

No. 700,511.

Patented May 20, 1902.

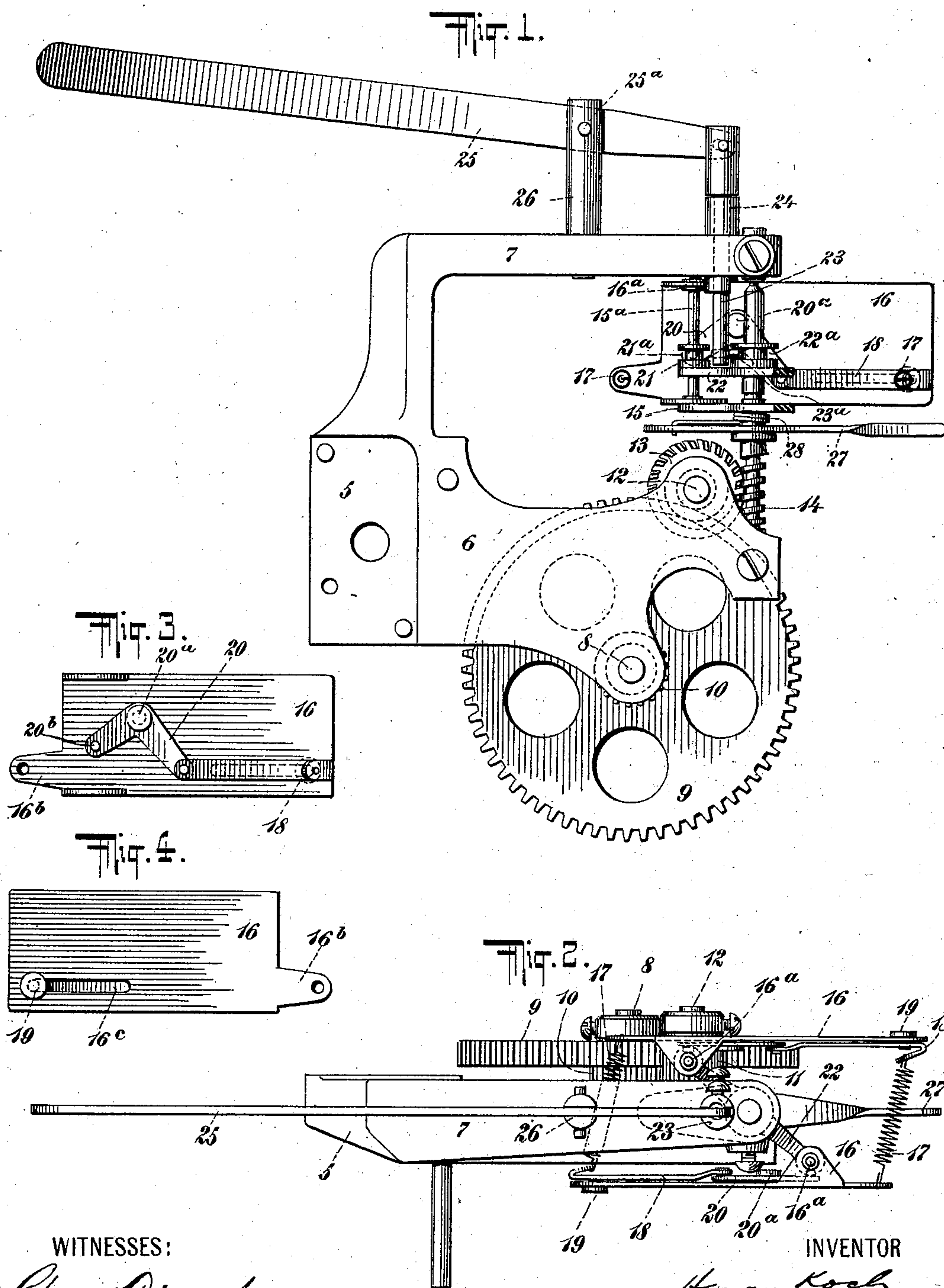
H. KOCH.

