Feb. 9, 1937. A. M. GRIFFITH 2,070,165

FILAMENT SECTION FEEDING MACHINE

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Fig. 1.

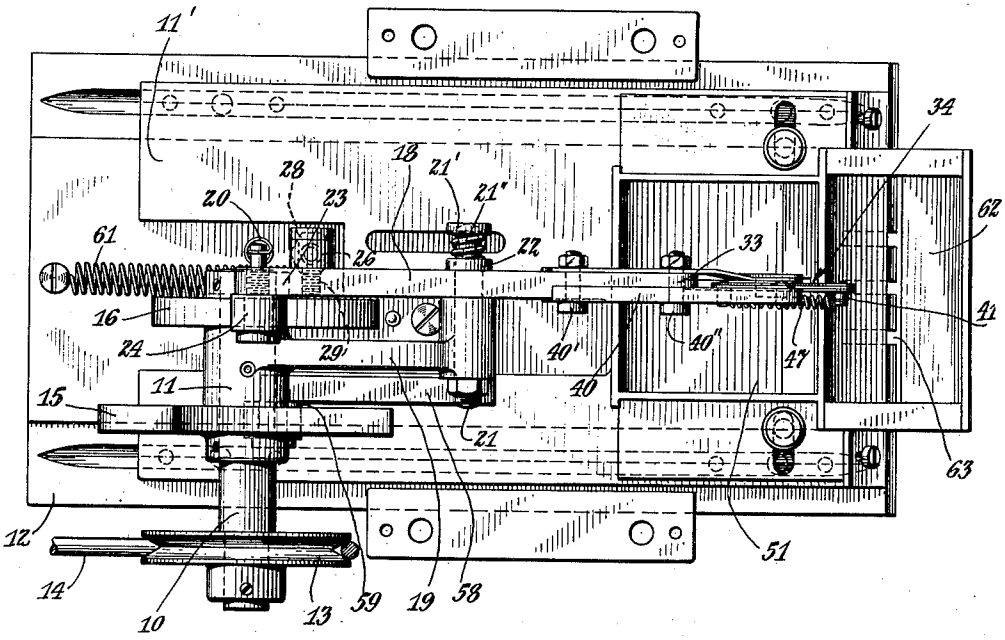
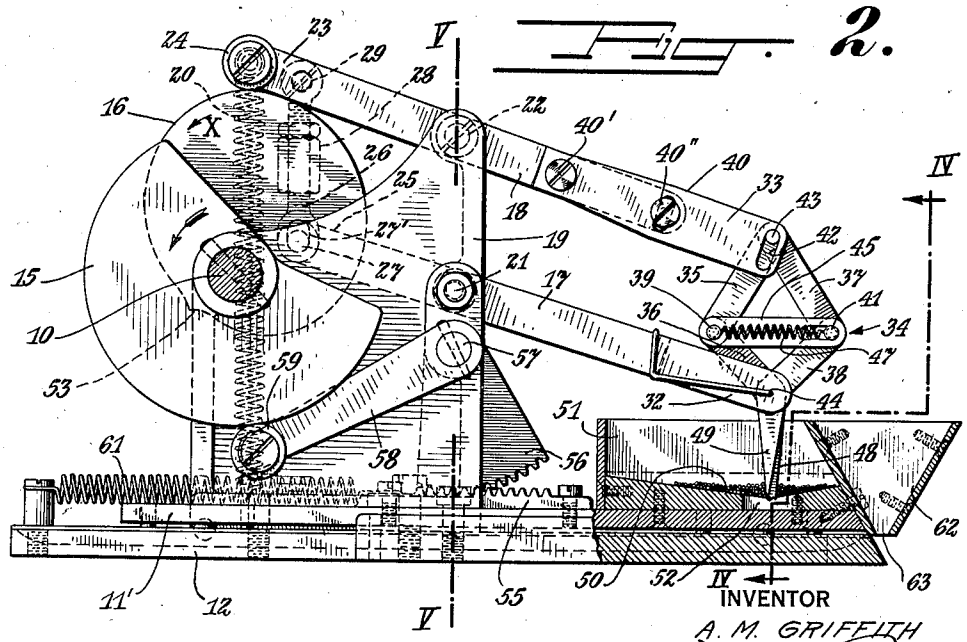



Fig. 2.




