

No. 664,963.

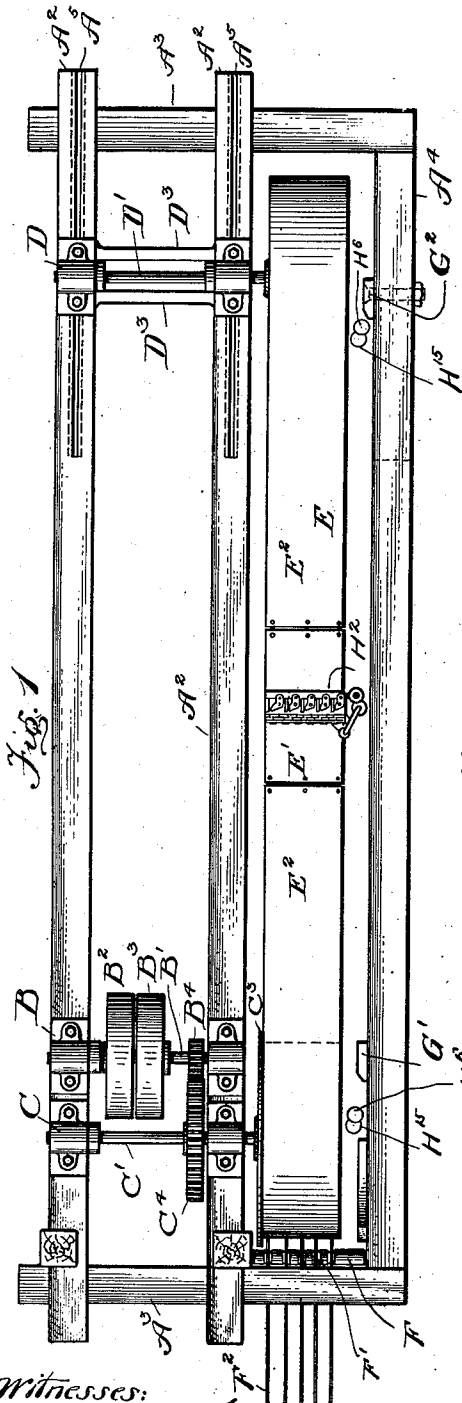
Patented Jan. 1, 1901.

J. W. MILLER.
WIRE CUTTING MACHINE.

(Application filed Apr. 12, 1900.)

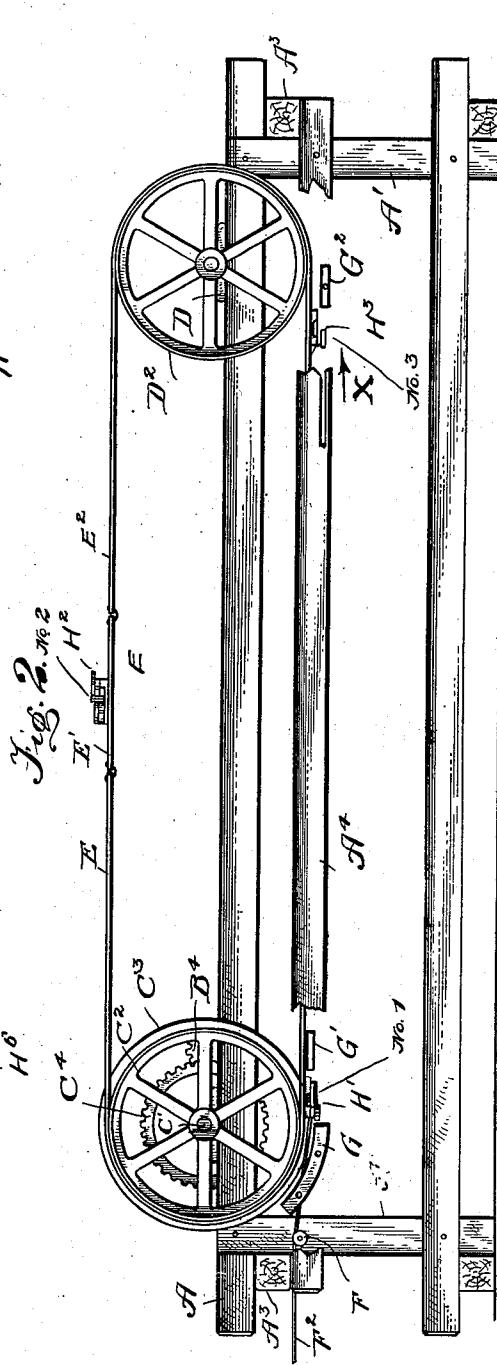
(No Model.)

