May 4, 1954 W. H. PAUL ET AL 2,677,228

CUCKOO MOVEMENT IN CUCKOO CLOCKS

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Fig. 3.

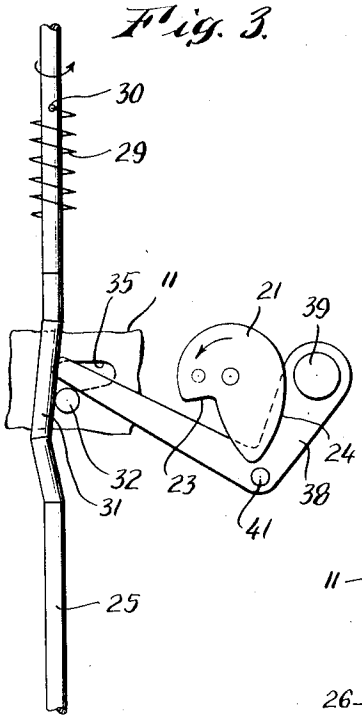


Fig. 1.

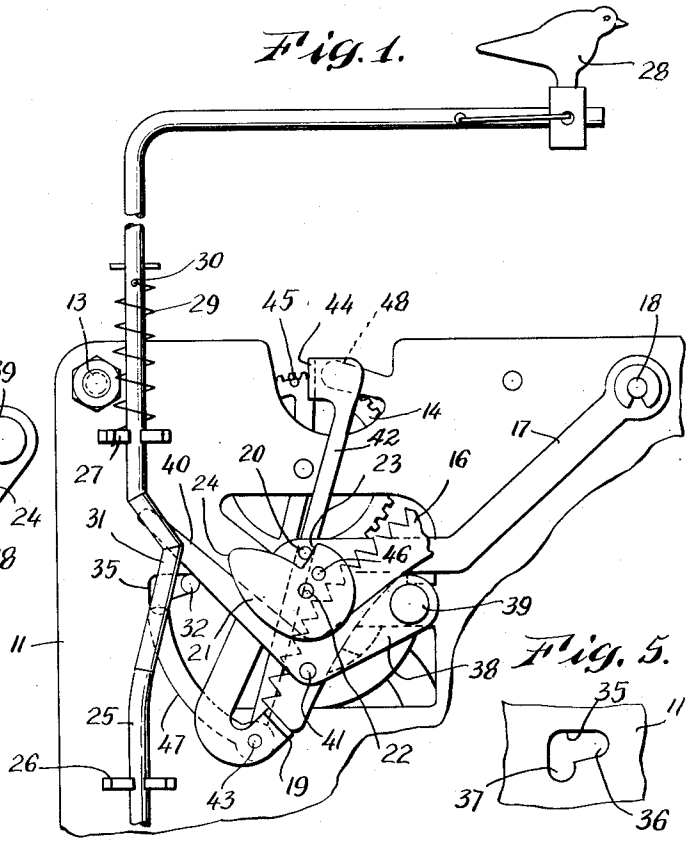


Fig. 5.

Fig. 4.

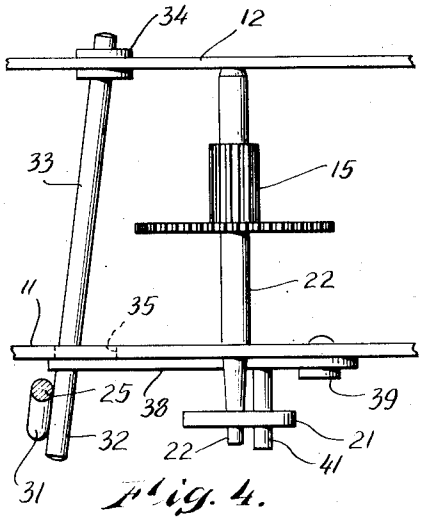
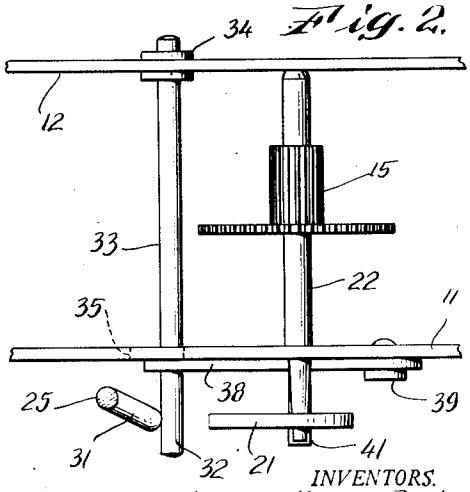