INVENTOR
A. M. GRIFFITH
BY M. F. Reges
ATTORNEY

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Fig. 3.

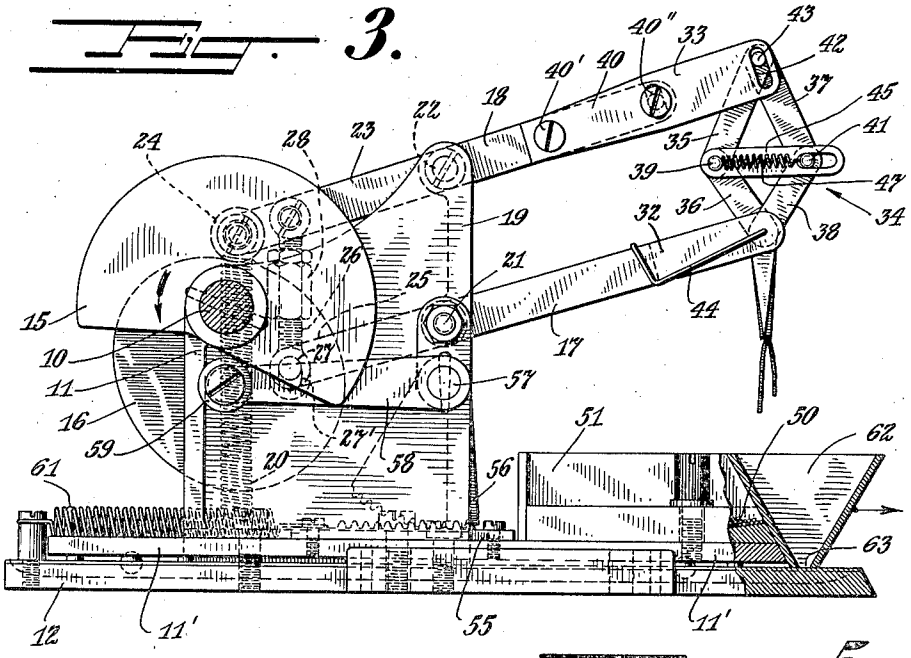



Fig. 5.

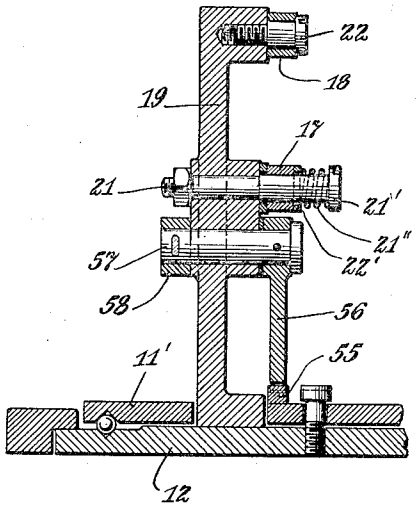
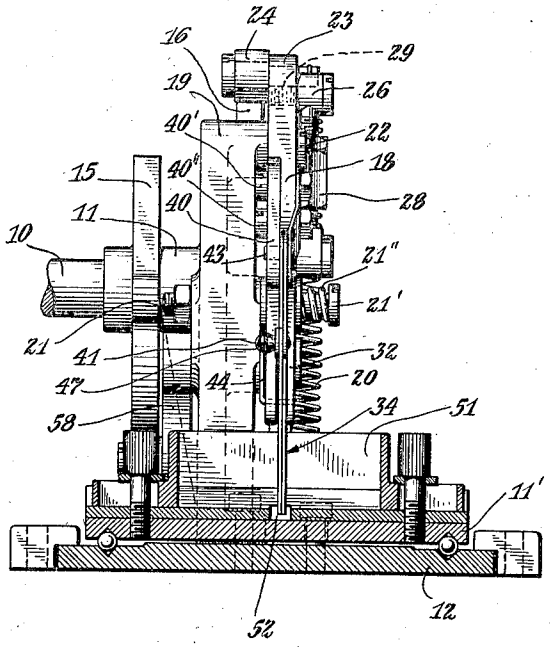



Fig. 4.