2 Sheets—Sheet 1.



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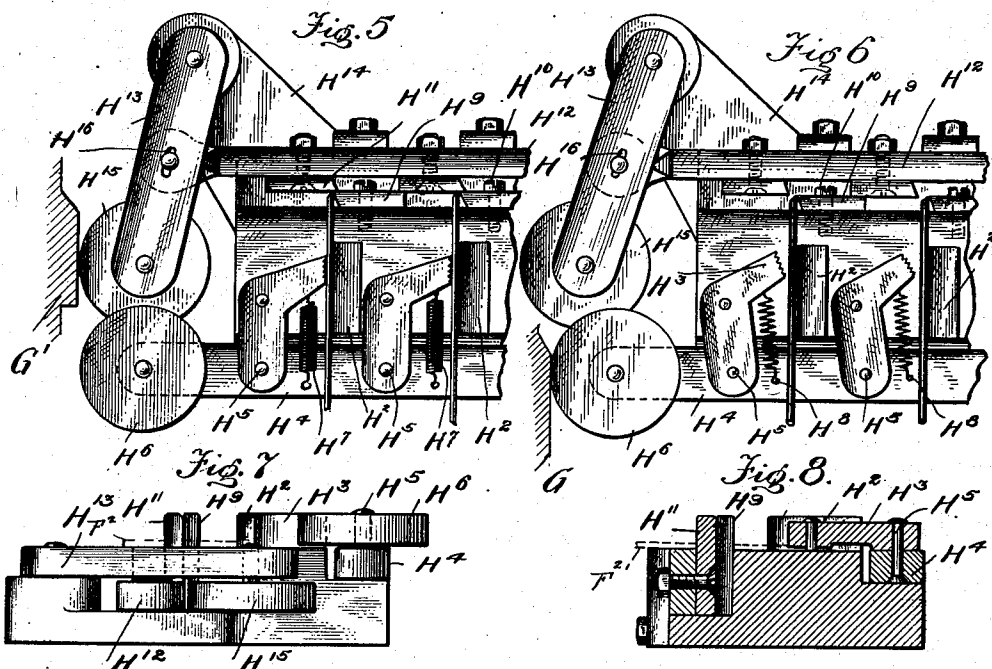
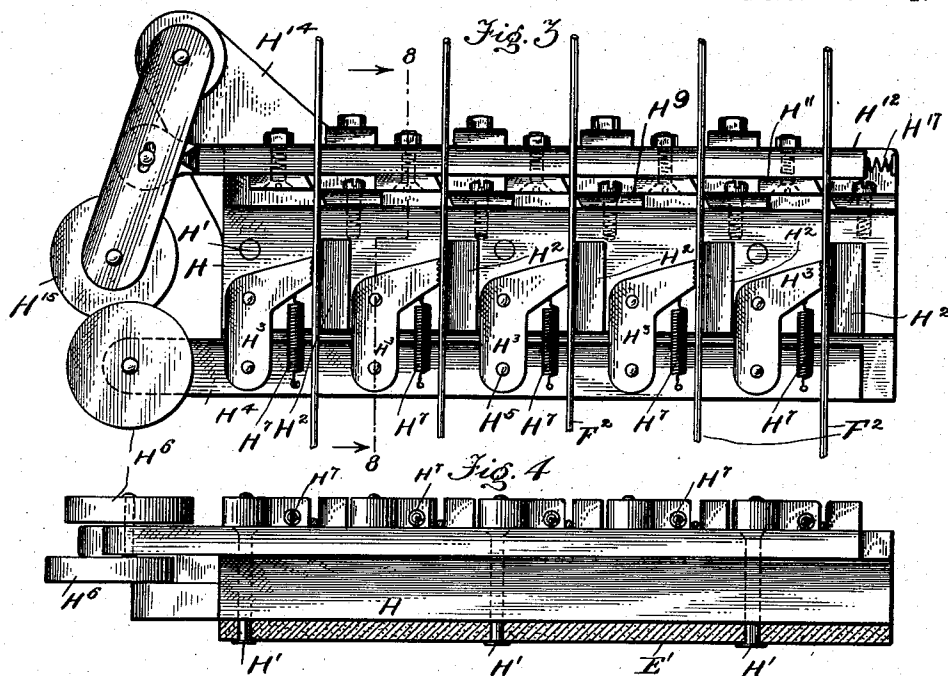
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(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

JOHN W. MILLER, OF JOLIET, ILLINOIS.