FAN GOVERNOR.

(Application filed July 5, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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*John Lotka*

INVENTOR

*Henry Koch*

BY *Messrs. Knauth*

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2 Sheets—Sheet 2.

Fig. 5.

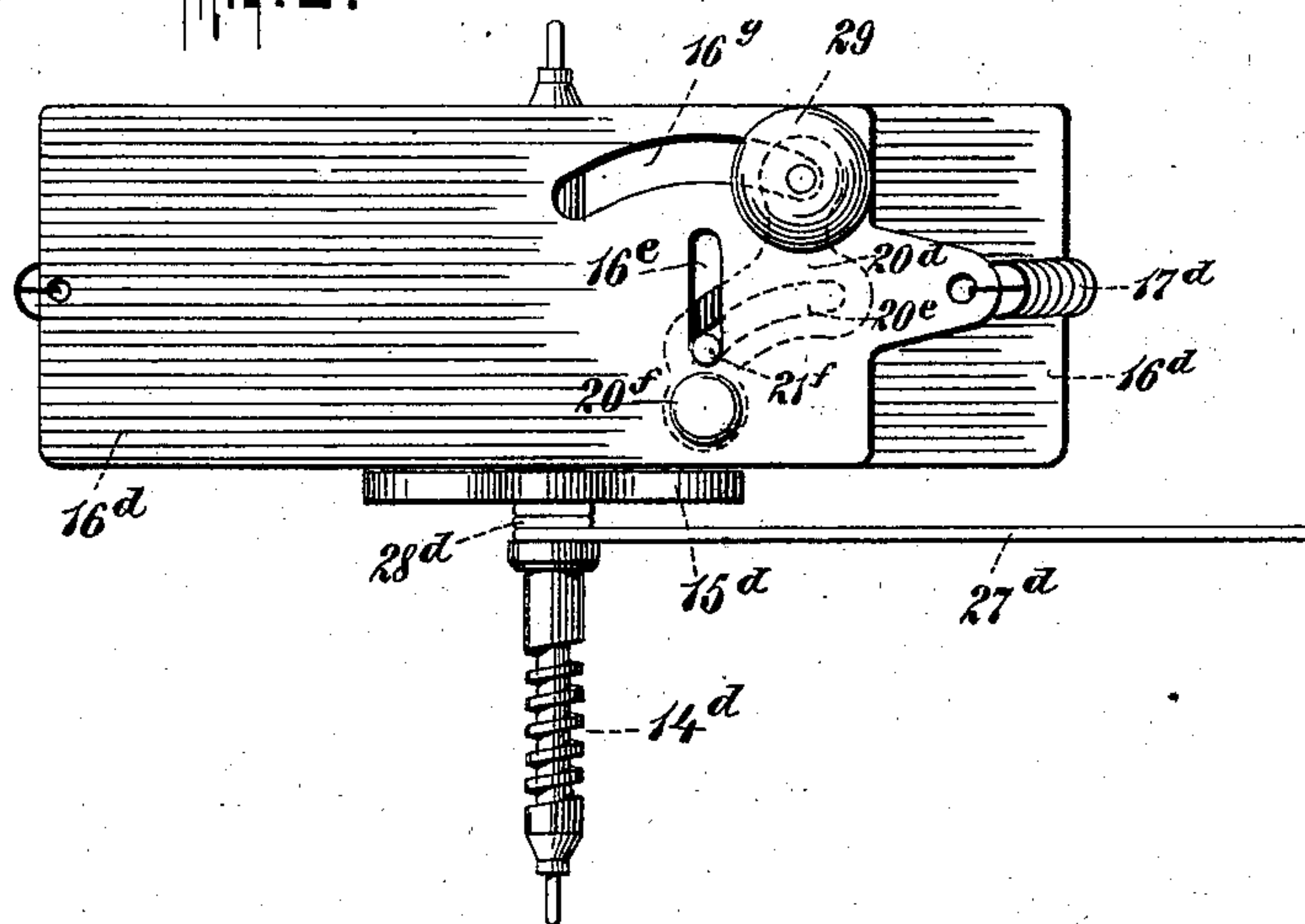


Fig. 6.