INVENTOR
A. M. GRIFFITH
BY M. F. Reyes
ATTORNEY

Feb. 9, 1937. A. M. GRIFFITH 2,070,165

FILAMENT SECTION FEEDING MACHINE

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Fig. 6.

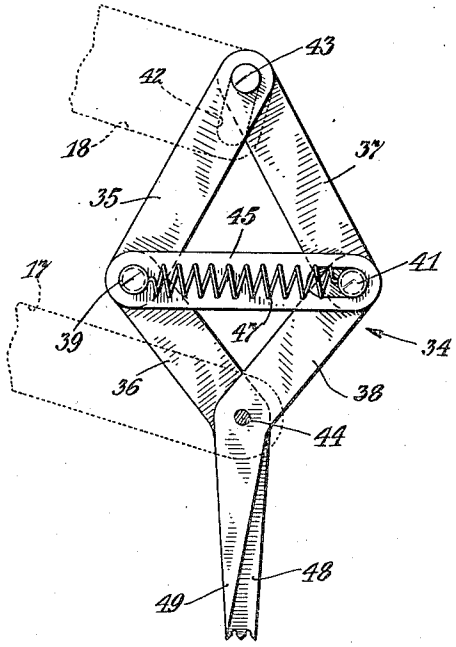



Fig. 7.

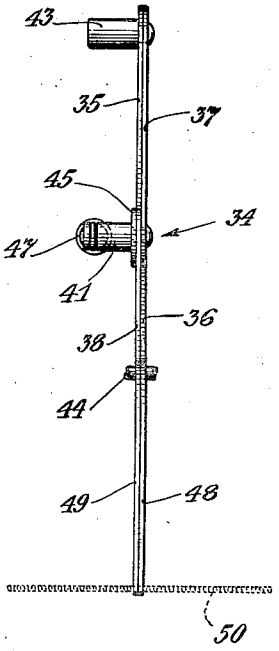



Fig. 8.

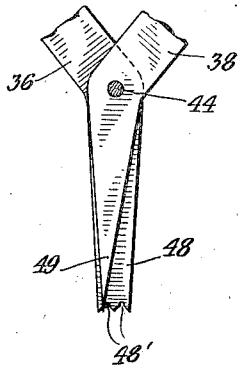



Fig. 9.

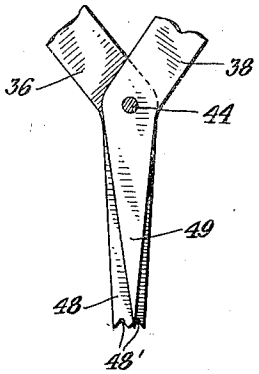
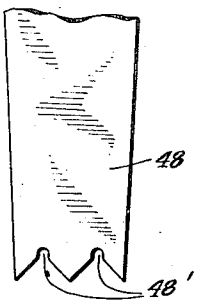



Fig. 10.




INVENTOR
A. M. GRIFFITH
BY M. F. Reger
ATTORNEY

Patented Feb. 9, 1937

2,070,165

# UNITED STATES PATENT OFFICE

2,070,165

## FILAMENT SECTION FEEDING MACHINE

Arthur M. Griffith, West Caldwell, N. J., assignor, by mesne assignments, to Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania

Application March 28, 1934, Serial No. 717,704

9 Claims. (Cl. 140—132)

This invention relates to a device for feeding coiled filamentary sections and relates more particularly to a machine for securing and removing a single coil filamentary section from a group of such sections.