Fig. 2.



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Fig. 7.

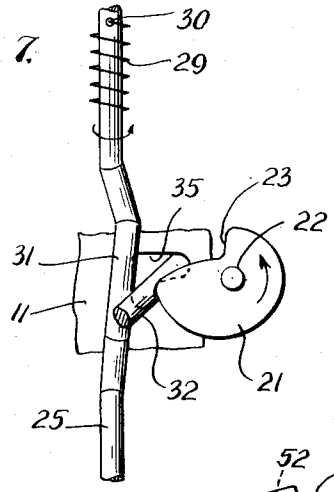
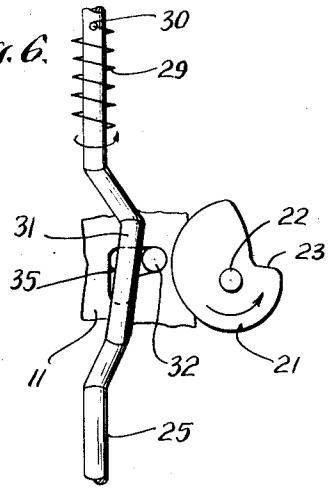


Fig. 6.



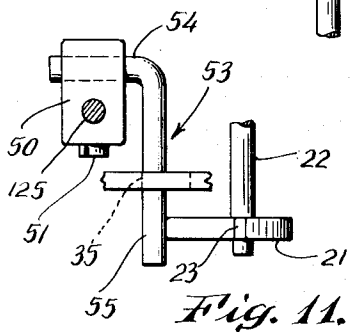


Fig. 11.

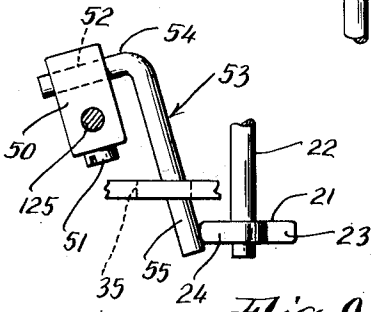


Fig. 9.

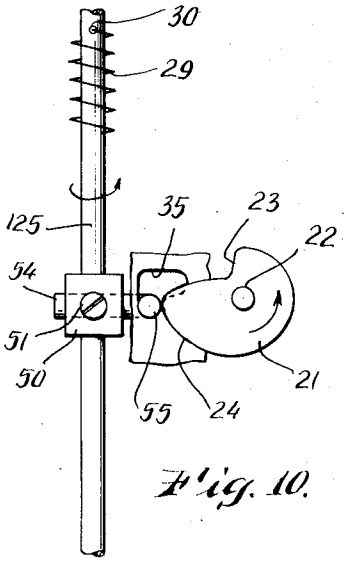


Fig. 10.

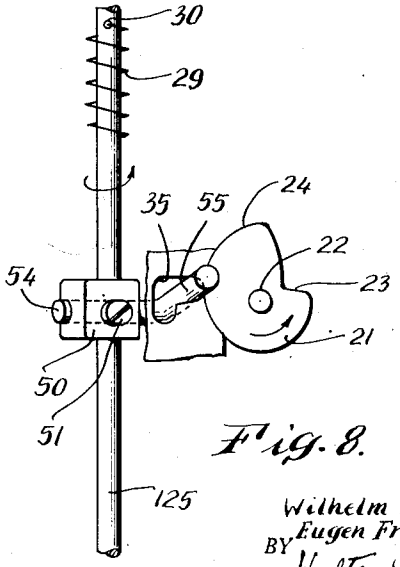


Fig. 8.

