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AUTOMATIC SPRING TENSION VARYING MEANS

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2 SHEETS—SHEET 2

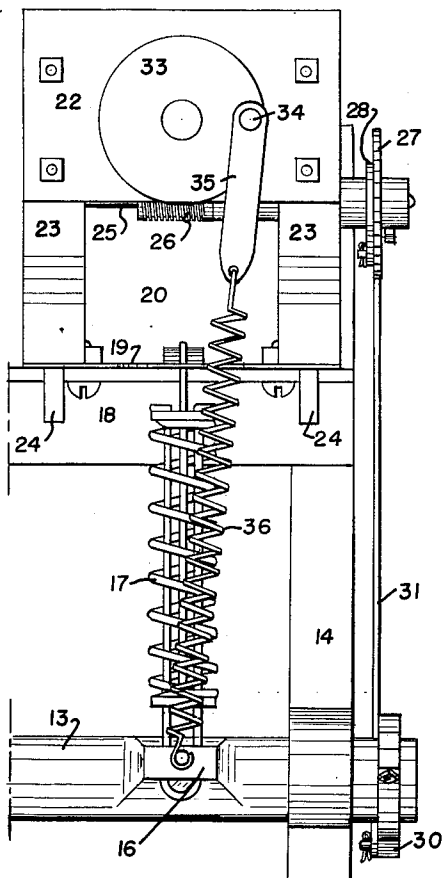


Fig. 2

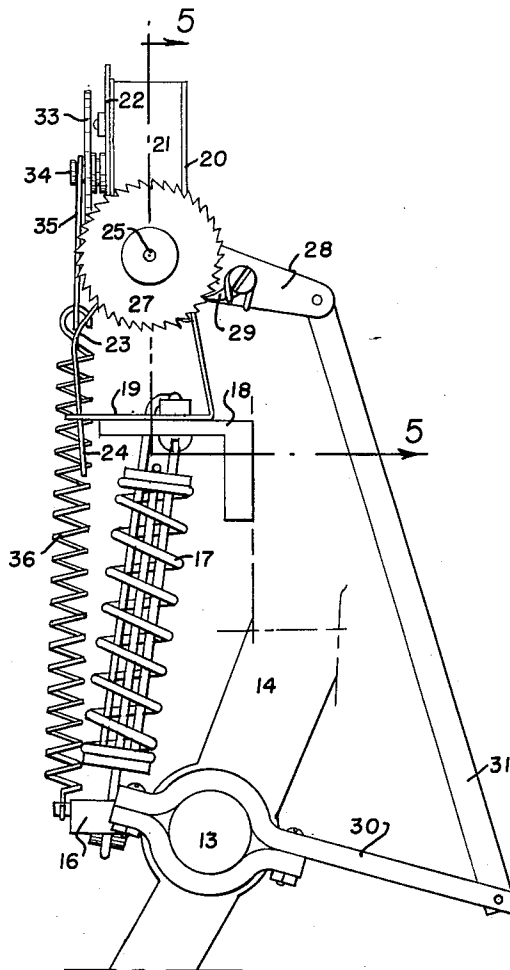


Fig. 4

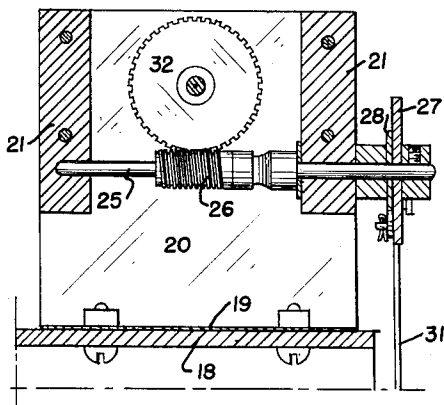


Fig. 5

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AUTOMATIC SPRING TENSION VARYING
MEANS

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5 Claims. (Cl. 267-1)

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This invention relates to means automatically and continuously operable to vary the tension of an actuating spring as an incident of cyclic spring reaction, and more particularly to means susceptible of operative association with conventional spinner-type game and hazard devices commonly known as "slot-machines" to alter the effective tension of the spinner-actuating spring element thereof in automatic reaction to play of the machine, and has as an object to provide a simple and improved adjunct adapted for such use and purpose.

A further object of the invention is to provide improved means for varying the tension of an actuating spring constructed and arranged for convenient mounting on and in operative relation with pertinent elements of conventional "slot-machines."

A further object of the invention is to provide improved means for varying the tension of an actuating spring that is fully automatic in effective operation.

A further object of the invention is to provide improved means for varying the tension of an actuating spring synchronously with and as a reflection of each spring operating cycle.

A further object of the invention is to provide improved means for varying the tension of an actuating spring that is simple and inexpensive of construction, facile of operative installation, positive and efficient in operation, and readily adaptable to various conditions and occasions of use.