WIRE-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 664,963, dated January 1, 1901.

Application filed April 12, 1900. Serial No. 12,535. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. MILLER, a citizen of the United States, residing at Joliet, in the county of Will and State of Illinois, have invented certain new and useful Improvements in Wire-Cutting Machines, of which the following is a specification.

This invention relates to apparatus for cutting wire; and has for its object the production of a machine for automatically cutting from spools of wire pieces of a certain predetermined length.

In the embodiment herein shown of this invention an endless belt is provided at intervals upon its outer face with carriages, each having a gripping mechanism and a cutting mechanism for the wire. The cutting mechanism is cam-actuated, so that when the carriages pass a certain point in the supporting-frame the cutting mechanism will be operated by a cam secured to said frame.

In the accompanying drawings, Figure 1 is a plan view of a cutting-machine embodying the features of my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a plan view of one of the carriages secured to the outer face of the endless belt. Fig. 4 is a front elevation of said carriage. Fig. 5 is a fragmental view of the carriage, showing the wires severed by the cutting-knives. Fig. 6 is a similar view showing the cutting-jaws and the gripping-jaws open to release the wires. Fig. 7 is an end elevation of the carriage, showing the cam-rollers; and Fig. 8 is a transverse vertical section through the carriage on dotted line 8 8 of Fig. 3.

Like letters of reference indicate corresponding parts throughout the several views.

In the construction of this wire-cutting machine I provide a supporting-frame A, having the legs A', the longitudinal top pieces A², the transverse pieces A³, and the cam-supporting piece A⁴. At one end of the supporting-frame I provide the channels A⁵ in the upper faces of the top pieces A².

In bearings B upon the longitudinal top pieces A², I mount the drive-shaft B', carrying the tight and the loose pulleys B² and B³, respectively, and the pinion B⁴, fixed to the shaft B'. I also mount upon said top pieces in the bearings C and D the shafts C' and D', carrying the pulleys C² and D², respectively, which

pulleys are rigidly mounted upon said shafts, the pulley C² having the flange C³ at one side of its face. The gear-wheel C⁴ is fixed upon the shaft C' and meshes with the pinion B⁴ on the drive-shaft B, communicating motion from said drive-shaft to the shaft C'. The bearings D are connected by their integral arms D³ in order that said bearings may always be in perfect alinement, they being adjustably movable lengthwise of the frame A by means of the channels A⁵.

A belt E lies upon the faces of the pulleys C² and D². This belt is made up of several sections of belting material, E' being short pieces of belt upon which are secured the wire gripping and cutting carriages to be later described and the larger sections E² for connecting said sections E' together in an endless belt. Any suitable form of belt-fastener easily detachable may be used in securing the pieces E' and E² together. Three or more gripping and cutting carriages may be employed, the distance between the pulleys C² and D² being adjustable to accord with the length of the endless belt E. The length of the sections E' being constant, the length of wire cut is determined by the length of the connecting-sections E². The belt travels in the direction of the arrow X, Fig. 2, and the gripping-jaws of the carriages upon the lower side of said belt engage the wire, which latter is drawn into the machine, passing from left to right. The idler-roller F, journaled in the frame A, having the spacing-grooves F' at suitable intervals, holds the wires F² upward and properly spaced, so that each strand will find its proper place in the gripping-jaws of each carriage.

A curved cam G is secured to the inner side of the cam-supporting piece A⁴, its purpose being to open the gripping-jaws of the carriages, so that said jaws may be in a position to receive the strands of wire F² entering the machine.

G' is a cam for closing the cutting-jaws to sever the length of wire lying between the two carriages on the lower side of the belt E, and G² is a cam for opening the gripping-jaws to release the lengths of wire severed by the cutting-jaws.

The construction and operation of the gripping and cutting carriages (particularly

shown in Figs. 3, 4, 5, 6, 7, and 8) will now be described. H is the base of one of said carriages, secured by any suitable means, as by the rivets H', to the outer face of the section E' of the belt E. A series of holding-blocks H², in this instance five, are fixed to the face of said base H at suitable intervals to be engaged by the holding-jaws H³, pivotally mounted on pins fixed to said base H.