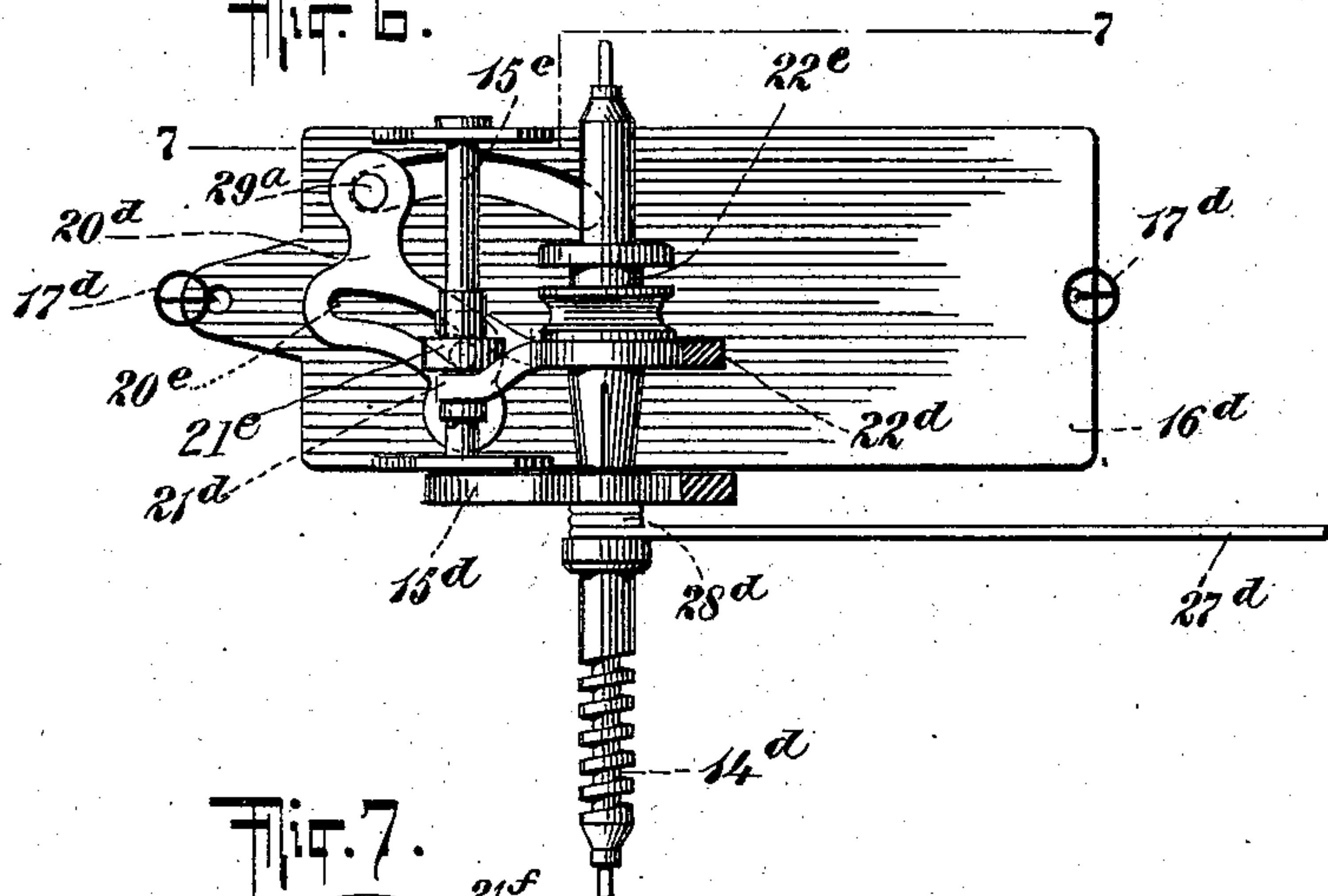
