(No Model.)

W. KOCH.

STOP DEVICE FOR INTERMITTENT FEED MECHANISM.

No. 370,705. Patented Sept. 27, 1887.

Fig. 1.

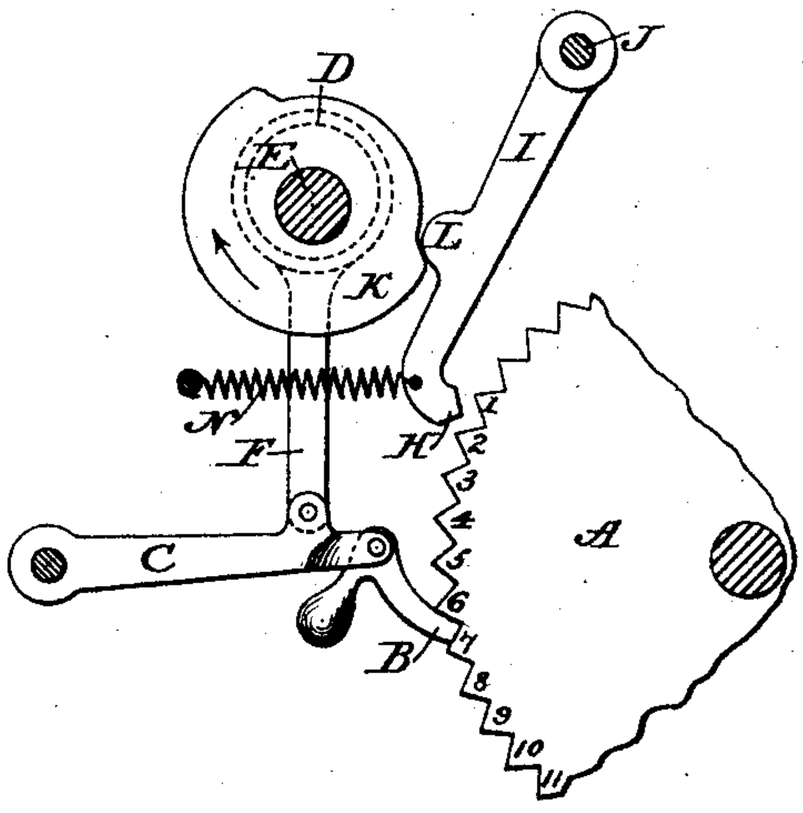


Fig. 2.

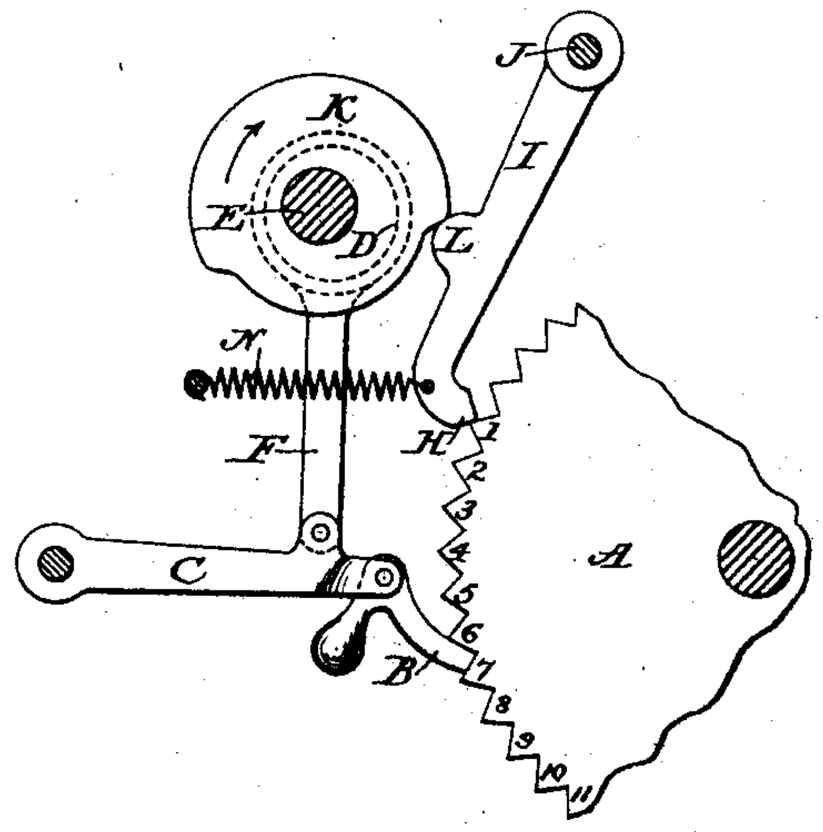


Fig. 3.