In the manufacture of incandescent electric lamps it has been found desirable to provide helically coiled filaments of given lengths which filaments are mounted on suitable supports and in a finished lamp constitute the light source. In the manufacture of helical filamentary wire, machines are provided which form the wire into the proper dimensioned helical coil which issues from the machine continuously and is cut into sections of suitable length depending upon the rating of the lamp in which the sections are to be used. For example, Patent 1,670,499 shows a machine in which the coiled filamentary wire is cut into sections of a definite length. It will be understood that lamp filaments are of extremely small diameter and are very difficult to handle; as for example, when it is necessary to feed the filamentary sections individually to a machine which mounts the filaments on the stem or internal structure of the lamp.

In Patent 1,905,046 a machine is shown in which a pair of blades are operated to provide what may be termed a "pick-up" mechanism which structure shows a pair of blades which are operated on the scissor principle and which are thrust into a group of coils and closed so as to trip a coil between the edges of the blades. A movable discharge chute is employed into which the filamentary sections are released.

Although the mechanism as disclosed in the above mentioned patent has operated satisfactorily, certain disadvantages attended such operation mainly in connection with the pick-up since it was necessary to thrust the blades relatively deeply within the group of coils in order to secure a coil. A certain percentage of misses occurred and it is an object of the present invention to improve the pick-up mechanism and further to improve the method of discharging a selected coiled section.

In addition to certain novel improvements in the arrangement and construction of the present machine, the coil pick-up mechanism consists of a pair of blades one of which is provided with a plurality of notches so that when the blade is thrust into a group of coiled sections arranged in parallel relation, a coiled section will enter one or all of the notches. Cooperating with the blade having the notches is another retainer or holding blade which moves to engage a coil in a notch to hold it in position whereupon the mechanism is released and the coil discharged into a suitable discharge guide or chute.

Various other objects and advantages will be evident from the following description taken with the accompanying drawings in which

Fig. 1 is a plan view of a machine constructed in accordance with the present invention;

Fig. 2 is a side elevational view of the machine partly in section to show the hopper for holding the coiled sections;

Fig. 3 is a side elevational view similar to Fig. 2 which shows the operating elements in a raised position to lift the coiled section;

Fig. 4 is a view taken on line IV—IV in Fig. 2;

Fig. 5 is a view taken on line V—V in Fig. 2;

Fig. 6 is an enlarged fragmentary side view showing the blades of the coil pick-up;

Fig. 7 is an end view of the pick-up device shown in Fig. 6 and showing a coiled section in dotted lines;

Fig. 8 is a fragmentary detailed view of the coil pick-up blades showing the retainer blade in position to hold a coil in the first notch;

Fig. 9 is a view similar to Fig. 8 but shows the blade holding a coil in the second notch and

Fig. 10 is an enlarged fragmentary view of the notched blades.

The selected embodiment of the invention may comprise a main driving shaft 10 journaled in a bearing 11 secured to a carriage 11' on a bed plate 12. One end of the shaft 10 is provided with a pulley 13 and a belt 14 leading to any suitable source of power as for example a motor, not shown.

Mounted on the shaft 10 and at one side of the bearing 11 is a cam member 15 and at the opposite side of the bearing and also mounted on the shaft 10 is a cam member 16. The cam member 16 serves to actuate a pair of rocker arms or bars 17 and 18 pivoted on a bearing bracket 19 by means of pins 21 and 22 respectively. The pin 21 is provided with a collar 21' (see Fig. 5) and a spring 21'' which engages a friction washer 22'. Thus the rocker arm or bar 17 rocks about its pivot in opposition to friction and has a delayed action with respect to the bar 18, the purpose of which will be more fully explained.

One end 23 of the bar 18 is provided with a rocker 24 which traverses the surface of the cam 16 and is held against the cam by a spring 20. An end 25 of the bar 17 is provided with a link 26 pivotally connected with the said bar by means of a pin 27 disposed in a slot 27'. The

link 26 is provided with a turnbuckle 28 and pivotally connected to the end 23 of the bar 18 at 29.

The bars 17 and 18 may be adjusted as to their parallel relation by means of the nut of the turnbuckle 28 which is provided with locking means in the form of a lock nut to retain the desired space relation of the bars. The opposite or free ends 32 and 33 of the bars 17 and 18 respectively are connected by a double toggle mechanism 34 comprising links 35 and 36 and links 37 and 38. The links 35 and 36 are pivotally connected at 39 and the links 37 and 38 are pivotally connected by pin 41.

