No. 670,383. Patented Mar. 19, 1901.

G. CARLSON.

RATCHET DEVICE.

(Application filed Sept. 6, 1900.)

(No Model.)

Fig. 1.

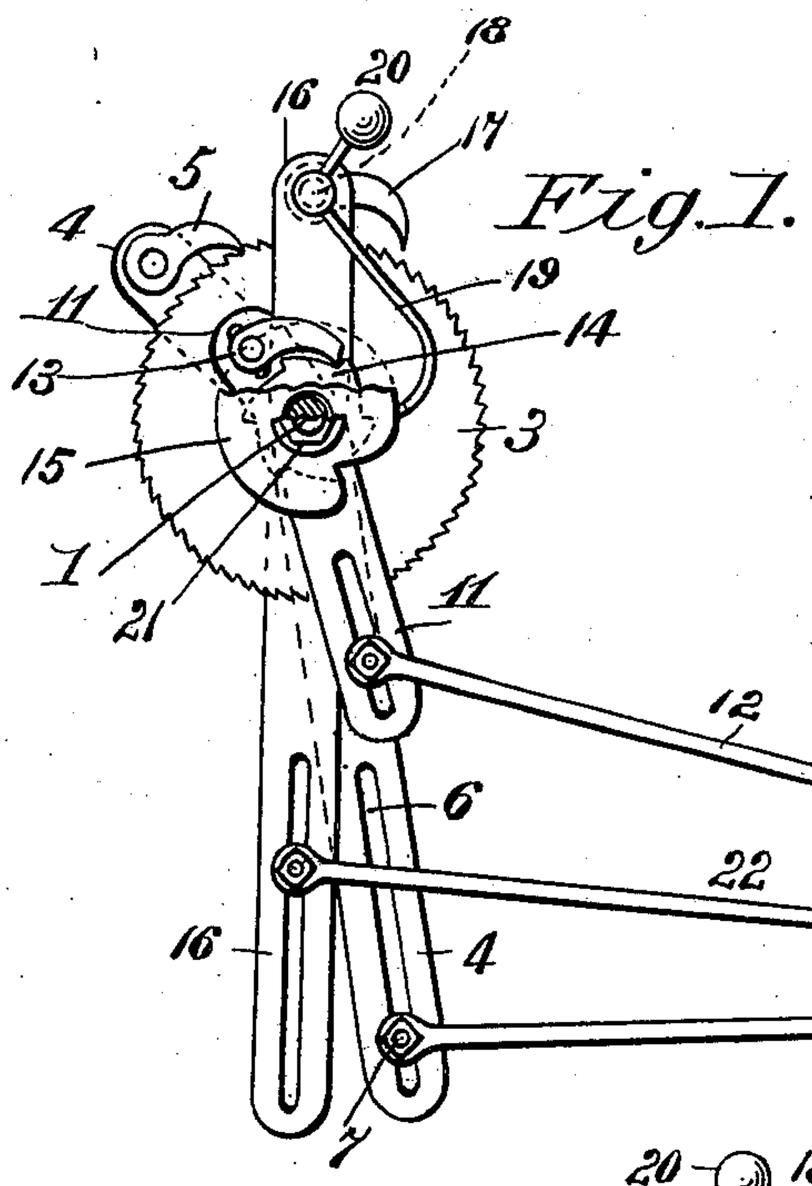


Fig. 3.