With the foregoing and other objects in view, my invention consists in the construction, arrangement, and combination of elements as hereinafter set forth, pointed out in my claims, and illustrated by the accompanying drawings, in which—

Figure 1 is a rear elevation of a conventional "slot-machine" with a back cover portion broken away to disclose an operative installation of the improved spring tension varying means therein. Figure 2 is a fragmentary, detail elevation, on an enlarged scale, of the installation according to Figure 1. Figure 3 is a top plan view of the arrangement shown in Figure 2. Figure 4 is a side elevation of the arrangement shown in Figure 2. Figure 5 is a fragmentary, detail section, taken substantially on the indicated line 5-5 of Figure 4.

Certain mechanical arrangements particularly exemplified by the so-called "slot-machines" include an actuating spring susceptible of being manually or otherwise loaded and then released

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for desired operative effect determinative of play or other end results. In certain instances, and especially in the operation of game and hazard devices, a variation in the effective output of the loaded actuating spring and a consequent unpredictable variation in the results deriving from the spring loading is significant and desirable, and the instant invention is hence directed to the provision of an attachment convenient of operative association with an actuating spring and automatically reactive to loading and release of the spring to effect variation in the tension thereof.

Typical of a preferred use and installation of the improvement, a conventional "slot machine" is represented as a closed cabinet 10 rising from a base 11 and mounting an exterior operating handle 12 arranged, through means not shown, to arcuately oscillate and release a rock-shaft 13 journaled transversely of the cabinet 10 on a rigid frame 14 interiorly of said cabinet as and when it is arcuately manipulated. A fixed, radial projection 16 of the rock-shaft 13 is linked by means of an extensible and retractible actuating spring 17 to a transverse member 18 of the frame 14 spacedly and upwardly paralleling the rock-shaft, so that reaction of the latter to manipulation of the handle 12 operates to increase the tension in, and to load, the spring 17 which is thus conditioned to return the rock-shaft to its initial position when released by said handle, such return oscillation of the rock-shaft functioning, through means and connections not illustrated and by virtue of the spring 17 loading, to set in motion the elements determinative of end results. The force initiative of machine element operation being the tension of the spring 17, it is readily apparent that automatic variation of such tension separate and apart from the loading imposed through the handle 12 will introduce an unpredictable variation in such force and the end results therefrom deriving and preclude the effectiveness of manipulative control sought to be exercised through the handle 12, and such automatic variation in the spring 17 tension and force output is effectively had through the agency of the attachment shown and hereinafter described.

A suitable rigid frame plate is formed with a base flange 19 arranged to bear against and be bolted to the horizontal flange of the frame member 18 above the spring 17 and an angularly related web 20 disposable substantially radially of the rock-shaft 13 when said flange 19 is secured to the member 18. Spacedly-parallel blocks 21

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are secured along and to outstand from the vertical margins of the web 20 on the upper portion of the latter and engage with a closure plate 22 provided with spaced, depending legs 23 whereof the lower ends are formed as tongues 24 slidably engaged through slots in the flange 19, thus completing a vertically-disposed, box-like throat fixed and frame-mounted above the spring 17 upper end. A shaft 25 journaled in lower portions of the blocks 21 spacedly parallels the rock-shaft 13 and extends at one end beyond the adjacent block 21 to projectingly overhang the end of the frame member 18, and a worm 26 is fixed to and for rotation with said shaft 25 between the blocks 21. A ratchet-toothed wheel 27 is fixed to the projecting end of the shaft 25 and a lever 28 is loosely end-journaled on and to project radially from said shaft adjacent said wheel, so that a spring-loaded detent 29 carried by the lever 28 is positioned to mesh with the teeth of the wheel 27 and to rotate the latter when the lever 28 is moved in one direction and to ratchet over said teeth without rotation of the wheel when the lever is moved in the other direction. An arm 30 is adjustably clamped to and to extend radially from the end of the rock-shaft 13 below the wheel 27 and a link 31 hingedly interconnects the free ends of the lever 28 and arm 30, so that oscillation of said rock-shaft under the influence of the handle 12 or spring 17 is reflected as corresponding, proportioned oscillation of the lever 28 to the end that said lever may operate through its detent 29 to rotate the wheel 27, and the shaft 25 and worm 26 fixedly associated therewith, as the rock-shaft reacts to the force of the loaded spring 17 and swing freely relative to and without rotative effect upon said wheel when the rock-shaft reacts to handle 12 manipulation. Meshing with and rotatively reactive to the worm gear 32 is housed between the web 20, blocks 21, and plate 22 on a shaft journaled for rotation in said web and plate above and in axially-perpendicular relation with the shaft 25, one end of the shaft mounting the gear 32 projecting through and beyond the plate 22 to fixedly mount a crank plate 33 for rotation synchronously with said gear. A stud or pin 34 outstands from and in eccentric disposition on the plate 33 for the pivotal mounting of one end of a link 35 thereby disposed to depend toward the fixed end of the spring 17, and a retractile spring 36 connects the lower end of the link 35 with the projection 16 of the rock-shaft whereto the movable end of the spring 17 is attached, thus disposing the spring 36 in supplementing relation with the spring 17. As is manifest, the spring 36 may be omitted and the upper end of the spring 17 transferred from its connection with the frame member 18 to direct attachment to the link 35 lower end when element design and arrangements permit, but with a considerable eccentric throw introduced by the plate 33 and a powerful spring 17 of limited extensibility, use of the supplemental spring 36 is practical and appropriate.