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UNITED STATES PATENT OFFICE

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CUCKOO MOVEMENT IN CUCKOO CLOCKS

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Application February 14, 1951, Serial No. 210,812

Claims priority, application Germany March 1, 1950

7 Claims. (Cl. 58—12)

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The invention relates to the movement of the cuckoo figure in cuckoo clocks. In our Patent Number 2,574,704 granted November 19, 1951, we have described a rack striking mechanism in combination with a drive for the movement of a cuckoo figure out of and into its housing in timed relation with the beginning and ending of the sounding of the cuckoo call. The mentioned drive utilizes the kinetic energy of rotating parts of the striking mechanism for imparting impulses to the bird-moving mechanism. This requires a blow-like effect exercised by one part on another one. The device though satisfactory in many instances has certain disadvantages in other cases as the blow-like action is sometimes undesirable, and the device comprises members which add to the complication of the clock work.

The invention aims, therefore, to avoid the mentioned drawbacks, and to provide means whereby a member needed in the clock work for other purposes is rendered instrumental to cause the bird movement by cam action.

The invention further aims to utilize the cam disc which controls the rack striking mechanism for the control of the movement of the cuckoo.

The invention further consists in that in a rack striking mechanism the same cam which in cooperation with a holding pawl controls the rack movement, also cooperates with a member causing the movement of the cuckoo figure.

Further objects and details of the invention will be apparent from the description given hereinafter and the accompanying drawing illustrating several embodiments thereof by way of example.

In the drawing:

Fig. 1 is a front elevation of a mechanism according to the invention in a position before the appearance of the cuckoo; only as much of the remainder of the clock work being shown as necessary for the understanding.

Fig. 2 is a top plan view of parts of the mechanism in the same position as in Fig. 1,

Figs. 3 and 4 are a front elevation and a top plan view, respectively, of the parts shown in Fig. 2 in their position after the appearance of the cuckoo,

Fig. 5 is a front elevation of a guide slot in the stationary part of the mechanism,

Figs. 6 and 7 are front elevations of a modified mechanism in positions corresponding to those illustrated in Figs. 1 and 3,

Figs. 8 and 9 are a front elevation and a top plan view, respectively, of another modification in the position before, and

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Figs. 10 and 11 are views corresponding to Figs. 8 and 9 of the last mentioned modification in the position after the appearance of the cuckoo.

Referring now to the drawing, the mechanism according to the invention is shown as applied to a cuckoo clock of the type fully described in our aforementioned application. Fig. 1 illustrated only those parts of the clock work which cooperate with our novel device and are necessary to understand the invention. In the other figures even those parts are omitted which do not directly contribute to the functioning of the novel device.

The clock work in general comprises the front plate 11 and the rear plate 12 connected in a spaced relationship by posts 13. The gear trains of the clock movement and the striking mechanism are accommodated between the plates as, e. g. the wheel 14 visible in Fig. 1 and the wheel 15 in Fig. 2. The control elements among which there is the rack 16 of the striking mechanism are arranged in front of the front plate 11. A holding pawl 17 is pivoted at 18. It is provided with an abutment 19 supporting rack 16 when the striking mechanism is at rest, and it is furthermore provided with a laterally extending pin 20 which constitutes the follower of a cam 21. The cam is secured to a shaft 22. Its periphery is recessed at 23 and forms a crest 24. Pin 20 in the position of Fig. 1, where it engages in recess 23, prevents the cam from rotating so that the striking mechanism can not run off. The cam is also provided with a pin 46 which, during the rotation of the cam engages the teeth of the rack to raise the latter stepwise for a purpose and in a manner fully described in the aforementioned application. A substantially vertical shaft 25 is journaled in bearings 26 and 27 at a distance from cam shaft 22. Shaft 25 is instrumental to move the cuckoo 28 so as to appear or disappear depending on whether the shaft is turned into the one or other of its end positions which are defined as hereinafter described. A torsion spring 29 is secured with one of its ends to the shaft at 30 and with its other end to the bearing 27. It tends to turn the shaft so as to cause disappearance of the bird figure. Intermediate its bearings the shaft has a crank 31 which bears against the free end 32 of a rod 33. The rod is journaled in a bearing 34 in the rear plate 12 so that it can swivel about the center of its bearing. The front end of the rod 33 is guided is a slot 35 provided in the front plate 11. The slot is substantially L-shaped as shown in Fig. 5 and comprises a horizontal leg 36 and a