The movement of the carriages is in the direction indicated by the arrow X, Fig. 2, and it will be seen that the backward pull of the wires F² between the holding-jaws H³ and their blocks H² will cause the jaws H³ to grip said wires tightly. A rod H⁴ is free to slide with relation to the base H, and said rod has a pivotal engagement by means of the pins H⁵ with the rear ends of the gripping-jaws H³. The outer end of this rod H⁴ bears the roller H⁶ for engaging the cam G and releasing the grip of the jaws H³ upon the wires F². Fig. 6 illustrates the position of the holding-jaws H³ when in their releasing position, the roller H⁶ being in contact with the cam G. A coil-spring H⁷ is secured at one end to a pin H⁸ on the sliding rod H⁴ and at its other end to the gripping-jaw H³ near its point of contact with the wire F², the tendency of said spring being to cause the gripping-jaw to engage the wire. Upon the opposite edge of the base H are secured a series of cutting-knives H⁹, one for each gripping-jaw, and consequently for each strand of wire. These knives H⁹ are secured by the screws H¹⁰ to the edge of the base H. Corresponding knives H¹¹ are attached to the knife-bar H¹², which bar is adapted to slide with relation to said base H. An operating-lever H¹³ is pivotally mounted on an arm H¹⁴, extending from the base H, and bears at its outer end the roller H¹⁵, which latter is intended to engage the cam G' to close the cutting-knives and sever the strands of wire F² between them. An elongated opening H¹⁶ intermediate the ends of the operating-lever H¹³ provides a means for making a pivotal connection between the outer end of said operating-lever and the knife-bar H¹², and a spring H¹⁷ holds said cutting-jaws normally open.

In operation five spools of wire, (not shown,) of suitable gage for the purpose intended, are placed in convenient positions to pass the strands of wire composing said spools through an annealing means (not here shown) and, if necessary, through a cooling means and a straightening means (not here shown) to the idler spacing-roller F, where each of said five wires F² assumes a place in one of the spacing-grooves F' of said roller. The ends of the strands F² are then carried forward and placed between the gripping-jaws H³ and the holding-blocks H² of one of the carriages—as, for instance, the carriage designated as “No. 1.” Fig. 2. Power being applied to the machine either by hand or by belt over the pulley B², said carriage holding the ends of the wire strands is moved forward in the direction of the arrow X, Fig. 2. As the second car-

riage (No. 2) mounted upon its section E' of the belt E is brought into a position where the roller H⁶ engages the cam G its holding-jaws H³ are opened and the strands of wire F² enter the space between said jaws and the holding-blocks H². As soon as the carriage has advanced sufficiently for the roller H⁶ to leave the cam G the springs H⁷ draw said holding-jaws into contact with said strands, the backward pull of the wire being sufficient to cause the jaws to engage the strands tightly. As the carriage (No. 2) advances the roller H¹⁵ engages the cam G', causing the knife-bar to be reciprocated and the knives H⁹ and H¹¹ to sever the strands F² between them. At the instant that said strands are so severed the first carriage, (No. 1,) passing in the direction of the arrow X, Fig. 2, reaches a point where the roller H⁶ engages the cam G², releasing the grip of the jaws H³ of said forward carriage (No. 1) upon the forward ends of the wire strands, permitting them to drop downward from the machine. Carriage No. 1 now passes around the pulley D², and carriage No. 2 proceeds in the direction of the arrow X, Fig. 2, drawing a new length of wire after it into the machine. When said carriage No. 2 approaches the rear end of the machine, carriage No. 3 is passing around the pulley C², and the roller H⁶ of the latter carriage engaging the cam G opens its gripping-jaws H³ for the reception of the wire strands F². As said carriage No. 3 proceeds the jaws H³ close upon the strands F², the roller H¹⁵ encounters the cam G', shears the wire strands between the knives H⁹ and H¹¹, and as this occurs the roller H⁶ on carriage No. 2 engages the cam G² and releases the hold of the gripping-jaws H³ on the forward end of the strands previously gripped by the jaws of said carriage No. 2.

When it is desirable to change the length of the strands cut by the machine, the belt E is removed from the pulleys C² and D², the sections E² taken from the belt, and sections of belting of a different length substituted. After the belt E is made up the distance between the pulleys C² and D² is adjusted to accommodate its length by moving the shaft D' and its bearings D backward or forward in the channels A⁵ in the top pieces A² of the supporting-frame A.

