair of rollers and a web mounted upon said rollers and adapted to wind from either thereof to the other, of a common actuating member for said rollers, a connection for establishing a periodic step-by-step drive from said actuating member to one of said rollers, a relatively high speed drive connection from said actuating member to the other roller, a double acting clutch member for alternatively establishing the two said drive connections, means yieldably urging said clutch member to a position establishing one of said drive connections, a rotary control element for said clutch member, adapted during a portion of each revolution of said member to establish the other of said drive connections, and a drive connection to said rotary control element from said actuating member.

5. The combination with a casing having a sight opening, of a web mounted within said casing for travel across said opening, and carrying a series of lines of reading matter adapted to be individually displayed through said opening by travel of said web, an actuating element for said web, a drive connection for advancing the web step-by-step in one direction to successively register said lines of reading matter with said sight opening, a relatively high-speed drive connection for effecting a return travel of the web, a clutch member coacting with said actuating member to alternatively establish either of said drive connections from said actuating member, according as said clutch member occupies either of two limiting positions means yieldably urging said clutch member to one of said positions, a rotary control element for said clutch member adapted to establish the other limiting position of the clutch member during a certain portion of each revolution of said control element, and a speed-reducing drive connection to said control element from said actuating member.

6. The combination with a casing having a sight opening, of a pair of rollers mounted within said casing, a web carried by said rollers, adapted for travel across said opening, and carrying a series of lines of reading matter adapted to be individually displayed through said opening by travel of said web, a motor, a connection for driving one of said rollers intermittently from said motor to advance said lines of reading matter successively into registration with said sight opening, a connection for continuously driving the other of said rollers from said motor at a relatively high speed for rewinding the web, and means for alternatively establishing said drive connections.

In testimony whereof I sign this specification.

FLORENCE M. STADER.