vertical leg 37. The arrangement is such that, in the position of Figs. 1 and 2, the rod end is urged against the end of the slot leg 36 by the crank 31 due to the tension of spring 29. An angle lever 38 is pivoted at 39 to the front plate 11, laterally of the cam shaft 22, and its free end 40 bears on the rod end 32 opposite the crank 31. The lever face which engages the rod is inclined with respect to the directions of both the legs 36 and 37 of the guide slot 35 so that the lever when swinging downward, exerts a pressure component first to urge the rod end along the horizontal leg 36 of the slot and then downward into the leg 37. A pin 41 is secured to lever 38 near its end for cooperation with the cam 21 so that, upon rotation of the cam in the direction of the arrow, the cam crest 24 will depress the lever thereby to shift the rod end 32 and to turn shaft 25 into the locked position of Figs. 3 and 4.

When in order to start the striking mechanism at the proper time, holding pawl 17 will be raised by means not shown, pin 20 of the pawl will be withdrawn from the cam recess 23 so that the latter is free to rotate. Simultaneously the rack 16 will drop a distance according to the number of sounds required to strike the correct time. Also a lever 42 pivoted at 43 to the lower end of the holding pawl 17 will be raised. Thereby its upper end 44 leaves the path of a pin 45 secured to wheel 14 which meshes with wheel 15 so that the cam will start to rotate and the striking mechanism will run off. When the cam bears down on pin 41 of lever 48 the latter will be turned in a counter-clock-wise direction, thereby pushing the free end 32 of rod 33 first along leg 36 and then into the leg 37 of slot 35. The free end 32 will take crank 31 along so as to turn the shaft 25 causing the cuckoo to appear. In this position of the parts which is shown in Figs. 3 and 4 the rod is locked in slot leg 37 as there is no force tending to raise the rod end to the level of the leg 36. On the other hand, the rod end 32 locks the shaft 25 in its last mentioned end position. In consequence, further rotation of the cam has no influence on rod 33 and the shaft 25. The rotating cam engaging the teeth of the rack by means of a pin 46 lifts the latter upward so that when the position of Fig. 1 is reached the holding pawl 17 can drop down into its original position. Thereby, the upper end 44 of the lever 42 enters the path of the pin 45 on wheel 14. As a result, wheel 45 and thus the entire striking mechanism is stopped and lever 42 will be turned in clock-wise direction about its pivot 43 as far as an abutment 48 permits. Thereby, an arm 47 of lever 42 will be slightly raised so as to engage the rod end 32 from below and to shift the rod upward, whereupon the crank 31 due to the tension of spring 29 will push the rod end back to its position of Fig. 1.

Thus, the described structure renders it possible to cause turning of the shaft 25 by means of the cam 21, and only a very simple element namely the lever 38 is required in order to cause a shift of the rod end and a turn of shaft 25 by means of that cam. It will be also noticed that the transmission of the necessary power from cam 21 to rod 32 occurs smoothly and without any impact reaction as in the case of the aforementioned application.