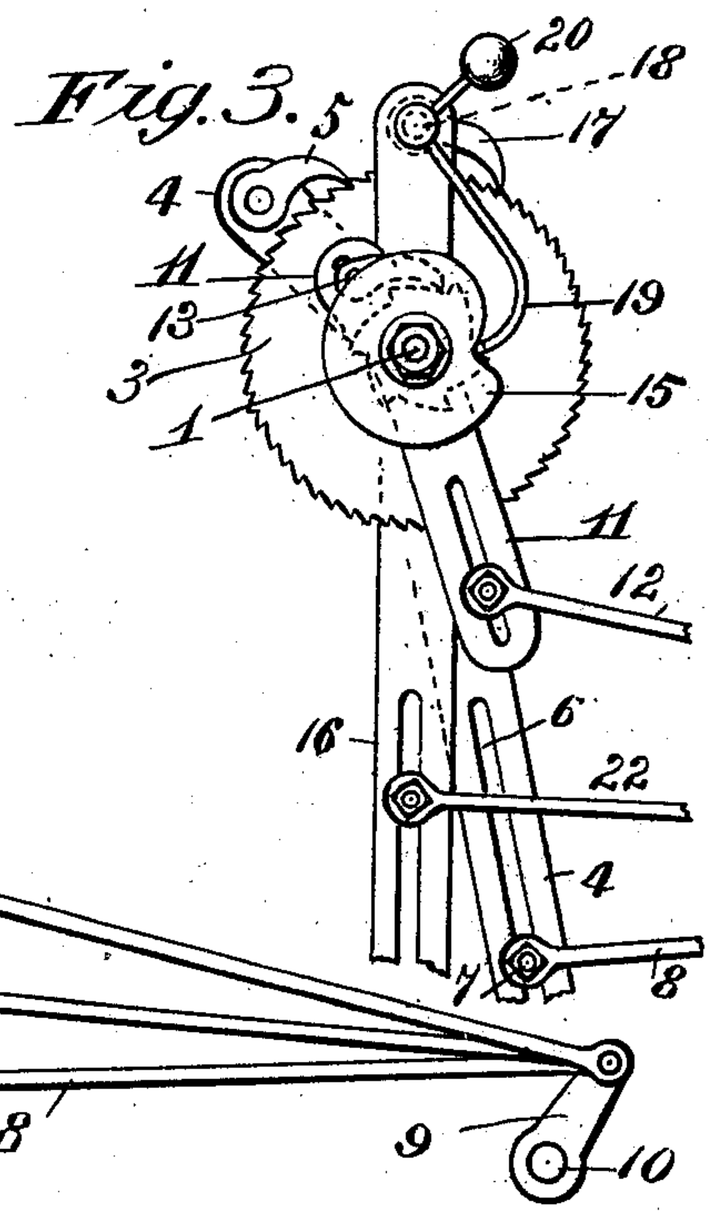
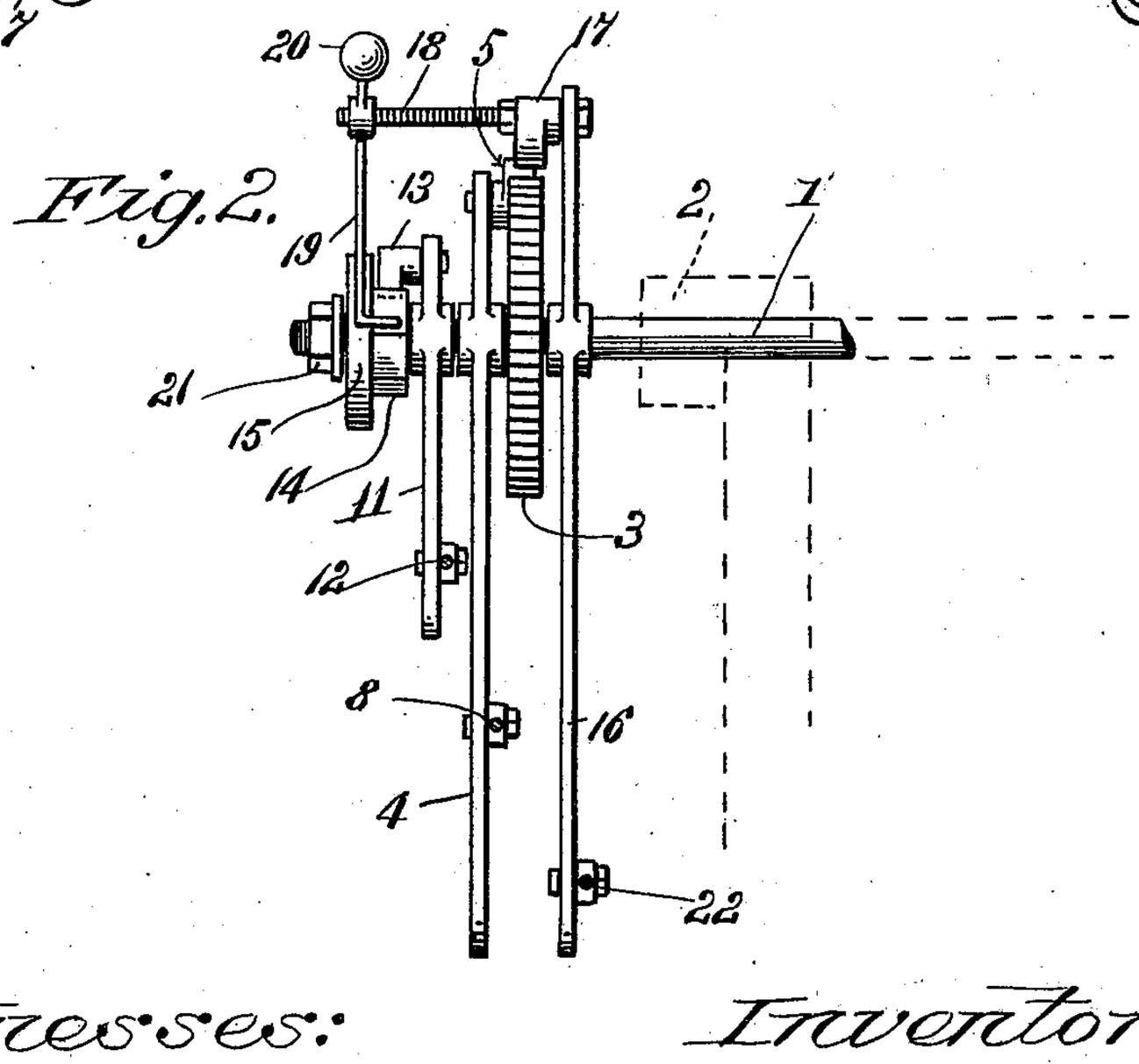