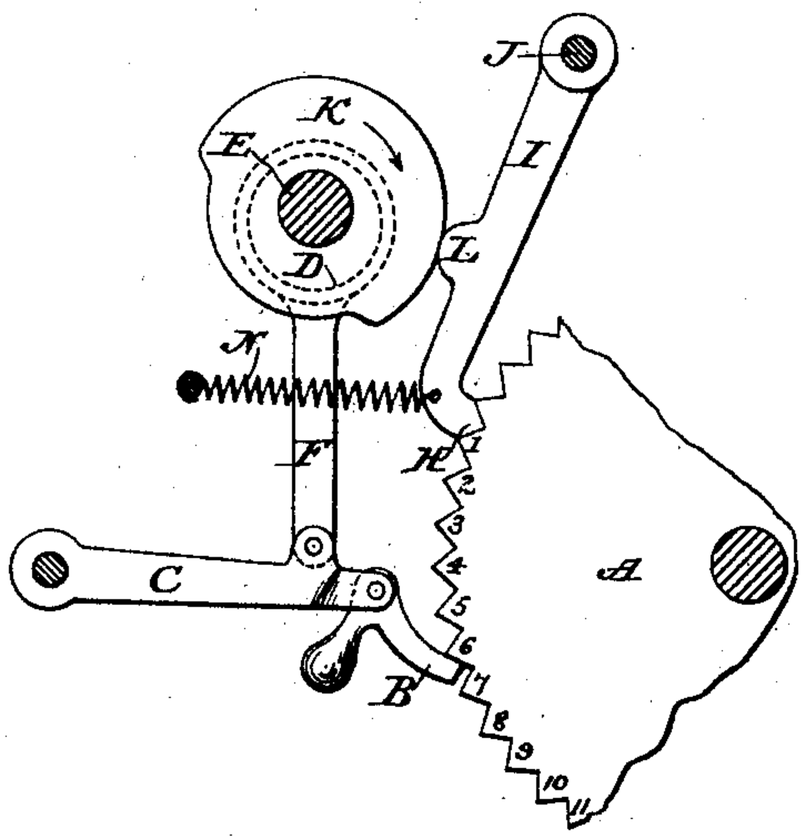


Fig. 4.

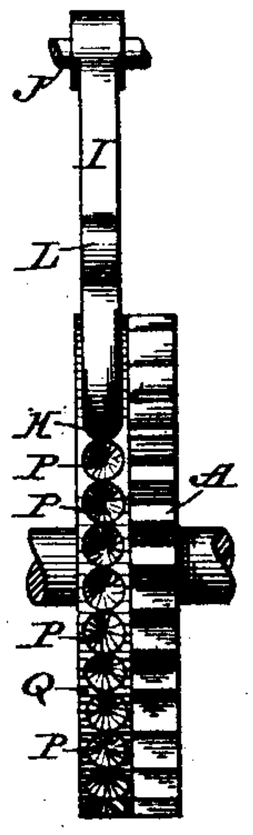
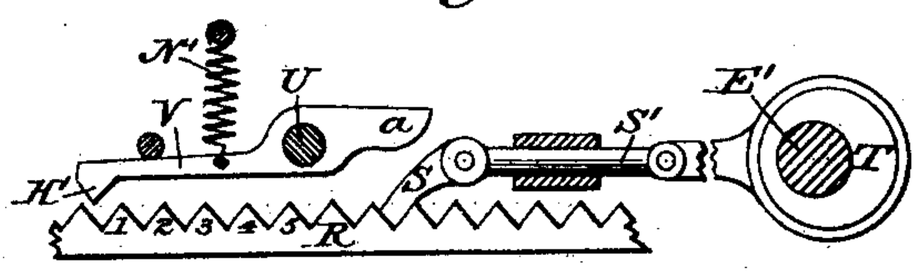


Fig. 5.



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UNITED STATES PATENT OFFICE.

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STOP DEVICE FOR INTERMITTENT FEED MECHANISM.

SPECIFICATION forming part of Letters Patent No. 370,705, dated September 27, 1887.

Application filed February 25, 1887. Serial No. 228,906. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM KOCH, of the city, county, and State of New York, have invented certain new and useful Improvements in Stop Devices for Intermittent Feed Mechanism; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification, in which—

Figure 1 illustrates my stop device as applied to a ratchet-wheel actuated by a pawl upon a pawl-arm coupled by an eccentric gear to a rotating shaft, the stop device being actuated by a cam upon the same shaft. In said figure the pawl is represented as about to make its forward stroke. Fig. 2 is a similar view, illustrating the position of the several parts when the pawl has made a little more than half its forward stroke; Fig. 3, a similar view, illustrating the device when the forward stroke of the pawl is fully completed and the ratchet-wheel is locked by the stop-tooth; Fig. 4, an elevation of the device transversely to the ratchet-wheel, illustrating as a modification the combination, with the ratchet-wheel, of a second wheel of the same diameter having conical recesses formed in its periphery to correspond with the ratchet-teeth and engage the stop-tooth; and Fig. 5 is an elevation illustrating another modification of my invention, in which a straight ratch-bar is used instead of a ratchet-wheel.