Whether directly connected to and for variation in the tension of the spring 17 or arranged, as shown, to utilize the supplemental, variable-tension spring 36, the improvement functions to accomplish its purpose of varying the actuating spring tension in a rather obvious manner. With the elements of the attachment constructed, mounted, and connected as shown and described, each manipulation of the handle 12 oscillates the rock-shaft 13 the usual amount, loads the springs 17 and 36, and swings the lever 28 about

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the shaft 25 without rotation of said shaft and to a new engagement of the detent 29 with the ratchet teeth of the wheel 27. Upon release of the rock-shaft 13 from engagement with the handle 12, the power of the loaded springs 17 and 36 returns the shaft to its original position and effects the appropriate machine element operation, while at the same time the shaft return acts through the arm 30, link 31, lever 28 and detent 29 to rotate the wheel 27, and consequently the shaft 25 and worm 26, through an angle proportioned to the rock-shaft oscillation, such rotation of the worm 26 effecting a rotative reaction through the gear 32 and plate 33 which serves to angularly displace the eccentric pin or stud 34 for alteration in the length of spring 36 extension, thus varying the tension of the spring 17 and 36 combination. Were the spring 36 omitted and the spring 17 connected directly to the link 35, operation of the improvement would be exactly the same in effect, though different in degree.

While the improvement has been shown and described as applied to and in operative association with a particular mechanism, it is apparent that it is applicable to functioning with identical effect in a variety of mechanical organizations, and since changes, variations, and modifications in the form, construction and arrangement of the elements shown and described may be had without departing from the spirit of the invention, I wish to be understood as being limited solely by the scope of the appended claims, rather than by any details of the illustrative showing and foregoing description.

I claim as my invention:

1. The combination with a rock-shaft having a radial projection, an actuating spring serving said projection to normally retain the rock-shaft at one limit of its oscillation, and means for oscillating said rock-shaft against the tension of and to load said spring, of means operatively interlinking said rock-shaft and the end of the spring remote therefrom for automatically varying the tension of said actuating spring as an incident of rock-shaft oscillation.

2. In combination with a rock-shaft having a radial projection, an actuating spring serving said projection to normally retain the rock-shaft at one limit of its oscillation, and means for oscillating said rock-shaft against the tension of and to load said spring, a rotatable, eccentric-pin connection for the end of said spring remote from the rock-shaft, and means between the rock-shaft and said connection for progressively rotating said connection as an incident of rock-shaft oscillation, whereby to automatically vary the spring tension.

3. In combination with a rock-shaft having a radial projection, an actuating spring serving said projection to normally retain the rock-shaft at one limit of its oscillation, a fixed connection for the end of said spring remote from said rock-shaft, and means for oscillating said rock-shaft against the tension of and to load said spring, means for automatically varying the effective tension of said spring as an incident of rock-shaft oscillation, said means comprising a supplemental spring end-connected with said projection, a rotatable, eccentric-pin connection for the end of the supplemental spring remote from the rock-shaft, and means between the rock-shaft and said connection for progressively rotating said connection as an incident of rock-shaft oscillation.

4. The organization according to claim 2,

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wherein said rotatable, eccentric-pin connection comprises a shaft journaled for rotation in spaced, axially-perpendicular relation with the rock-shaft, a plate on one end of said shaft, a pin outstanding from and eccentrically of said plate, a link pivotally depending from said pin and connecting with the spring free end, a worm gear on said shaft, a worm in driving relation with said gear, and ratchet means interlinking said worm and rock-shaft for the rotative advance of the former during return oscillation of the latter.

5. The organization according to claim 2, wherein said rotatable, eccentric-pin connection comprises a shaft journaled for rotation in spaced, axially-perpendicular relation with the rock-shaft, a plate on one end of said shaft, a pin outstanding from and eccentrically of said plate, a link pivotally depending from said pin and connecting with the spring free end, a worm gear on said shaft, and a worm in driving

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relation with said gear spacedly paralleling the rock-shaft, and the means for rotating said connection as an incident of rock-shaft oscillation comprises a ratchet-toothed wheel on and for the rotation of said worm, a ratchet detent lever swingable about the worm axis in cooperation with said wheel, an arm on and radially of the rock-shaft beneath said lever, and a link hingedly connecting the free ends of said arm and lever.

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