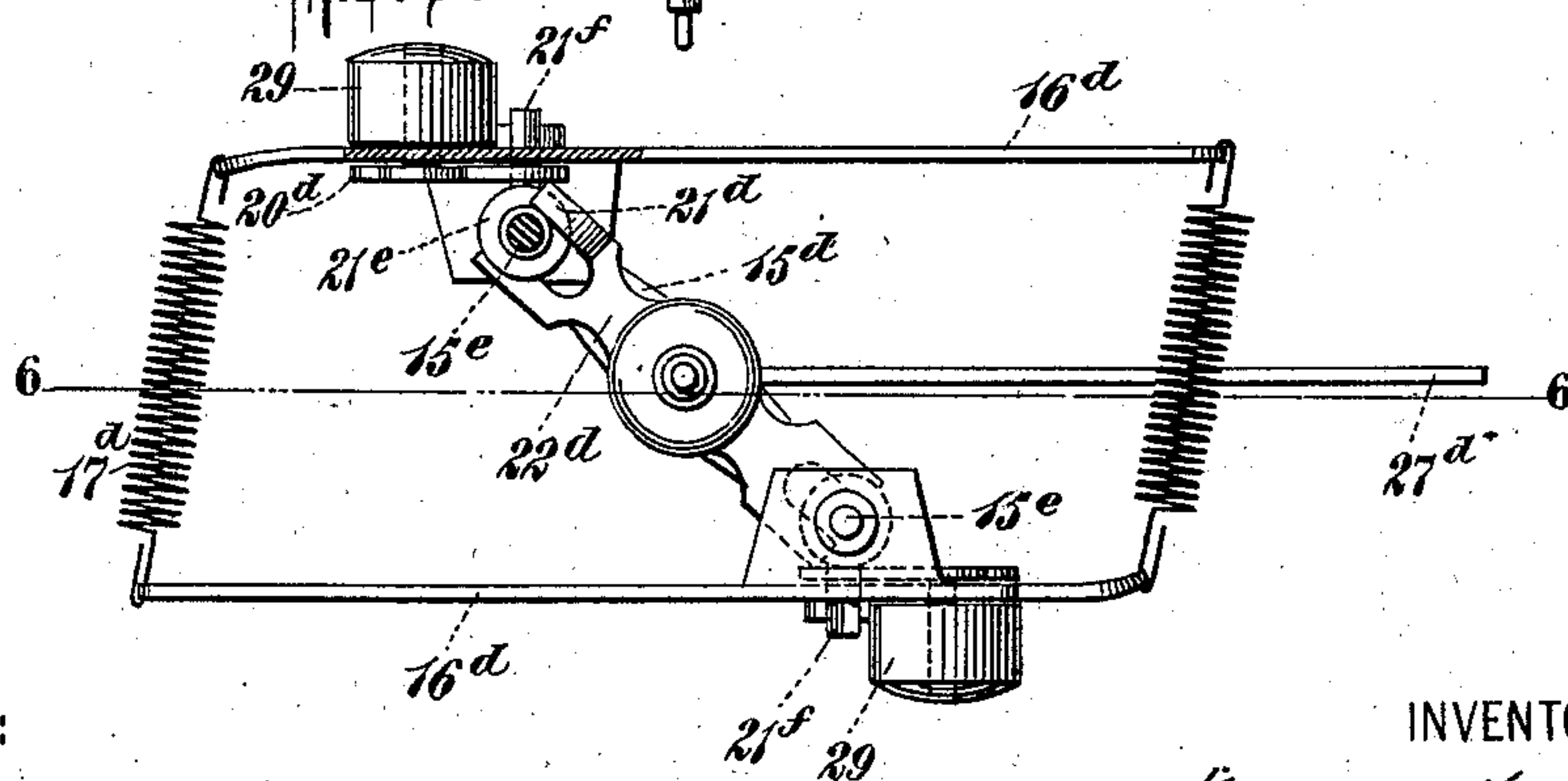