The object of my invention is to prevent the overthrow which commonly results after the quick stroke of the pawl actuating a rapidly-moving ratch, and to produce a perfect, secure lock of the ratch during the return movements of the pawl after each forward stroke, and thereby insure a positive, exact, uniform, intermittent movement of the ratch, whatever may be the speed at which it is driven. This object is obtained, as hereinafter fully described, by combining with the ratch and its pawl a stop-tooth adapted to drop into and engage the interdental notches, and which is operated synchronously with the movements of the pawl by suitable devices, substantially as hereinafter described, whereby the stop-tooth is made to engage the ratchet-wheel or ratch-bar automatically as the pawl is completing its forward movement, and be disengaged therefrom at the inception of its next forward movement.

In the accompanying drawings, A represents a ratchet-wheel actuated by the reciprocating pawl B, mounted upon a pivoted arm, C, which is made to oscillate by means of an eccentric, D, upon a rotating shaft, E, the eccentric being coupled to the arm C by means of a coupling-rod, F, pivoted to the arm C, and secured to a strap encircling the eccentric D in the customary manner.

My improved stop device consists of a tooth, H, upon the end of an arm, I, so pivoted to a suitable support at J that the tooth may drop successively into the notches separating the teeth 1, 2, 3, 4, &c., of a ratchet-wheel, A, or of any equivalent ratch. (See Figs. 4 and 5.) The pivot-pin J, upon which said arm I turns, and the length of the arm itself, are so adjusted that when the stop-tooth H is brought into contact with the outer end of the rear face of one of the ratchet-teeth or interdental notches, (see Fig. 3,) and then forced inward toward the ratchet-wheel, it will, in bearing against said tooth, operate as a wedge to drive it forward until the end of the stop-tooth reaches the bottom of the interdental notch and becomes thereby locked therewith.

The movement of the stop-tooth H to enter the interdental notch and lock the ratchet-wheel may be produced at the proper moment by means of a cam-wheel, K, mounted upon the shaft E, and whose periphery is brought to bear against an offset, L, on the pivoted arm I, as shown in the drawings. In such case the stop-tooth H is held in its locking position in engagement with a notch of the ratchet, as shown in Fig. 3, by the contact of the concentric portion of the periphery of the cam-wheel K with the arm I. This concentric peripheral bearing-surface is made to embrace about two-thirds of the circumference of the cam-wheel K, and the wheel is so adjusted and secured upon the shaft E in reference to the eccentric D upon the same shaft as that the offset L on the stop-arm I shall be in contact with said concentric surface from the moment at which the pawl B has in its forward movement brought the point of one of the ratchet-teeth 1 slightly past the end of the stop-tooth H, as shown in Fig. 2, until said pawl

has completed both its forward and its return stroke, and is ready to again start forward. The remainder of the circumference of the cam-wheel K is so cut away as to permit the arm I to move back far enough to carry the stop-tooth H entirely clear of the ratchet-teeth at the moment the pawl begins its forward stroke, and to keep it clear until, as above set forth, the point of that ratchet-tooth which is moving toward the stop-tooth (see Fig. 1) has passed by and beyond the end of the latter, (see Fig. 2,) whereupon the enlargement of the cam will operate to force the stop-tooth, as a wedge over the rear face of said ratchet-tooth, and thereby not only cause it to coact with the pawl in driving the ratchet-wheel forward, but also cause the wheel A to fully complete its movement independently of the pawl until the stop-tooth is fully embraced by the notch of the ratchet into which it has dropped. (See Fig. 3.)

The arm I, carrying the stop tooth H, is held in constant contact with the cam-wheel K, and is automatically withdrawn, so that the stop-tooth shall clear the ratchet whenever the recess in the cam-wheel permits it, by means of a spring, N.

