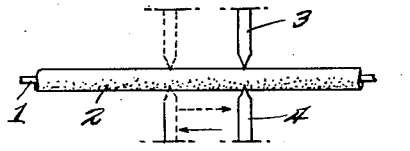
Oct. 10, 1933. R. M. ZIMBER 1,930,219

CLEANING AND SCRAPING METHOD AND APPARATUS

Filed Jan. 9, 1930

Fig. 1.



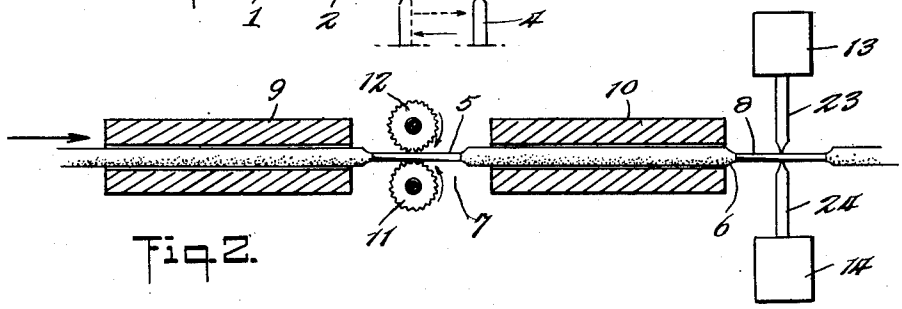


Fig. 2.

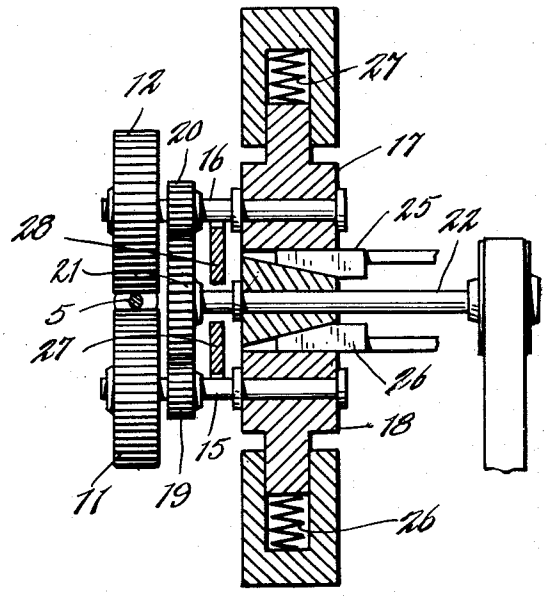
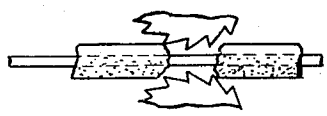


Fig. 3.

Fig. 4.



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CLEANING AND SCRAPING METHOD AND APPARATUS

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11 Claims. (Cl. 29—33)

This invention relates to cleaning and scraping methods and with particularity to methods and means for cleaning and scraping wires or similar articles.

A principal object of the invention is to provide a method of removing a coating from a coated wire filament, strip, or band at predetermined points throughout the length thereof.

In one known type of electron discharge device a coated filament is employed as a source of electrons. This filament usually consists of a metal wire coated in any suitable manner with electron emissive substance. In order that proper electrical contact may be made with the filament it is necessary that certain parts thereof be scraped and cleaned of the emissive coating in order to enable a lead-in wire to be welded or otherwise electrically united to the uncoated portions of the filament.

Accordingly it is another object of the invention to provide methods and means for removing a coating from an electron emissive filament.

A feature of the invention relates to the means for scraping or cleaning a coated wire by employing a rotary scraper or milling device.

A further feature relates to the means for scraping and cutting an electron emissive filament suitable for use in electron discharge devices.

Other features and advantages of the invention not specifically enumerated will be apparent after a consideration of the following detail descriptions and the appended claims.

While the invention will be described as applied to a machine for scraping or cleaning filaments of round cross section such as ordinarily employed in electron discharge devices, it will be understood that the invention is not limited thereto. The methods and means disclosed are capable of application to any type of coated material whether the same be in strip, band or sheet formation.