Fig. 7.



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# UNITED STATES PATENT OFFICE.

HENRY KOCH, OF RAHWAY, NEW JERSEY, ASSIGNOR TO REGINA MUSIC BOX COMPANY, OF RAHWAY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## FAN-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 700,511, dated May 20, 1902.

Application filed July 5, 1901. Serial No. 67,092. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY KOCH, a citizen of the United States, and a resident of Rahway, Union county, New Jersey, have invented certain new and useful Improvements in Fan-Governors, of which the following is a specification.

My invention relates to fan-governors for regulating the speed of spring-motors and the like, and is particularly adapted for use in connection with music-boxes.

The object of my invention is to provide a simple and readily-operated fan-governor of that class in which the governor can be adjusted or set for different rates of normal speed, thereby enabling the time of the music to be varied in accordance with the requirements of each piece and also enabling the time to be changed while the music-box is in operation—that is, during the playing of the music.

The invention will be fully described hereinafter and its novel features pointed out in the appended claims.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a side elevation, partly in section, of one form of my improved governor and the parts directly connected therewith. Fig. 2 is a plan of the same parts. Figs. 3 and 4 are detailed elevations of the governor-wings seen from opposite sides. Fig. 5 is a side elevation of another form of my invention. Fig. 6 is a sectional elevation of the same substantially on line 6 6 of Fig. 7, and Fig. 7 is a plan with parts in section on line 7 7 of Fig. 6.

As shown in Figs. 1 to 4, the frame 5 of the governor has upper and lower brackets 6 and 7, respectively, the lower bracket having journaled therein the shaft 8, upon which is mounted the pinion 10, through which motion is imparted to the shaft 8 from the spring-motor by means of a suitable gear-wheel. On the same shaft 8 is also mounted a gear-wheel 9, engaging a pinion 11 upon a shaft 12, which also carries a worm-wheel 13. This wheel is in engagement with the threads of a worm 14, journaled about a vertical axis in suitable bearings in the brackets 6 and 7. The shaft

of the worm at the same time forms the governor-shaft and has rigidly connected therewith a frame 15, preferably of rectangular shape, the said frame having pivoted to it at the periphery the wings 16 of the governor. The pivots of these wings are indicated at 16<sup>a</sup>. Each wing is provided at its pivot end with an extension or lug 16<sup>b</sup> and at the other end with a slot or slideway 16<sup>c</sup>. To the lug 16<sup>b</sup> is attached one end of a coiled spring 17. The other end of said spring is secured to the free end of an arm 18, having a pivotal connection with a pin 19, which is adapted to slide in the slot 16<sup>c</sup>. The direction of this slot is radial, or substantially so, with respect to the pivot 16<sup>a</sup>. The other end of the arm 18 is in pivotal connection with a bell-crank lever 20, fulcrumed at 20<sup>a</sup> upon the wing 16 and provided at its other arm or end with a pin 20<sup>b</sup>, which pin 20<sup>b</sup> engages an annular groove 21<sup>a</sup> upon a collar 21, secured upon a cross-bar or slide 22, which is movable vertically upon parallel bars 15<sup>a</sup>, forming part of the frame 15. This slide also engages the shaft of the worm 14 and is there provided with another grooved collar 22<sup>a</sup>, which is engaged by a pin 23<sup>a</sup>, projected from a normally stationary rod 23. This rod has guided vertical movement in a sleeve 24, carried by the upper bracket 7, and is connected at its upper end loosely with the operating-lever 25, fulcrumed at 25<sup>a</sup> upon a suitable support or post 26, rising from the bracket 7. Upon the shaft of the worm 14 is also secured the stop-arm 27, adapted to be engaged by a screw or other suitable projection to start and stop the motor in the well-known manner. Preferably the stop-arm 27 is capable of a slight yielding movement independently of the spindle of the worm 14, being held in frictional engagement therewith by means of a coiled spring 28.

