

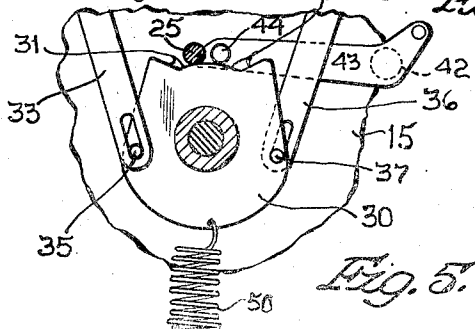
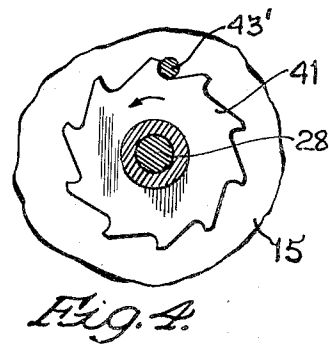
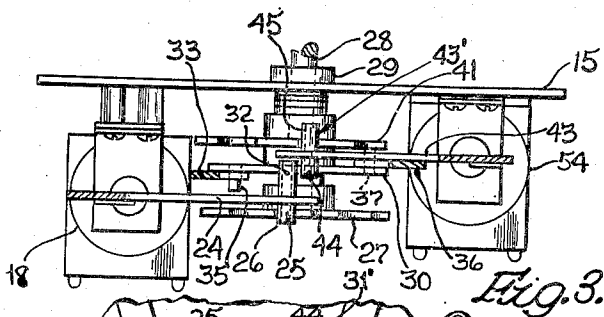
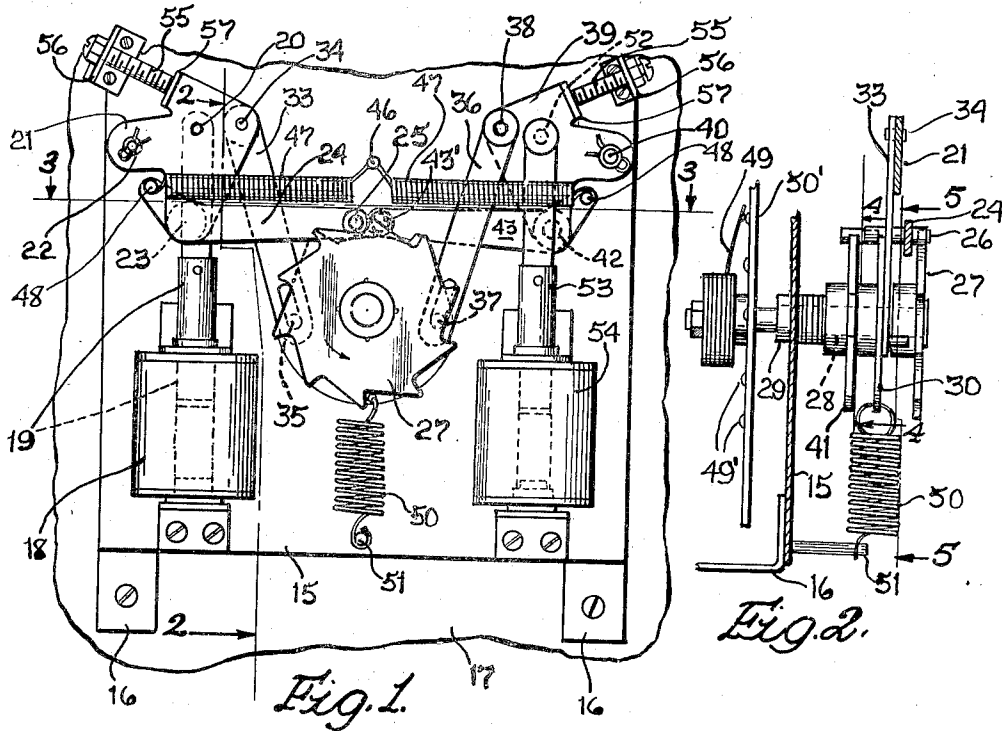
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M. J. BINKS

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COMBINATION STEP-UP AND RESET MECHANISM

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INVENTOR
Melvin J. Binks
BY
Charles E. Shady
His Attorney.

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COMBINATION STEP-UP AND RESET
MECHANISMMelvin J. Binks, Chicago, Ill., assignor to Republic
Patent Corporation, Chicago, Ill.

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3 Claims. (Cl. 74-158)

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My invention relates to a combination step-up and reset mechanism especially adapted for incorporation in the score circuit or free-play circuit of a coin controlled amusement game apparatus.

More specifically the invention contemplates providing on a shaft or other member a pair of fixed ratchet wheels or other teeth-bearing members the teeth of which extend in opposite directions with respect to each other, together with means for alternately engaging actuating dogs with such teeth whereby to advance or retract the rotation of said shaft.