Fig. 2.



Witnesses:
J. D. Dunfield
K. I. Clemons

Inventor:
Gabriel Carlson
by Chapin & Co.
Attorneys.

UNITED STATES PATENT OFFICE.

GABRIEL CARLSON, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO CONFECTIONERS' MACHINERY & MANUFACTURING COMPANY, OF SAME PLACE.

RATCHET DEVICE.

SPECIFICATION forming part of Letters Patent No. 670,383, dated March 19, 1901.

Application filed September 6, 1900. Serial No. 29,185. (No model.)

To all whom it may concern:

Be it known that I, GABRIEL CARLSON, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Ratchet Devices, of which the following is a specification.

This invention relates to ratchet mechanisms, and especially refers to an intermittent ratchet mechanism, the object of the invention being the construction of a mechanism of this class whereby a certain number of impulses of a uniform character may be imparted to a shaft or other machine element, the uniformity of said impulses being interrupted at regular or irregular intervals by the production of one or more impulses varying in degree from said uniform impulses; and the invention consists in the construction fully set forth in the following specification and pointed out in the claims.

In the drawings forming part of this specification, Figure 1 is a side elevation of a ratchet mechanism embodying this invention, a portion of one of the parts being shown broken away. Fig. 2 is an end elevation of the mechanism in the position shown in Fig. 1. Fig. 3 is a side elevation showing the parts in a different position to that shown in Fig. 1.

Referring to the drawings, let it be assumed that 1 is a shaft in a machine to which it is desired to impart regular rotative impulses interrupted at stated intervals by impulses varying in degree from said first-named impulses, said shaft being supported in any suitable bearing, as 2, for instance. (Indicated in dotted lines.) Fixed on said shaft is a ratchet-wheel 3, and a pawl-lever 4 is hung loosely on the shaft in proximity to said ratchet-wheel and carries on its upper end the pawl 5. The lower end of the pawl-lever 4 is provided with a long slot 6, within which a stud 7 may slide. To this stud there is secured by a nut a connecting-rod 8, whose other end is supported on the wrist-pin of a crank 9 on a shaft 10, which by any suitable means is made to rotate uniformly. By sliding the stud 7 toward or from the shaft 1, on which the lever 4 oscillates, the throw of the upper end thereof, which carries the pawl 5, may be varied. It is obvious from the above description that the rotation of the shaft 10 will impart to the ratchet-wheel 3 uniform rotative impulses through the engagement of the pawl 5 with the teeth on the periphery of said wheel. Near said pawl-lever 4 there is loosely hung on the shaft 1 another pawl-lever 11, whose lower end is slotted like that of the lever 4 and connected in the same manner by a connecting-rod 12 with the wrist-pin of the crank 9. On the upper end of this lever 11 is a pawl 13, which engages the teeth of a ratchet 14, turning loosely on the shaft 1. Secured to this ratchet 14 is a convolute cam 15. A third pawl-lever 16 is hung loosely on the shaft 1, carrying on its upper end a pawl 17, rigidly secured on a long stud 18, which is rotatably supported in the upper extremity of the said lever. The free end of said stud 18 projects over the edge of the cam 15, and there is rigidly secured on said stud, near its end, an arm 19, which bears on said cam. This arm may be provided with a weight 20, whereby it is held in contact with the edge of said cam, whereby the latter, with its attached ratchet 14, is thus provided with a certain degree of frictional resistance to rotation. This ratchet 14 and its cam may be made either in one piece or separately, as desired, and both are removably supported on the shaft 1 in any suitable manner, as by means of a nut 21, for instance. The pawl-lever 16 is, like the levers 11 and 4, connected adjustably with a wrist-pin of the crank 9 by a rod 22.