Referring to the drawing;

Fig. 1 illustrates a conventional method of scraping or cleaning a coated surface according to the prior art;

Fig. 2 illustrates schematically a portion of the machine according to the invention;

Fig. 3 is another view of a portion of the machine shown in Fig. 2;

Fig. 4 illustrates schematically the manner in which the coating is chipped from the filament according to the invention.

Referring more particularly to Fig. 1 there is represented schematically the usual method of cleaning or scraping coated filaments for use in electron discharge devices. In this figure the numeral 1 represents the filament material proper in the form of a wire which is provided with an electron emissive coating 2. When it is desired to remove the coating 2 from the wire 1 at the desired points, a pair of scraper jaws 3 and 4 are moved perpendicular to the wire 1 and are then oscillated back and forth along the wire as indicated by the dotted lines to effect a scraping away of the coating 2. It has been found that this method of removing the coating from the filament has serious disadvantages not the least of which is that the jaws 3 and 4 must be extremely accurately gauged to the thickness of the wire 1 in order that they may not nick or cut into the wire during the scraping process. Furthermore, since the coating 2 is removed by a scraping movement parallel to the wire 1, there is a tendency for the coating to clog between the jaws 3 and 4 and interfere with the proper feeding of the wire through the machine. In addition, in order to prevent cutting of the wire 1 the wire must be maintained under considerable tension in order to preserve its axis parallel to the path of movement of the scraper jaws 3 and 4. Otherwise the wire will be unequally scraped on opposite sides and may even be broken during the scraping action.

There is shown in Figs. 2 and 3 a mechanism whereby the above disadvantages are overcome, and whereby the removing of coating from the filament proper may be effected most efficiently and expeditiously.

Referring to Figs. 2 and 3, the numeral 5 represents a metal filament of nickel, tungsten, iron or other material such as ordinarily employed for filaments of electron discharge devices. As indicated by the numeral 6, the wire 5 is provided with a coating of appreciable thickness; this coating in the case of filaments for electron discharge devices taking the form of an electron emissive substance. In order that the proper electrical connection may be made to the filament when positioned within the electron discharge device, it is necessary to remove the coating 6 at the proper points as indicated by the numerals 7 and 8.

By means of suitable mechanism (not shown) the coated filament is fed through a pair of guides 9 and 10, and between the cleaning members 11 and 12 and the cutting mechanism represented schematically by the numerals 13 and 14. The members 11 and 12 for effecting the cleaning or scraping away of the coating are preferably in the form of milling wheels which are

mounted on respective spindles 15 and 16, which spindles are provided with suitable bearings in members 17 and 18. Attached to the spindles 15 and 16 respectively, are spur gears 19 and 20 which mesh with a gear 21 affixed to shaft 22 which is preferably constantly driven at the required speed from a suitable motive source not shown. By means of any suitable feeding device the coated filament may be advanced either in a step-by-step manner, or preferably in a continuous manner through the guides 9 and 10, and at properly timed intervals the mill wheels 11, 12 and the cutting jaws 23, 24 are brought into engagement with the wire. To effect the removal of the coating 6 at the proper points throughout the length of the filament the mill wheels 11 and 12 are normally spaced away from the moving filament by means of the wedges 25 and 26 which force the spindles 15 and 16 laterally away from filament 5 against the tension of associated springs 26 and 27. At the proper points in the travel of the coated film the wedges 25 and 26 are moved towards the right under control of suitable cams (not shown) whereby the gears 19 and 20 are brought into engagement with the continuously rotating gear 21. The inward movement of the gears 19 and 20 is limited by suitable stops 27 and 28 which are preferably adjustable so that when the spindles 15 and 16 engage said stops the teeth of the wheels 11 and 12 are in the right relation with respect to the wire 5 as shown in Fig. 3. Consequently as the wheels 11 and 12 rotate they remove the coating 6 mainly by a chipping action, as illustrated schematically in Fig. 4. As a result of this method of removal of the coating it is not necessary that the wheels 11 and 12 be in contact with the wire 5 as is necessary with the arrangement disclosed in Fig. 1. Consequently there is less likelihood of the wire 5 being damaged during the cleaning operation.

As indicated in connection with Fig. 2, the wheels 11 and 12 are preferably, although not necessarily, rotated in opposite directions to the feeding movement of the wire 5. Furthermore, while only one set of wheels is shown in Fig. 2 for cleaning opposite sides of the wire 5, it will be understood that an additional pair of wheels may be provided for cleaning other sides of the wire.