As such the invention has for its principal object the provision of an improved construction of this character which will be highly efficient in use and economical in manufacture.

An object of this invention is to provide an arrangement comprising relatively few parts and arranged in combination as a unitary structure for effectively and rapidly advancing and retracting the rotation of a shaft or other member.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

Fig. 1 is an elevational view of the invention;

Fig. 2 is a sectional detail view taken substantially on line 2-2 of Fig. 1;

Fig. 3 is a sectional detail view taken substantially on line 3-3 of Fig. 1;

Fig. 4 is a sectional detail view taken substantially on line 4-4 of Fig. 2; and

Fig. 5 is a sectional detail view taken substantially on line 5-5 of Fig. 2.

The invention now to be described may be used as a combination step-up and reset mechanism or may be used in combination with other step-up and reset mechanisms, as shown and described in my early application Serial No. 222,911, filed April 25, 1951, on a "Multiple Step-Up Mechanism."

To accomplish this and several other objects of the invention, I provide a mounting which may be in the form of a relatively flat rectangular plate 15 to which are secured by spot welding or the like, brackets 16. These brackets 16 facilitate mounting the plate 15 upon a stationary support 17.

Mounted on the plate 15 in the lower left-hand corner thereof is an electromagnetic coil 18. This coil 18 includes a plunger 19, the upper end of

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which is connected as at 20 to a rocker plate 21 in turn pivotally mounted upon the plate 15 by means of a pin 22.

Pivotally connected to a downwardly extending portion of the plate 21, as at 23, is an arm 24 having a pin 25 extending laterally from opposite sides thereof. The end 26 of the pin 25 provides a dog adapted to engage the teeth of a ratchet wheel 27. This ratchet wheel 27 is fixed to a shaft 28 journaled in a suitable bearing 29 provided by the plate 15. Adjacent this ratchet wheel 27 and mounted for free rotation on the shaft 28 is a cam disc 30 having a hill 31 which is adapted to be engaged by the other end portion 32 of the pin 25.

A lever 33 has one end portion pivotally connected as at 34 to the rocker plate 21. The opposite end portion of this lever 33 by means of a slot and pin connection 35 is connected to the cam disc 30.

A second lever 36 has one end portion connected to the cam disc 30 by means of a slot and pin connection 37. The opposite end portion of this lever 36 is connected as at 38 to a rocker plate 39 similar in construction to the rocker plate 21. This rocker plate 39 is pivotally connected as at 40 to the plate 15.

Adjacent the cam disc 30 and arranged between such disc 30 and the plate 15 is a ratchet wheel 41 similar to the ratchet wheel 27 and like such wheel 27 is fixed to the shaft 28. The teeth of the wheel 27 extend in a direction opposite to that of the teeth of the wheel 41.

The rocker plate 39 has pivotally connected thereto as at 42 an arm 43 similar to the arm 24 and like the arm 24 carries at its outer end portion a transversely extending pin 43'.

One end portion 44 of this pin 43' is adapted to engage a cam hill 31' of the cam 30 while the other end portion 45 of such pin engages the teeth of the ratchet wheel 41. The cam hill 31' is spaced from the cam hill 31.

A pin 46 projects laterally from the plate 15 and has connected thereto adjacent end portions of springs 47, the opposite ends of such springs being connected as at 48 to end portions of the arms 43 and 24 whereby to yieldably maintain these arms in the position shown in Fig. 1.

On the shaft 28 is secured a wiper finger 49. This finger 49 is adapted to successively engage contact heads 49', there being at least nine of such heads carried on a fixed non-conductive plate 50.

When the coil 18 is energized, the plunger 19 is moved downwardly to rock the plate 21 in a

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clockwise direction whereby to move the dog 26 in a position to engage a tooth of the ratchet wheel 27 whereby to advance such ratchet wheel 27 when the plunger returns to its other position under the power of the springs 47. When the arm 24 is thus moved, the pin portion 32 thereof engages the cam hill 31 of the cam disc 30 and rotates such disc in an anti-clockwise direction as viewed in Fig. 4 to engage the pin 44 with the cam hill 31'. Such engagement of the pin with the cam hill 31' will pivot the arm 43 upwardly as viewed in Fig. 5 to disengage the pin portion 45 from the ratchet wheel 41 to permit the rotation of the ratchet wheel 27 in the afore-said anti-clockwise direction.

One end portion of a spring 50 is connected to the cam disc 30 while the other end thereof is connected as at 51 to the plate 15. This spring 50 is related to the cam disc 30 in a manner such as to return the cam disc to the position shown in Fig. 5.

