No. 717,649. PATENTED JAN. 6, 1903.

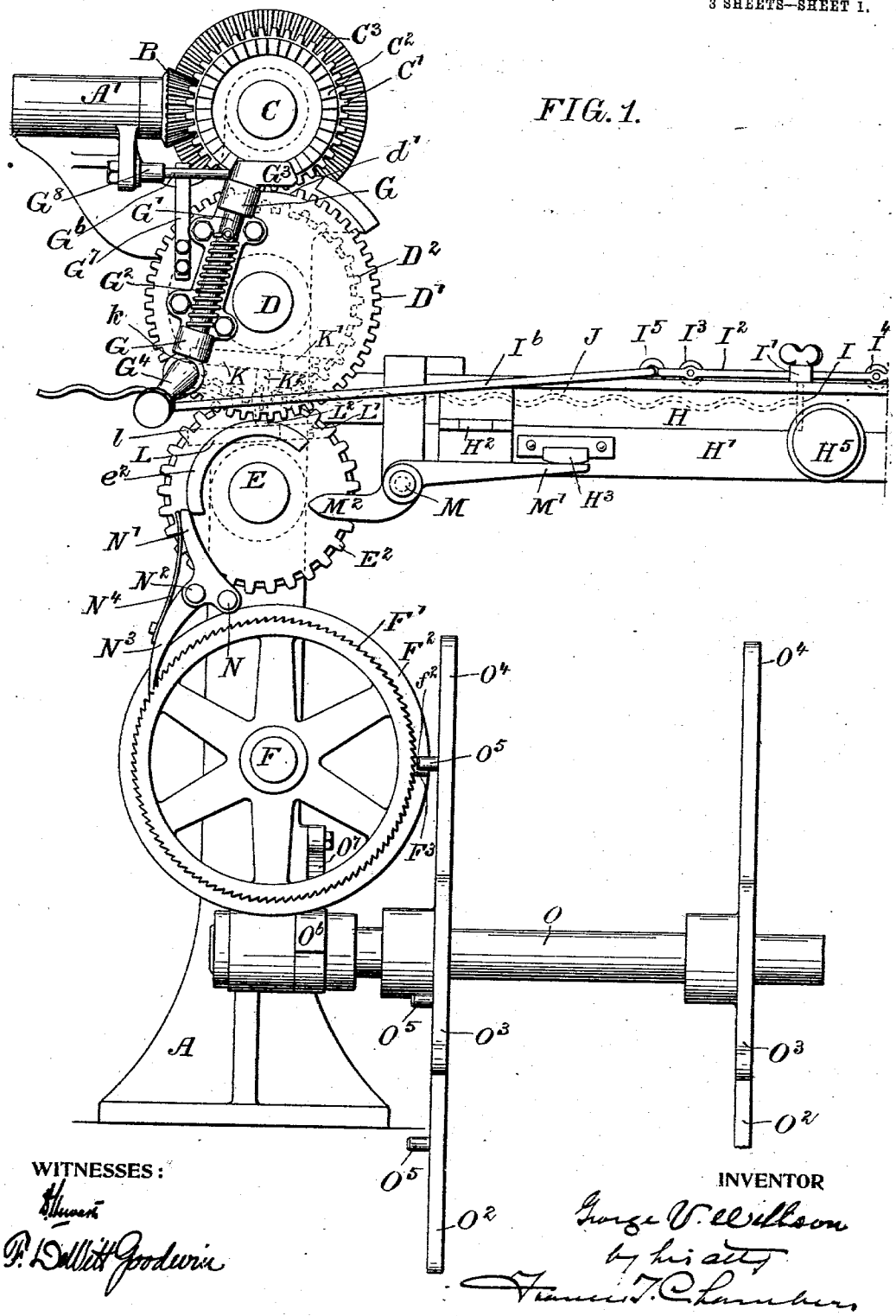
G. V. WILLSON.

WIRE CUTTING MACHINE.

APPLICATION FILED APR. 18, 1901. RENEWED JUNE 12, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

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NO MODEL. 3 SHEETS—SHEET 2.

FIG. 2.