The end 33 of the bar 18 is provided with a slot 42 in which a pin 43 is slidable which pin connects the links 35 and 37. The end 33 of the bar 18 is in the form of an extension piece 40 held by a top bolt 40' and a pin 40'' disposed in a slot so that the extension or end of the bar 18 may be adjusted to adjust the action of the double toggle 34. The end 32 of the bar 17 is provided with a shaft 44 in the form of a tensionally held spring member and upon which the lower ends of the links 36 and 38 are pivoted. A guide link 45 having one end slotted to receive the pin 41 is provided across the toggles and a spring 47 connects the central pivots 39 and 41 of the toggle device causing them to move toward each other thus tending to close blades 48 and 49. Blade 48 is integral with link 36 and blade 49 is integral with the link 38. Thus an actuation of the toggle operates to open or close the blades.

The blades 48 and 49 are, as more clearly shown in Figs. 6 to 10, so constructed that when thrust into a pile of coiled filamentary sections either a single section or a plurality of sections 50 are adjusted to be picked up. That is, instead of depending upon the scissors action of a pair of blades one of the present blades adjusts one or more sections to be picked up and the other blade cooperates by providing the blade 48 with notches 48' across which the end of blade 49 is moved. As clearly shown in the drawings and particularly in Figs. 8 and 9, the blade 49 is moved to cause the free end thereof to travel across the notches 48'. Since the blade 49 is hinged at 44 a movement of the link 38 will cause the blade or member to move substantially transversely or laterally across the notch or notches if no coiled section is positioned in a notch. When the blades are thrust into a pile of filament sections 50 the notches 48' receive the sections and if the first notch contains a section the blade moves to engage it and hold it in the notch. If no section is in the first notch the blade 49 will engage a section in the next notch. The chances of a miss are, therefore, reduced to a minimum. It is obvious that more than the two notches shown may be used but it has been found in practice that with the two notches provided the percentage of failure in picking up a section is negligible.

It will be noted that the coiled sections 50 are disposed in a hopper 51 having bottom surfaces inclined toward an aperture or slot 52 across which the coils are disposed so that when the blades enter the coils they are not opposed by a resisting surface and the coils are not crushed.

The double toggle device including the blades which may be termed a pick-up mechanism may be raised and lowered during which movement the various elements operate to actuate the blades in the following manner:

Assuming that the blades have been moved into a pile of coiled sections 50 as shown in Fig. 2, the blade 48 is in contact with the sections and a section is in a notch 48'. The notches may be considered as coil-positioning means and the blade 49 may be considered as the holding means. When the blades enter the coils the blade 49 is disposed at one side of the notches. The cam 16 has raised the end 23 of the bar 18 so that the pin 43 is at the upper end of the slot 42 by reason of the action of the spring 47. Thus the blades are open.

The cam 16 moves in the direction of the arrow X and, as the end 23 of the bar 18 is released, the spring moves it downwardly and the end 33 moves upwardly and away from the pin 43. The pin 43 is thus free and the spring 47 operates to close the blades and grip a coiled section. It will be understood that the only force applied to the coiled section is that provided by the spring 47 so that this spring may be made as delicate as is necessary to give just the right amount of pressure to lift a coiled section without danger of distortion.

The cam 16 may continue to move to raise the pick-up mechanisms but during the initial movement of the bar 18 the bar 17, by reason of the slot 27' and the friction bearing or pivot 21, does not move thus allowing for the change in the space relation between the ends of the bars and permitting the pin 43 to have relative movement for the operation of the blades. As the cam rotates, the pin 27 reaches the end of the slot 27' and the end 32 of the bar 17 moves upwardly with the bar 18 and the pick-up mechanism is raised carrying a coiled-section ready for deposit in another machine or in a hopper operated in a manner to be presently described.

The coil thus held suspended is released when the cam 16 moves to bring a lift portion beneath the end 23 which lift operates to cause the end 33 of the bar 18 to move the pin 43 and thus actuate the toggles in opposition to the action of the spring 47 and open the blades thereby releasing the suspended coiled section.