The rocker plate 39 is pivotally connected as at 52 to the upper end portion of a plunger 53 of an electromagnetic coil 54. Such coil constitutes a reset coil in that when such coil is energized and the plunger 53 moved downwardly the plate 39 will be rocked in an anti-clockwise direction as viewed in Fig. 1, to engage the pin portion 45 with a tooth of the ratchet wheel 41 whereby to rotate such ratchet wheel in an anti-clockwise direction as viewed in Fig. 4. At the same time, the pin portion 44 engages the cam hill 31' of the cam disc 30 to rotate such cam disc in a clockwise direction to engage the cam hill 31 with the pin 32 whereby to elevate the arm 24 upwardly to disengage the dog 26 from the ratchet wheel 27.

The pivotal movement of the plates 21 and 39 in their anti-clockwise and clockwise direction, respectively, is limited by limiting screws 55 carried by brackets 56 mounted on the plate 15 and engaging lateral extensions 57 provided by the plates 21 and 39.

From the foregoing description it is apparent that I have provided a combination step-up and reset mechanism substantially compact in construction and which will be effective for positive and rapid operation of the ratchet wheels for advancing and retracting the rotation of the shaft on which they are fixedly mounted.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A device of the class described comprising a rotatable shaft, cam means carried by said shaft for rotation relative thereto, a pair of ratchet members fixed to the shaft on opposite sides of said cam means, the teeth of one of said members extending in a direction opposite to that of the teeth of the other member, a pair of horizontally extending pivotal levers above and in spaced relation to said shaft with one lever having an end thereof extending between one of said ratchet members and said cam means and the other lever having a like end extending between the other ratchet member and said cam

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means, a dog carried by said end of one of said levers and extending transversely with respect thereto and having one portion thereof adapted for engagement with said cam means and having another portion adapted for engagement with said one ratchet member, a second dog carried at said end of said other lever and extending transversely with respect thereto and having one portion thereof engageable with said cam means and another portion engageable with said other ratchet member, means for moving said dogs into engagement with said teeth of said ratchet members, means cooperating with said dogs and actuated by said cam means for disengaging one of said dogs from engagement with its respective teeth of said ratchet member during engagement of the other dog with its respective teeth of said other ratchet member, said cam means comprising a pair of spaced cam hills adapted to alternately move said dogs from engagement with the teeth of said ratchet members, and means for operatively connecting said cam means with said dog moving means to alternately engage said cam hills with said dogs.

2. A device of the class described comprising a rotatable shaft, cam means carried by said shaft for rotation relative thereto, a pair of ratchet members fixed to the shaft on opposite sides of said cam means, the teeth of one of said members extending in a direction opposite to that of the teeth of the other member, a pair of horizontally extending pivotal levers above and in spaced relation to said shaft with one lever having an end thereof extending between one of said ratchet members and said cam means and the other lever having a like end extending between the other ratchet member and said cam means, a dog carried by said end of one of said levers and extending transversely with respect thereto and having one portion thereof adapted for engagement with said cam means and having another portion adapted for engagement with said one ratchet member, a second dog carried at said end of said other lever and extending transversely with respect thereto and having one portion thereof engageable with said cam means and another portion engageable with said other ratchet member, means including electromagnetic means and spring means for moving said dogs into and from engagement with said teeth of said members, means cooperating with said dogs and actuated by said cam means for disengaging one of said dogs from engagement with its respective teeth of said member during engagement of the other dog with its respective teeth of said other member, said cam means comprising a pair of spaced cam hills adapted to alternately move said dogs from engagement with the teeth of said members, and means for operatively connecting said cam means with said dog moving means to alternately engage said cam hills with said dogs.

3. A device of the class described comprising a rotatable shaft, cam means carried by said shaft for rotation relative thereto, a pair of ratchet members fixed to the shaft on opposite sides of said cam means, the teeth of one of said members extending in a direction opposite to that of the teeth of the other member, a pair of horizontally extending pivotal levers above and in spaced relation to said shaft with one lever having an end thereof extending between one of said ratchet members and said cam means and the other lever having a like end extending between the other ratchet member and said cam

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means, a dog carried by said end of one of said levers and extending transversely with respect thereto and having one portion thereof adapted for engagement with said cam means and having another portion adapted for engagement with said one ratchet member, a second dog carried at said end of said other lever and extending transversely with respect thereto and having one portion thereof engageable with said other ratchet member, means including electromagnetic means and spring means for moving said dogs into and from engagement with said teeth of said members, means cooperating with said dogs and actuated by said cam means for disen-

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gaging one of said dogs from engagement with its respective teeth of said member during engagement of the other dog with its respective teeth of said other member, and means for operatively connecting said cam means with said dog moving means to alternately engage said cam means with said dogs.

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