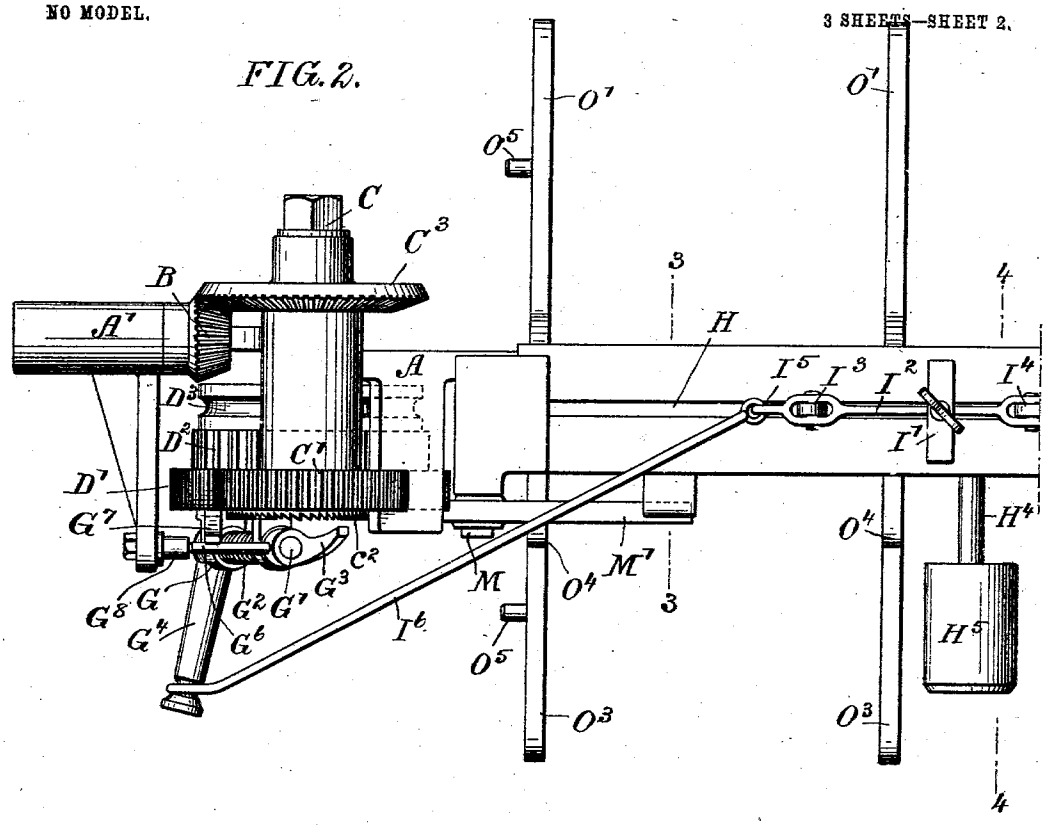


FIG. 3.

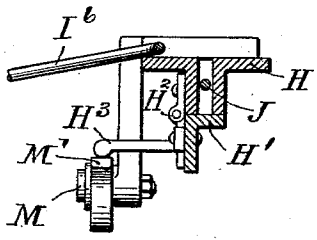
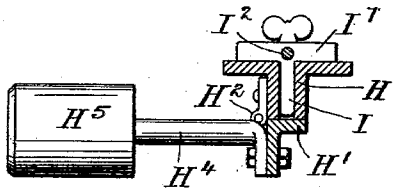


FIG. 4.