It will be understood that in operation as long as the lever 25 remains in the same position the governor will work in the same way as in the ordinary music-boxes. By actuating the lever 25 the grooved collar 22<sup>a</sup>, and with it the slide 22, will be shifted up or down lengthwise of the governor-spindle. This movement through the medium of the grooved collars 21 engaging the pins 20<sup>b</sup> will cause



the bell-crank levers 20 to swing on their fulcrums 20<sup>a</sup> and will thus move the pins 19 and the ends of the springs 17 attached thereto inward or outward relatively to the rods 15<sup>a</sup>. Assuming the tension of the springs 17 to remain equal, it will be obvious that by such a shifting movement of the spring ends the purchase or leverage of the springs and the resistance they oppose to the centrifugal movement of the wings will be varied, and consequently the governing action of the apparatus will be different—that is, if the lever 25 is in the up position (shown in Fig. 1) the governor will regulate the speed of the spring-motor for a predetermined number of revolutions. Should the lever 25 be thrown fully down, the motor would again rotate at a practically constant rate of speed; but this rate of speed would be different from that obtaining in the first case. To each intermediate position of the lever and of the slide 22 will correspond an intermediate rate of normal speed. It will be obvious that the speed may be changed, not only before setting the mechanism in motion, but just as readily while the music is being played, without injuriously affecting any part of the governor. The invention therefore provides simple and efficient means for changing the normal rate of speed of the motor both while it is at rest and during its operation.

Another form of my invention embodying the same principle and presenting the same advantages is shown in Figs. 5, 6, and 7. In these views the frame 5, with its brackets 6 and 7, and the driving-wheels 9, 10, 11, and 13 have been omitted, it being understood, however, that these parts are exactly the same as in the construction first described. Similarly the means for shifting the governor or for adjusting the normal speed are the same—that is, there will be employed a lever 25 with a rod 23, having a projecting pin 23<sup>a</sup>, exactly as shown in Fig. 1. This pin will engage in a groove 22<sup>e</sup> of a cross-bar or slide 22<sup>d</sup>, movable vertically upon the spindle of the worm 14<sup>d</sup> and upon the parallel bars 15<sup>e</sup>, which form part of the frame 15<sup>d</sup>. Adjacent to the bars 15<sup>e</sup> the slide 22<sup>d</sup> is formed with arms or lugs 21<sup>d</sup>, which engage a sleeve 21<sup>e</sup>, movable vertically on the bars 15<sup>e</sup>. From each of the sleeves 21<sup>e</sup> is projected a pin 21<sup>f</sup>, which works in a vertical slot 16<sup>e</sup> of the corresponding wing 16 and in a curved slot 20<sup>e</sup> of an arm 20<sup>d</sup>, fulcrumed at 20<sup>f</sup> upon the wing 16<sup>d</sup>. At its upper end said arm carries a pin 29<sup>a</sup>, which passes through a segmental slot 16<sup>e</sup> of the wing 16<sup>d</sup> and carries a weight 29. The springs 17<sup>d</sup> are connected with the ends of the wings 16<sup>d</sup>, and no provision is made for shifting the springs, as in the construction first described.

It will be understood that as the slide 22<sup>d</sup> is moved up or down by means of the lever 25 the pins 21<sup>f</sup> will cause the arms 20<sup>d</sup> to swing on their pivots 20<sup>f</sup>, carrying the weights 29 nearer to or farther away from the bars 15<sup>e</sup>, about which the wings 16<sup>d</sup> swing. This will

increase or diminish the resistance which the said arms oppose to rotation, and thus the speed of the mechanism will be regulated. It will be understood that this regulation is readily effected while the mechanism is in motion.

I desire it to be understood that in both constructions I employ shifting means movable upon the wings toward and from the pivots of the wings, and by changing the position of said shifting means I vary the location of the center of gravity, and thus increase or decrease the momentum of the revolving wing.