The structure can be simplified still further by an arrangement according to Figs. 6 and 7 in which merely the cam 21, the end 32 of the swivel rod in its slot 35, and the bird shaft 25 are shown. This arrangement does not require the lever 38 of Figs. 1 to 4. The shaft 25 and the swivel rod are located so closely to the cam 21 that the latter can directly act on the rod end 32 to push it and the crank 31 from the position of Fig. 6 into that of Fig. 7. In all other respects this modification is similar to the embodiment of Figs. 1 to 4 as to structure and function.

Another simplified structure serving the same purpose is shown in Figs. 8 to 11. In this modification shaft 125 is straight, that means, it does not require the crank of the preceding embodiments. A block 50 is secured to the shaft by means of a screw 51 approximately in that portion of the shaft in which the crank is located in the preceding figures. Block 50 is provided with a bore 52 which crosses the axis of shaft 125. A rod of L-shape, in general denoted by 53, is journaled with its shorter leg 54 in bore 52 whereas, the longer leg 55 is guided in the L-slot 35 described in connection with Fig. 3. The arrangement is such that cam 21 is located with respect to the leg 55 is a similar relationship as the cam in respect to the rod end 32 in Fig. 6. If now cam 21 starts to rotate from its position shown in Figs. 8 and 9 it will bear with its crest 24 on the leg end 55 and thereby, turn shaft 125 against the tension of the spring 29 until the rod end 55 is in the position shown in Figs. 10 and 11, that means, until it engages the leg 37 of the slot 35, for which purpose the rod leg 54 can turn in block 50. In all other respects the same is valid what has been said and described with respect to the preceding embodiments.

It will be apparent to those skilled in the art that many modifications and alterations of the structure shown are possible without departure from the essence and spirit of the invention which for that reason shall not be limited but by the scope of the appended claims.

We claim:

1. In a rack striking mechanism of a cuckoo clock including a rotatable cam disc to move said rack, and a holding pawl engageable with said cam and operative to release said cam to start rotation at the beginning and to stop its rotation at the end of the striking of an acoustical signal the combination of a cranked shaft turnable between two end positions and adapted to cause said cuckoo to appear and to disappear, a spring connected to said shaft and tending to urge said shaft into its first end position, a rod swivellingly journaled with one of its ends in a stationary part of said clock, the free end of said rod permanently bearing against the crank of said shaft, a lever pivoted with one of its ends to said stationary clock part and bearing with its other end against said free rod end opposite said crank, at least one point of said lever intermediate its ends being in the path of a crest of said cam whereby said cam when rotating will be instrumental to turn said shaft with the aid of said lever and said rod into its second end position, means to lock said shaft in its second end position, and means connected to said pawl to release said shaft when said pawl engages said cam to stop its rotation.

2. A device as claimed in claim 1 further comprising a stationary part provided with an L-shaped slot in which said free end of said rod is guided so as to move in the one arm of said slot when shifting said shaft from its first to its sec-

ond position, and to be locked when engaging said other arm, and said lever having its face with which it engages said rod, inclined with respect to the directions of said slot arms so as to exert pressure components in both said directions.

3. In a rack striking mechanism of a cuckoo clock including a rotatable cam disc to move said rack, and a holding pawl engageable with said cam and operative to release said cam to start rotation at the beginning and to stop its rotation at the end of the striking of an acoustical signal, the combination of a cranked shaft turnable between two end positions and adapted to cause said cuckoo to appear and to disappear, a spring connected to said shaft and tending to urge said shaft into its first end position, a rod swivellingly journaled with one of its ends in a stationary part of said clock, the free end of said rod permanently bearing against the crank of said shaft and being in the path of a crest of said cam so as to turn said shaft into its second end position under the action of said cam when the latter rotates, means to lock said shaft in its second end position, and means connected to said pawl to release said shaft when the pawl engages said cam to stop its rotation.