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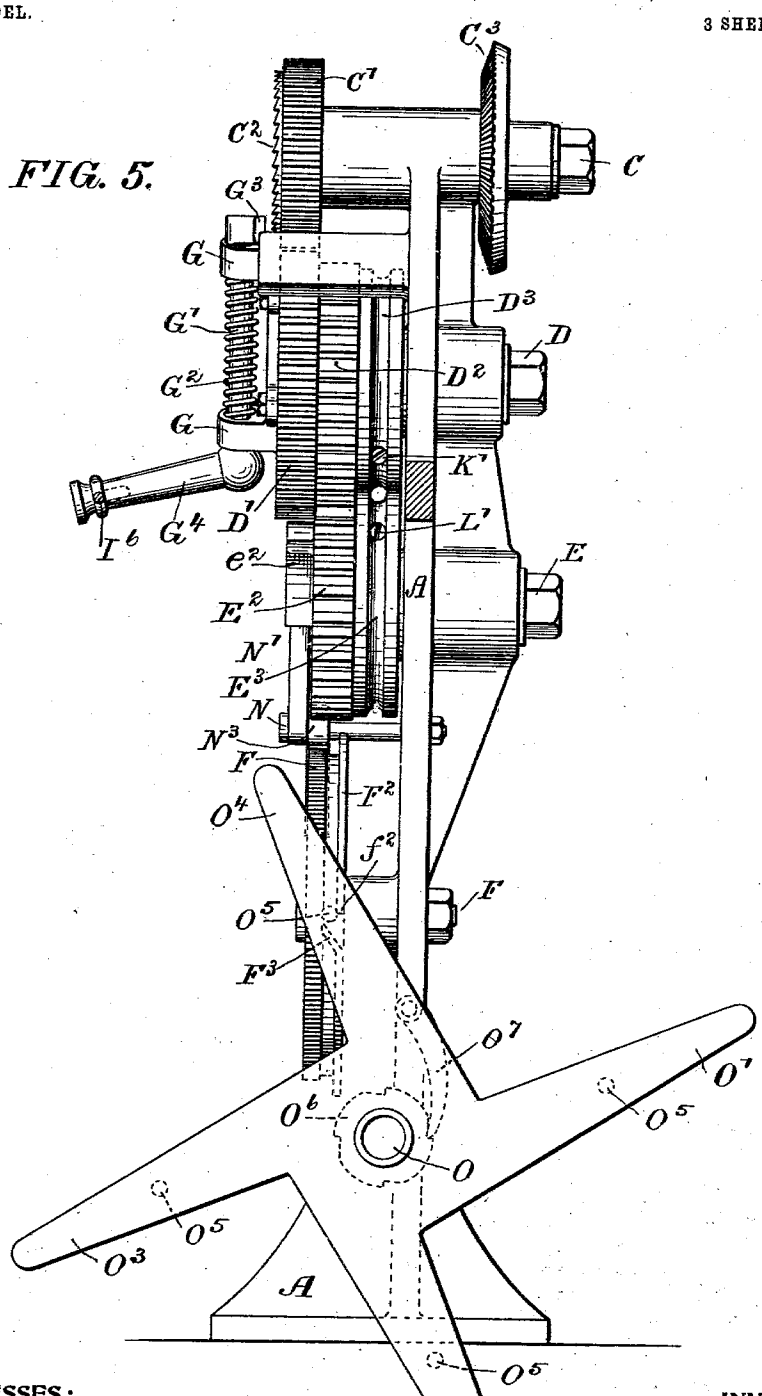
NO MODEL. 3 SHEETS—SHEET 3.

FIG. 5.



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UNITED STATES PATENT OFFICE.

GEORGE V. WILLSON, OF PITTSBURG, PENNSYLVANIA.

WIRE-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 717,649, dated January 6, 1903.

Application filed April 18, 1901. Renewed June 12, 1902. Serial No. 111,288. (No model.)

To all whom it may concern:

Be it known that I, GEORGE V. WILLSON, a citizen of the United States of America, residing in Pittsburg, in the county of Allegheny, in the State of Pennsylvania, have invented certain new and useful Improvements in Wire-Cutting Machines, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to machinery for cutting off wire in measured lengths, having for its object to provide an efficient apparatus for this purpose and also preferably for delivering the cut wires in automatically-counted bundles.

The nature of my improvements will be best understood as described in connection with the drawings, in which they are illustrated as embodied in a machine which I believe to be the best form and embodiment of my invention, and in which—

Figure 1 is a side elevation of the machine; Fig. 2, a plan view thereof; Fig. 3, a cross-section on the line 3 3 of Fig. 2; Fig. 4, a cross-section on the line 4 4 of Fig. 2, and Fig. 5 an elevation with the box H and its connected parts removed.