In the construction in which the springs themselves are shifted or adjusted the center of gravity is obviously varied at the same time, since the springs virtually form weights. In other words, in the construction illustrated in Figs. 1 to 4, inclusive, there is obtained a double action by adjusting the springs, said action being due partly to the fact that by shifting the springs on the wings the center of gravity is altered, and, second, the purchase or effective energy of said springs is also varied, as above set forth.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with the governor-spindle of a frame held to turn with the spindle, wings pivoted to the frame at a distance from the spindle, springs connecting said wings and a shifting mechanism turning with the wings and movable thereon for changing the center of gravity of the wings.

2. The combination with the governor-spindle of a frame held to turn with said spindle, wings pivoted to said frame at a distance from the spindle, shifting members carried by the wings and adapted to change the location of the center of gravity thereof and means for adjusting said shifting members.

3. The combination with the governor-spindle of a frame held to turn with said spindle, wings pivoted to the frame at a distance from the spindle, shifting means movable on the wings toward and from the pivots of the wings and mechanism for changing the position of said shifting means.

4. The combination with the governor-spindle of a frame held to turn with the spindle, wings pivoted to the frame at a distance from the spindle, shifting means movable on the wings toward and from their pivots and an operating-slide connected with said shifting means and movable parallel with the governor-spindle.

5. The combination with the governor-spindle of a frame held to rotate therewith, wings pivoted to said frame at a distance from the spindle about axes parallel with the spindle, shifting means movable on the wings toward and from their pivots, and an operating-slide connected with said shifting means and movable lengthwise upon the governor-spindle and upon the wing-pivots.



6. The combination with the governor-spindle and means for rotating it, of a frame held to turn with said spindle, wings pivoted to said frame at a distance from the spindle, 5 springs connecting said wings, and a shifting device for moving the attached ends of the springs toward and from the pivots of the respective wings.

7. The combination with the governor-spindle and means for rotating it, of a frame held to turn with said spindle, wings pivoted to said frame at a distance from the spindle, springs connecting said wings, and means 10 carried by the wings, for adjusting said springs.

8. The combination with the governor-spindle and means for rotating it, of a frame held to turn with said spindle, wings pivoted to said frame at a distance from the spindle, 20 springs connecting said wings, each wing having a slot or slideway extending toward and from its pivot, pins or attaching members movable in said slideways and each connected with one end of a spring, and a shifting 25 device for moving said attaching members in or out.

9. The combination with the governor-spindle and means for rotating it, of a frame held to turn with said spindle, wings pivoted to said frame at a distance from the spindle, 30 springs connecting said wings, a slide movable parallel with the governor-spindle, means for operating said slide, and a shifting device, actuated by the movement of the slide, 35 for moving the attached ends of the springs toward and from the pivots of the respective wings.

10. The combination with the governor-spindle and means for rotating it, of a frame 40 held to turn with the spindle and provided with bars extending parallel with the spindle,

a slide movable lengthwise of said bars, means for actuating the slide, wings pivoted to said frame, springs connecting the wings, and a shifting device operated by the movement of 45 the slide, for moving the spring ends toward or from the pivots of the respective wings.

11. The combination with the governor-spindle and means for rotating it, of a frame held to turn with the spindle and provided 50 with bars extending parallel with the spindle, a slide movable lengthwise of said bars, means for actuating the slide, wings pivoted to said frame, attaching devices movable toward and from their pivots, springs each of which has 55 one end secured to a wing directly and the other end to the attaching device on the other wing, and a shifting device, operated by the movement of the slide, for moving the said attaching devices toward or from the pivots 60 of the respective wings.

12. The combination with the governor-spindle and means for rotating it, of a frame held to turn with the spindle and provided 65 with bars extending parallel with the spindle, a slide movable lengthwise of said bars, and of the spindle, and provided with grooved collars at the spindle and bars, an actuating device for moving the slide, provided with a projection engaging the collar at the spindle, 70 wings pivoted to the frame, bell-crank levers fulcrumed on the wings and provided with projections engaging the collars at the bars, and springs connecting the wings and each having one end controlled by said bell-crank 75 lever to vary the working tension of the springs.

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Witnesses:

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