Now if rotative movements be imparted to the shaft 10 the three pawl-levers 4, 11, and 16 will each have imparted thereto a swinging motion on the shaft 1 proportionate to the distance between said shaft and the point of attachment of their respective connecting-rods 8, 12, and 22 with said pawl-levers, it being borne in mind that the said connecting-rods are all actuated from one source—viz., the crank 9. The lever 4 will impart rotative movements to the ratchet-wheel 3, the lever 11 will impart rotative movements to the cam 15 through the ratchet 14, and the lever 16 will swing idly until the cam 15 arrives at the point shown in Fig. 3, at which time the arm

19 will drop from the highest to the lowest point on said cam, and thus permit the pawl 17 to engage the teeth of the ratchet-wheel.

It will be observed that the connecting-rod 22, which actuates the lever 16, is connected to the latter at a point nearer the shaft 1 than is the connecting-rod 8, which is connected to the lever 4. Therefore the swing of both of these connecting-rods being uniform the upper end of the lever 16 will swing through a longer arc than the upper end of the lever 4, and hence the action of the pawl 5 on the ratchet will be supplemented at this point by the more prolonged engagement of the pawl 17 with said ratchet, which will at this point therefore have imparted thereto a greater degree of rotation than it would receive from the action of the lever 4 unaided.

It is obvious from the preceding description that the lever 16 may thus be brought into action by varying the shape of the cam 15 in such a way as to supplement the uniform actions of the lever 4 as may be desired by the auxiliary action of the lever 16.

In the construction of the cam 15 and ratchet 14 shown in the drawings it is seen that the number of teeth on said ratchet is six and that the lowest point in the cam registers with one of said teeth. Therefore the pawl-lever 4 will impart to the ratchet-wheel 3 five impulses of a uniform character, the sixth varying in degree from the preceding five by reason of the engagement of the pawl 17 with the ratchet-wheel 3, which takes place as has been described. It is clear, therefore, that by removing the cam 15 and ratchet 14 and substituting therefor another ratchet and another cam a great many changes may be effected in the coöperative relation of the levers 4 and 16.

Of course any change in the number of teeth of the ratchet 14 would necessitate a change of position of the point of attachment of the connecting-rod 12 with the lever 11. The number of teeth on the ratchet 14 which lie between the points on the cam 15, at which the pawl 17 is brought into engagement with the ratchet-wheel 3 determine the number of uniform impulses which the lever 4 may impart to said ratchet-wheel, and the shape of the cam at said point where the pawl 17 is brought into play will determine the duration of the engagement of said pawl 17 with said ratchet-wheel 3. For instance, if the shape of the cam is made as shown in Fig. 1 the ratchet-wheel 3 would receive but one impulse from the lever 16; but if from said lowest point on the cam 15 said cam-surface were concentric with the shaft said pawl 17 would remain in engagement with said ratchet-wheel until the ratchet 14 had carried the cam past said concentric portion thereof and, through the medium of the arm 19, the pawl 17 had been raised out of engagement with the ratchet-wheel 3.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination with a ratchet-wheel of a suitable support therefor, two pawl-levers having the same axis as said support, a pawl on each of said levers, one of which is in constant operative relation to the ratchet-wheel and is adapted to impart thereto rotative movements of uniform degree, and means for bringing the second pawl into operative engagement with the ratchet-wheel, at stated periods, whereby one or more of said rotative movements may be varied, substantially as described.

2. In a pawl-and-ratchet device, a ratchet-wheel, two pawl-levers, pawls thereon adapted to engage said ratchet-wheel, means for swinging said levers simultaneously, means for operating said pawls whereby one of them may impart uniform consecutive rotative impulses to said wheel, and the other of them periodic impulses varying in degree from said consecutive impulses, and means for varying the throw of each of said pawl-levers, substantially as described.

3. The combination in a ratchet device, of a shaft, a ratchet-wheel secured thereon, two pawl-levers adapted to swing freely on said shaft, a pawl on each of said levers, one of which is in continuous engagement with said ratchet-wheel, means for periodically effecting the engagement of the other of said pawls with said ratchet-wheel consisting of a cam loose on said shaft, a lever connected with said pawl and bearing on said cam, and means for rotating the latter independently, substantially as described.

4. The combination in a ratchet device, of a ratchet-wheel, a shaft to which said wheel is secured, a second ratchet-wheel loose on said shaft, pawl-levers loose on said shaft, pawls on said levers adapted to engage said wheels, a cam secured to the ratchet-wheel loose on the shaft, a third pawl-lever, a pawl thereon adapted to engage the ratchet-wheel secured to said shaft, a lever secured to said pawl and bearing on said cam, and means for varying the throw of each of said pawl-levers, substantially as described.

GABRIEL CARLSON.

Witnesses:
WILLIAM H. CHAPIN,
K. I. CLEMONS.