A indicates the framing of the machine, supporting, as shown in Figs. 1 and 2, a sleeve-bearing A′, through which passes the main driving-shaft of the machine, said shaft having secured to its end the bevel-pinion, (indicated at B,) which engages with and drives the bevel-gear C^3, secured on the shaft C, to which shaft is also attached the gear-wheel C′, having secured to its face, as shown, a ratchet-wheel C^2. The gear-wheel C′ is arranged to actuate the gear-wheel D′, which, however, has a mutilated segment, as indicated at d', which when it comes into registry with the gear C′ operates to release the engagement of the wheels, as indicated in Fig. 1. The mutilated gear-wheel D′ is secured to the shaft D, to which is also secured the gear-wheel D^2 and the wire-guiding roll, (indicated at D^3.) The gear-wheel D^2 engages the gear-wheel E^2, secured on the shaft E, to which shaft is also secured the grooved guide-roll, (indicated at E^3.)

F indicates still another shaft, having bearings in the frame A and having secured to it a ratchet-wheel F′ and the disk, (indicated at F^2,) which, as shown, is secured to the rear face of the ratchet, or rather has the ratchet formed upon its front face. The annular disk F^2 is at one place severed, as indicated at f^2, having a portion bent backward, as indicated at F^3, to form a switch for the purpose to be hereinafter described.

G G indicate bearings secured to the face of the mutilated gear D′ and supporting the rock-shaft G′, acted on by a spring G^2, so as to turn its pawl out of operative position, G^3 indicating a pawl secured on the end of the rock-shaft and arranged when depressed to engage the ratchet C^2 on the gear-wheel C′. Also secured to the rock-shaft G′ is the lever-arm G^4, extending outward therefrom, as indicated in the drawings. G^6 indicates a movable stop extending out from the rear of the pawl G^3 and when the pawl is in its normal position resting against a stop, (indicated at G^7,) said stop being fastened to the face of the mutilated gear, as shown. In this position the stop-pin G^6 is in direct line with the stationary abutment or stop, (indicated at G^8,) so that as long as it retains its normal position the mutilated gear-wheel D′ cannot revolve beyond the point indicated in Fig. 1.

H indicates a guide-box for the wire, which is fed into it between the guide-rolls D^3 and E^3. It is formed, preferably, of angle-irons, as well shown in Figs. 3 and 4, and has a bottom H′, also preferably formed of angle-iron and hinged to one of the walls of the box, as indicated at H^2, H^3 indicating an outwardly-extending arm arranged in the path of the lever-arm M′, and H^4 another outwardly-extending arm having a weight H^5 secured to it, which normally holds the bottom closed, as indicated in Fig. 4.

I is a movable gage-stop extending down into the box H from a cross-bar I′, which rests on the top of the box and is attached to a rod I^2, suitably guided—for instance, as indicated, by the rolls I^3 I^4 on the top of the box—and having at its end an eye (indicated at I^5) by which it is connected through a rod I^6 with the end of the lever-arm G^4.

J indicates the wire, which is fed into the box through the grooved guide-rolls and which when it abuts against the gage-stop I pushes the gage-stop to the rear.

K and L indicate the cutters, which are in-

serted in perforations formed in the grooved guide-rolls and held in proper place therein by the set-screws, (indicated at K′ K² and L′ L².

k and *l* indicate the cutting edges of the cutters, which project into the grooves of the rollers and act together to sever the wire passing between such grooves.

M is a pivot to which is secured the lever having the arms M′ and M², the arm M′ resting in contact with the outwardly-extending arm H³ of the box-bottom H′ and the arm M² projecting into the path of a cam (indicated at e^2) formed on the outer face of the gear-wheel E².

N is a pivot on which is secured the cam-contacting arm N′, having at N² a pawl N³, pivotally connected with it, N⁴ indicating a spring which presses the arm N′ upward. This arm also lies in the path of the cam e^2 and is actuated by it at each revolution of of the gear-wheel E².

O indicates a shaft upon which is secured a rack arranged to receive the cut wires as they are delivered from the box H. As shown and as preferably constructed the rack has several compartments or divisions formed by outwardly-extending arms O′, O², O³, and O⁴, the space between each pair of arms constituting a division of the rotatable rack, and on each of the arms, at one side of the rack, I have shown stop-pins O⁵ O⁵, &c., which are so arranged as to come in contact with the annular stop-rim F².

O⁶ is a ratchet secured to the shaft O and engaged by a pawl O⁷, the purpose of which is to prevent rotation of the rack in the opposite direction from that in which it is intended to move.