By means of suitable mechanism, represented schematically by the numerals 13 and 14, the cutting jaws 23 and 24 are reciprocated and brought into engagement with the cleaned portion 8 of the filament and effect a severing thereof into the proper lengths. Inasmuch as any suitable means for effecting this reciprocating movement of the jaws 23 and 24 may be employed, further description thereof is not deemed necessary beyond stating that the movement of said jaws is in timed relation with respect to the feeding of the wire 5 through the guides 9 and 10, and preferably in synchronism with the reciprocation of wheels 11 and 12.

As a result of the foregoing method of removing the coating from the filament by using rotating mill wheels 11 and 12, the wire 5 may be advanced in a continuous movement without interfering with the proper removal of the coating. Furthermore, it is not necessary to maintain the wire 5 under any considerable tension in order to effect this proper removal, since the wheels 11 and 12 may be separated a greater distance than the thickness of the wire 5, as hereinabove described.

While Figs. 2 and 3 illustrate one manner of mechanism for effecting the lateral movement of the mill wheels, it will be understood that this showing is merely illustrative and that any other well known manner of effecting the reciprocating movement of the wheels 11 and 12 and of the jaws 23 and 24 may be employed without departing from the spirit and scope of the invention.

What is claimed is:

1. In the art of manufacturing electron emissive devices the method of removing a coating from a strip-like member which comprises moving said member without affecting the surface thereof past a cleaning device and moving said cleaning device in a circular path with respect to said member to clip said coating from said member at regularly recurrent intervals.

2. In the art of manufacturing electron emissive devices the method of removing an electron emissive coating from a strip-like member without affecting the surface thereof which comprises feeding said member in a continuous motion past a cleaning point, and rotating a cleaning device in the opposite direction to the feeding movement of said member.

3. In the art of manufacturing electron emissive devices the method of removing a coating from a filamentary-like member which comprises feeding said member without affecting the surface thereof between a pair of rotary cleaning devices and at regularly recurrent intervals moving said device into engagement with said coating.

4. The method of removing an electron emissive coating from a filament which comprises subjecting said coating to a rotary chipping operation without affecting the surface of said filament.

5. In the manufacture of electron emissive filaments the method which comprises feeding the filament through a guide block and at regularly recurrent intervals moving a rotary cleaning device and a cutting jaw into engagement with said filament to remove the electron emissive coating from said filament without affecting the surface of said filament.

6. In a machine of the character described for removing a coating from a strip-like member, a rotatable member for removing said coating, and means for moving said member into engagement with said coating at regularly recurrent intervals to remove the coating from said member without affecting the surface thereof.

7. In a machine for removing an electron emissive coating from a strip-like member, a pair of rotary members for removing said coating without affecting the surface of said member, means for automatically bringing said members into engagement with said coating at regularly recurrent intervals, means for cutting said strip-like member, and means for operating said cutting means only when the uncoated part of said strip-like member is in registry therewith.

8. In a machine for removing an electron emissive coating from a strip-like member, a rotary device for removing said coating, means for moving said member in a continuous motion past said device, means for rotating said device in a direction opposite to the movement of said member, cutting means for said strip-like member, and means for operating said cutting means in timed relation to said means for removing the coating to cut said strip-like member only at the uncoated portions thereof.

9. In a machine for removing an electron emis-

sive coating from a coated filament, a pair of rotary members for removing said coating without affecting the surface of said filament, said members being normally out of contact with said filament, means for moving said members into contact with said coating at regularly recurrent intervals, cutting means, and means for operating said cutting means in timed relation to said rotary members to effect a cutting of said filament only at the uncoated portions thereof.

10. In a machine for removing an electron emissive coating from a coated filament, means for removing said coating at regularly recurrent points in the lengths of said said filament, comprising a rotary scraper, means for bringing said scraper into engagement only with said coating at said predetermined points, cutting means for said filament, and means for operating said cutting means in timed relation to said scraper means to effect a cutting of the filament only at the uncoated portions thereof.

11. In a machine for removing an electron emissive coating from a coated filament, a rotary member for removing said coating without affecting the surface of said filament, means for cutting said filament to length, and means for moving said rotary member and said cutting means into engagement with said filament at regularly recurrent intervals, and in timed relation to each other to effect a cutting of the filament only at the uncoated portions thereof.

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