4. In the striking mechanism of a cuckoo clock, a rack and means including a cam and a holding pawl in cooperative relationship to cause movement of said rack; the combination of said cam with a reciprocable member connected to said cuckoo, a rod-like element having one of its ends universally journaled to a stationary part of said cuckoo clock, an L-shaped guiding means for the other end of said rod, said guiding means being in a plane parallel to that of said cam and including stops for said other rod end at the ends of the legs of said L, a lost motion connection between said member and said rod for their common movement when the rod is shifted along the first leg of said L, and to allow substantially independent movement of said rod along the other leg of said L, a spring tending to urge said rod in the direction of said first leg against the stop at the end of the latter, another lost motion connection between said cam and said other rod end in which said cam is instrumental for shifting said other rod end from the end of said first leg to engage said second leg, and a releasing means in connection with and operated by said pawl to shift said other rod end out of said second leg into said first leg.

5. In a rack striking mechanism of a cuckoo clock including a rotatable cam disc to move said rack and a holding pawl engageable with said cam and operative to release said cam to start rotation at the beginning and to stop its rotation at the end of the striking of an acoustical signal, the combination of said cam with a reciprocable member connected to said cuckoo, a rod-like element having one of its ends universally journaled in a stationary part of said clock, a stationary guiding means of L-shaped form for the other end of said rod and including stops at the ends of the legs of said L, said legs of said L being located in a plane parallel to said cam, a lost motion connection between said member and said rod for their common movement when the rod is shifted along the first one of said legs and to allow independent movement of said rod along the other leg of said L, a spring tending to shift said rod in the direction of said first leg towards the stop at its end, a stationarily pivoted lever bearing against said other rod end in a direction opposite to that of the restraint of said spring, said lever being in the path of a crest of said cam whereby said cam when rotating will turn said lever to shift said other rod end from the end of said first leg into said other leg, and a means connected to said pawl to shift said other rod end from said second into said first leg of said L, when said pawl stops the rotation of said cam.

6. In a rack striking mechanism of a cuckoo clock including a rotatable cam disc to move said rack and a holding pawl engageable with said cam and operative to release said cam to start rotation at the beginning and to stop its rotation at the end of the striking of an acoustical signal, the combination of said cam with a reciprocable member connected to said cuckoo, a rod-like element having one of its ends universally journaled in a stationary part of said clock, a stationary guiding means of L-shaped form for the other end of said rod and including stops at the ends of the legs of said L, said legs of said L being located in a plane parallel to said cam, a lost motion connection between said member and said rod for their common movement when the rod is shifted along the first one of said legs and to allow independent movement of said rod along the other leg of said L, a spring tending to shift said rod in the direction of said first leg toward the stop at its end, said other end of said rod in its position at said end of said first leg of said L being in the path of a crest of said cam whereby said cam when rotating will shift said other rod end along said first leg into said other leg of said L, and a means connected to said pawl to shift said other rod end from said second into said first leg of said L when said pawl stops the rotation of said cam.

7. In a rack striking mechanism of a cuckoo clock including a rotatable cam disc to move said rack and a holding pawl engageable with said cam and operative to release said cam to start rotation at the beginning and to stop its rotation at the end of the striking of an acoustical signal, the combination of said cam with a shaft adapted to reciprocate said cuckoo, a substantially rectangularly bent rod pivoted with one of its arms to said shaft about an axis eccentrically and at right angles with respect to the axis of said shaft, a stationary guiding means of L-shaped form for the free end of the other arm of said rod and including stops at the ends of the legs of said L, said legs of said L being located in a plane parallel to said cam, a spring tending to turn said shaft so as to urge said free end of said rod in the direction of said first leg towards the stop at its end, said other end of said rod in its position at said end of said first leg of said L being in the path of a crest of said cam whereby said cam when rotating will shift said other rod end along said first leg into said other leg of said L, and a means connected to said pawl to shift said other rod end from said second into said first leg of said L when said pawl stops the rotation of said cam.

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