The operation of the machine is as follows: The gear-wheel B is in constant rotation and being positively engaged with the bevel-gear C³, this gear-wheel, together with the shaft C and the parts connected therewith, are also in constant rotation, but the mutilated segment *d′* of the gear-wheel D′ being normally in registry with the gear-wheel C′ the shafts D, E, and F, with the parts secured thereto, are normally at rest and in the relative positions indicated in Fig. 1. A wire J being fed between the grooved rolls and into the box H by any convenient mechanism, (not shown,) comes in contact with the movable gage-stop I and moves it backward, the movement of the gage-stop acting, through the rods I² and I⁶, to draw the lever-arm G⁴ in the same direction, with result of turning the rock-shaft G′ so that the stop-pin G⁶ is thrown up out of the path of the stationary abutment G⁸ and the pawl G³ moved down into engaging contact with one of the teeth of the rack C². This couples the gear-wheels C and D′ together, causing the mutilated gear D′ to rotate until its teeth are engaged by the teeth of the gear-wheel C′, whereupon the mutilated gear is compelled to make a full revolution and the cutters K and L are brought into operative contact with the wire passing through the grooved rolls, the severed end being delivered upon the bottom of the box H, and it will be noticed that whereas the rearward motion of the gage-stop I produces in the way indicated the revolution of the gear-wheel D′, yet as soon as that wheel begins its revolution the corresponding motion of the lever-arm G⁴, acting through the rods I⁶ and I², thrusts the gage-stop I backward with accelerated speed, so as to get out of the way of the end of the wire and leave it free to drop upon the bottom of the box H. It will also be obvious that as in the revolution of the mutilated gear D′ the parts again approach the position shown in Fig. 1 the spring G² and the resistance of the moving parts supported on the box-wall tend to move the rock-shaft backward, so that the stop G⁶ will be in line with the abutment G⁸ and coming in contact with it will prevent the revolution of the mutilated gear beyond the point indicated in Fig. 1. Immediately after the severance of the wire and its delivery onto the bottom of the box H the cam e^2 comes in contact with the lever-arm M², and raising the lever-arm M′ the bottom H′ of the box is thrown open through the action of the arm M′ on the arm H³, permitting the wire to fall into the hopper-division lying immediately below it, the bottom of the box closing as soon as the rear end of the cam e^2 has passed out of contact with the lever-arm M². When not in contact with the cam e^2, the arm N′ is pushed backward by the spring N⁴, and when the cam comes in contact with it it is thrust forward, its forward motion acting through the pawl N³, turning the ratchet-wheel and attached stop-rim F² through a determined distance, which can be regulated at will. Consequently for each wire severed in the machine the stop-rim F² moves through a determined distance, and for each complete revolution of the stop-rim a uniform number of wires are delivered to the rack. When, however, in the revolutions of the stop-rim one of the pins O⁵, which has rested against the rim, comes to the opening f^2, it passes under the switch F³ and when it clears the end of the opening f^2 is released entirely from the restraint of the stop-rim, the weight of the wires then turning the rack to deliver the counted bundle and to bring another compartment into position to receive wires from the box H, said compartment remaining in position until another bundle of wires of similar number has been delivered to it and then moving to give place to a third compartment, and so on.

While I have referred to my machine as a wire-cutting machine, it is of course adapted to cut rods or bands of any form, whether technically known as "wires" or not, and my claims are intended to cover my new mechanism for whatever purpose it may be used.

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

1. In a wire-cutting machine having intermittently-revolving cutters normally at rest, means for actuating said cutters consisting of a mutilated gear-wheel, and a complete gear-wheel having teeth arranged to engage at all points save where the mutilation occurs and one of said gear-wheels rotating constantly, a pawl-engaging device on one of said gears and a pawl on the other, means for holding the pawl normally out of contact with the engaging device, a movable gage-stop for the wire, and means connecting the gage-stop with the pawl whereby the movement of said stop forces the pawl into engagement with the engaging device and couples the gears.

2. In a wire-cutting machine having intermittently-revolving cutters normally at rest, means for actuating said cutters consisting of a mutilated gear-wheel, and a complete gear-wheel having teeth arranged to engage at all points save where the mutilation occurs and one of said gear-wheels rotating constantly, a pawl-engaging device on one of said gears and a pawl on the other, means for holding the pawl normally out of contact with the engaging device, a movable stop acting to arrest the gear-wheel which is not positively driven in a fixed position when disengaged by the other, a movable gage-stop for the wire, and means connecting the gage-stop with the pawl and movable stop on the gear-wheel whereby the movement of said stop disengages the stop on the gear-wheel and forces the pawl into engagement with the engaging device and couples the gears.