In the operation of my stop device, constructed as described, when the reciprocating pawl B is drawn back fully, in readiness to make its forward stroke, the stop-tooth H is drawn back by the spring N clear of the teeth on the ratchet-wheel A, as shown in Fig. 1, this position of the stop-tooth being permitted by reason of the recess in the cam-wheel K, which engages the swinging arm I, carrying said stop-tooth. As the pawl B, which is in engagement with tooth 7 of the ratchet-wheel A, (see Fig. 1,) moves forward, the tooth 1 is brought past the end of the stop-tooth H, so that when the pawl has made two-thirds of its stroke, as shown in Fig. 2, the rear face of the ratchet-tooth 1 is brought into position to be engaged at its outer end by the end of the stop-tooth H, and the latter, by reason of the movement of the cam-wheel K in unison with the eccentric D, actuating the pawl-arm C and pawl B, is at this moment forced forward toward the tooth 1 and is made to bear against it, and, by reason of the angle of inclination of its end, to force the tooth and wheel forward in co-operation with the action of the pawl. This movement of the stop-tooth is produced by the sudden engagement of the enlarged portion of the cam-wheel K with the offset L on the arm I of the stop-tooth, as is shown in Fig. 2. So soon as the stop-tooth has fully entered the notch in the rear of said tooth 1, it is held there by the bearing of the enlarged portion of the cam-wheel K upon the arm I, as shown in Fig. 3, while the pawl is moving back in readiness to engage another ratchet-tooth, 6. Since the stop-tooth engages the ratchet-wheel before the pawl has completed its movement, it is impossible for the ratchet-wheel to be carried by the stroke of the pawl beyond the proper limit thereof, and, as the stop-tooth acts upon the ratchet to move it until the stop-tooth is exactly centered and fully seated in a notch of the ratchet, the intermittent movements of the ratchet are positively and exactly defined, while the wheel is locked positively between each movement.

Various methods will suggest themselves to a skilled mechanic for pivoting the stop-tooth and actuating the pawl. It is only necessary to my invention that the stop-tooth be moved, substantially in manner as described, into engagement with the ratchet-wheel or ratch-bar to be controlled in unison and synchronism with the movement of the pawl actuating said wheel or bar.

In the modification of my invention illustrated in Fig. 4, the stop-tooth H, instead of engaging directly the notches of the ratchet-wheel A, is made to engage corresponding recesses, P P P, in the periphery of a stop-wheel, Q, attached laterally to the ratchet-wheel A, or fixed upon the shaft which carries said ratchet-wheel. The number of notches in the stop-wheel corresponds with those on the ratchet-wheel, and are arranged in the same radial planes. The stop-tooth in such case may be made conical, to enter counterpart conical recesses in the wheel Q, as shown in Fig. 4.

Fig. 5 illustrates one mode of applying my invention to a rapidly-moving ratch-bar actuated intermittently by a reciprocating pawl. R in said Fig. 5 represents the ratch-bar, and S the actuating-pawl, which is carried by a reciprocating rod, S′, coupled to an eccentric, T, upon a rotating shaft, E′. H′ is a stop-tooth adapted to engage the interdental notches of the ratch. This stop-tooth H′ is formed upon one end of a lever, V, and this lever is pivoted at U in such position as to permit the stop-tooth to drop upon the ratch and the opposite end, *a*, of the lever to be forced up by the end of the rod S′, which carries the pawl. The tooth is automatically lifted and disengaged from the ratch by a spring, N′, actuating the toothed end of the lever, as shown in the drawings. The rear end, *a*, of the lever V is so beveled and the relative position thereof with respect to the rod S′ so adjusted that when, in the forward movement of the rod S′, the pawl S has so far carried the ratch-bar R forward that the point of a tooth, 1, has passed the point of the stop-tooth H′, the end of the rod S′ will engage the inclined face of the rear end, *a*, of the lever V, and, moving under it, will gradually force up this end of the lever, and thereby force down the stop-tooth H′ on its opposite end, and cause it to enter positively the notch between the teeth 1 and 2. The forward movement of the pawl is arrested by the action of the eccentric just as the stop-tooth is fairly seated in the notch. The stop-tooth will thus positively lock and arrest the movement of the ratch-bar the moment the pawl has completed its forward stroke, and thereby prevent any excess of movement or overthrow. The reverse stroke of the pawl

will operate to release the stop-tooth, and as it is released it will be drawn back by the action of the spring N'.

I claim as my invention—

1. The combination, with a ratch and a reciprocating pawl actuating the same, of a stop-tooth mounted upon a swinging arm to drop into the interdental notches of the ratch, and mechanism, substantially as described, for moving the stop-tooth in synchronism with the movement of the pawl into an engagement with the ratch as each forward movement is completed and reversed, substantially in the manner and for the purpose herein set forth.

2. The combination, with a ratchet-wheel, a reciprocating pawl engaging said ratchet-wheel, a rotating shaft, and an eccentric upon said shaft actuating the pawl, of a cam-wheel upon the same shaft, a swinging arm actuated by said cam-wheel, and a stop-tooth carried by said arm to engage interdental notches corresponding with those of the ratchet-wheel and lock the same during the reverse stroke of the pawl, substantially in the manner and for the purpose herein set forth.

3. The combination, with the ratchet-wheel A, of the pawl B, pawl-arm C, shaft E, eccentric D, coupling-rod F, swinging arm I, stop-tooth H, carried thereby and engaging the ratchet-wheel, the cam-wheel K, engaging the arm I, and the spring N, enforcing the constant contact of the arm I and cam K, substantially in the manner and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM KOCH.

Witnesses:
S. A. STAVERS,
A. N. JESBERA.