It is clear that any number of strands F² may be operated upon in such a machine as the one herein shown and described, it being only necessary to provide carriages having the required number of gripping and cutting jaws.

I claim as my invention—

1. In a wire-cutting machine, in combination, a supporting-frame; two rotatable wheels mounted on said frame; an endless belt for said wheels; a carriage on the outer face of said belt, which carriage is provided with a series of gripping-jaws pivoted with relation to said carriage; a slidable actuating-rod for said gripping-jaws, said jaws having

a pivotal connection with said slidable actuating-rod; a slidable knife-bar; a series of cutting-knives mounted on said bar; a cam on the supporting-frame for sliding the rod to move the gripping-jaws; and a cam for sliding the knife-bar.

2. In a wire-cutting machine, in combination, a supporting-frame; two shafts journaled thereon; a pulley on each of said shafts; an endless belt for said pulleys; a carriage on the outer face of said belt, which carriage is provided with a series of gripping-jaws pivoted with relation to said carriage; a slidable actuating-rod for said gripping-jaws, said jaws having a pivotal connection with said rod; a spring for holding each of said jaws in a gripping position; a slidable knife-bar; a series of cutting-knives mounted on said bar; a series of stationary cutting-knives fixed with relation to the carriage; a cam on the supporting-frame for sliding the rod to move the gripping-jaws; and a cam for sliding the knife-bar.

3. In a wire-cutting machine, in combination, a supporting-frame; two shafts journaled thereon; a pulley on each of said shafts; a belt for said pulleys; three carriages on the outer face of said belt, each of which carriages is provided with a series of gripping-jaws pivoted with relation to said carriage; a slidable actuating-rod for said gripping-jaws, said jaws having a pivotal connection with said rod; a slidable knife-bar mounted on said carriage; a series of cutting-knives mounted on said bar; a series of cutting-knives fixed with relation to said carriage; a cam on the supporting-frame for sliding the rod to move the gripping-jaws; and a cam for sliding the knife-bar.

4. In a wire-cutting machine, in combination, a supporting-frame having a drive-shaft and a driven shaft rotatably mounted thereon; a shaft having an adjustable connection with said frame; a pulley upon said last-mentioned shaft, and a pulley upon said driven shaft; a belt for said pulleys, which belt is composed of several sections joined together at their ends; three carriages secured on the outer face of said belt to certain of said sections, each of which carriages is provided with a series of gripping-jaws pivoted with relation to said carriage; a slidable actuating-rod for said gripping-jaws, which jaws have a pivotal connection with said rod; a slidable knife-bar; a series of cutting-knives

mounted on said bar; a cam on the supporting-frame for sliding the rod to move the gripping-jaws; and a cam for sliding the knife-bar.

5. In a wire-cutting machine, in combination, a supporting-frame; a drive-shaft journaled thereon, having a pinion fixed on said shaft; a driven shaft having a gear-wheel meshing with said pinion; a shaft mounted on said frame, adjustably movable with relation to said driven shaft; a pulley on the driven shaft, and a pulley on said adjustably-movable shaft; a belt for said pulleys, which belt is composed of several sections fastened together at their ends; a carriage on each of three of said sections, which carriage is provided with a series of gripping-jaws pivoted with relation to said carriage; a slidable actuating-rod for said gripping-jaws, said jaws having a pivotal connection with said rod; a spring for holding each of said jaws in a gripping position; a slidable knife-bar; a series of cutting-knives mounted on said bar; a series of stationary cutting-knives fixed with relation to the carriage; a cam on the supporting frame for sliding the rod to move the gripping-jaws; and a cam for sliding the knife-bar.

6. In a wire-cutting machine, in combination, a supporting-frame; two shafts journaled thereon; a pulley on each of said shafts; an endless belt for said pulleys; a carriage on the outer face of said belt, which carriage is provided with a series of holding-blocks; a series of gripping-jaws pivoted with relation to said carriage; a slidable actuating-rod for said gripping-jaws, said jaws having a pivotal connection with said rod; a spring extending between a point on said actuating-rod and each of said gripping-jaws; a roller mounted at the outer end of said actuating-rod; a slidable knife-bar; a series of cutting-knives mounted on said bar; a series of stationary cutting-knives fixed with relation to the carriage; an operating-lever pivotally mounted with relation to said carriage, and having a connection with said knife-bar; a roller on said operating-lever; and two cams on the supporting-frame for engaging the roller on the actuating-rod and the roller on the operating-lever, respectively.

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Witnesses:

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