3. In a wire-cutting machine, the combination with the two similar gear-wheels D^2 and E^2 engaged together of cutters revolving with the gear-wheels, a mutilated gear-wheel connected to actuate the gears D^2 E^2 and to be actuated by a constantly-rotating gear-wheel C′, a pawl-engaging device moving with the gear C′, a pawl pivoted on this mutilated gear-wheel and normally held out of contact with the detent on the other wheel, a movable gage-stop for the wire, and means connecting said gage-stop with the pawl whereby the pressure of the advancing wire end on the gage-stop draws the pawl into engagement with the detent coupling the gear C′ with the mutilated gear-wheel and causing them to rotate together until their teeth engage.

4. In a wire-cutting machine, the combination with the two similar gear-wheels D^2 and E^2 engaged together, of cutters revolving with the gear-wheels, a mutilated gear-wheel connected to actuate the gears D^2 E^2 and to be actuated by a constantly-rotating gear-wheel C′, a pawl-engaging device moving with the gear C′, a pawl pivoted on the mutilated gear-wheel and normally held out of contact with the detent on the other wheel, a stop normally engaged with a detent and holding the mutilated gear and parts connected with it in fixed position, a movable gage-stop for the wire, and means connecting said gage-stop with the pawl and stop whereby the pressure of the advancing wire end on the gage-stop draws the stop on the mutilated gear out of contact with the detent and draws the pawl into engagement with the detent, coupling the gear C′ with the mutilated gear-wheel and causing them to rotate together until their teeth engage.

5. In a wire-cutting machine, the combination with the two similar gear-wheels D^2 and E^2 engaged together, of grooved cutter-rollers D^3 E^3 revolving with the gear-wheels, a mutilated gear-wheel connected to actuate the gears D^2 E^2 and to be actuated by a constantly-rotating gear-wheel C′, a pawl-engaging device moving with the gear C′, a pawl pivoted on the mutilated gear-wheel and normally held out of contact with the detent on the other wheel, a movable gage-stop for the wire, and means connecting said gage-stop with the pawl whereby the pressure of the advancing wire end on the gage-stop draws the pawl into engagement with the detent, coupling the gear C′ with the mutilated gear-wheel and causing them to rotate together until their teeth engage.

6. In a wire-cutting machine having intermittently-revolving cutters normally at rest, means for actuating said cutters consisting of a mutilated gear-wheel, said mutilated gear being directly connected to actuate the cutters, and a complete gear-wheel positively driven and adapted to engage and drive the mutilated gear when their teeth are engaged, a pawl-engaging device on the positively-actuated wheel, a rock-shaft G′ on the mutilated gear having attached to it a pawl G^3 adapted to engage the engaging device on the other gear-wheel and a lever-arm G^4, said rock-shaft being so journaled on the gear that its lever-arm moves in the direction of the moving wire when the wheel revolves, a movable gage-stop for the wire, and means connecting said movable stop with the lever-arm as described and so that the backward movement of the gage-stop turns the shaft to engage the pawl and then as the mutilated gear revolves is moved rearward by the movement of the lever-arm to which it is connected.

7. In a machine for cutting wire substantially as described, the combination with intermittently-moving cutters, of a guide-box H having a normally closed bottom, a movable gage-stop I situated in said box and connected to set the cutters in operation when moved, and means actuated by the movement of the cutter-actuating mechanism for opening the bottom of the box after the wire is cut.

8. In a machine for cutting wire, the combination with mechanism for cutting off wire in determined lengths, of a rotatable rack for receiving cut wires, said rack being so formed as to tend to rotate under the weight of wires

contained in it, an annular stop-rim F^2 having a releasing-switch F^3, said rim acting on a stop pin or pins in the rack as described, and means acting synchronously with the cutting-off mechanism for progressively rotating the stop-rim as the wires are cut so as to release the rack and permit it to turn to deliver its contents after a determined number of cut wires are delivered to it.

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Witnesses:
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