In accordance with the present construction a hopper is mounted on a carriage 11'. This carriage travels in a ball race and is provided with a rack 55 in mesh with a gear segment 56 secured to one end of a stub shaft 57 journaled in the bracket 19. The other end of the shaft has secured thereto a crank 58 provided with a roller or cam follower 59 which traverses the surface of cam 15. A helical spring 61 has one end of a stub shaft 57 journaled in the bracket 19. The other end of the shaft has secured thereto a crank 58 provided with a roller or cam follower 59 which traverses the surface of cam 15. A helical spring 61 having one end secured to the bed plate and the other end secured to the carriage tends to pull the latter rearward. When the cam 15 rotates it operates the crank 58 which in turn rocks the segment 56 and, by means of the rack 55, the carriage is moved forward.

At the front end of the carriage is mounted the hopper 51 and a guide chute 62. This chute has inclined walls and is so arranged that when the carriage is moved to its rearward position the outlet 63 of the chute is closed by the upper surface of the bed plate and the chute is disposed beneath the pick-up blades which at that time

are in their elevated position ready to drop a coiled section.

When the coiled section falls it is received by the chute and rests on the surface of the bed plate. When the carriage moves forward the chute moves the coil off the edge of the bed plate from which it drops into another machine or onto a carrier for transportation to a machine to be mounted in a lamp.

The cam 55 is so formed and arranged that during the pick-up operation the hopper 51 is disposed beneath the pick-up blades and when the blades are elevated the crank arm 53 is released permitting the spring 61 to return the carriage and dispose the chute beneath an elevated coiled section.

The coiled filamentary sections handled by the present machine are of fine hair-like proportions and the degree of the movement of the gripping blades is, obviously, very small. The filamentary sections are, of course, very light in weight and only a very slight compressive force is necessary to grip them in order that they may be lifted.

The present construction provides a means whereby a blade is thrust into the coils so that one or more of the coils are disposed in the notches of a blade. The movable or holding blade is moved under the action of a very light spring; that is, the spring may be made of such tension that the gripping action will take place without any detrimental force being applied to the coil. When the pick-up members are thrust into a pile of coils, the coils will, naturally, spread apart but, by reason of the inclined walls of the hopper, they have a tendency to accumulate and lie in the path of movement of the notches in the pick-up blade.

This notched blade acts as a separator element and, as above mentioned, a coil may be disposed in each notch but only the first coil engaged by the retainer blade will be picked up. When a coil is lifted and dropped into the guide chute, it falls upon the surface of the bed plate which temporarily closes the guide chute and, by reason of the formation of the coil, it will immediately straighten out when it is disposed upon a flat surface and as the guide chute moves, it is readily carried across the bed plate and over the edge for deposit in other mechanism to be mounted for use in a lamp.

Although a preferred embodiment of the invention is shown and described herein it is to be understood that modifications may be made therein without departing from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. A device for picking up coiled filamentary sections comprising a notched member and a member movable transversely across said notch when the notch is empty and operable to press a coil against the surface of said notch when a section is positioned therein to secure said section and means for lifting said members.

2. A device for picking up coiled filamentary sections comprising a notched member and a member movable transversely across said notch in the absence of a section, and operable when a section is in a notch to press the same against the surface of said notch to secure said section, means for lifting said members and means for separating said members to release said section.

3. A device for picking up coiled filamentary sections comprising two pivoted members, one of said members having a notch to receive a filamentary section, the other member being movable transversely to engage and hold a coil when in said notch, said members being movable across said notch in the absence of a coil and means for lifting said members to pick up a coiled section engaged by said member.

4. A device for picking up coiled filamentary sections comprising a pair of members, a common pivot point for said members, one of said members having a notch to receive a coiled section, means for causing a relative oscillatory movement of at least one of said members across said notch in the absence of a section and operable to secure a coiled section when positioned in a notch and means for lifting said members.

5. A device for picking up cylindrical articles comprising a plate having a notch, a member movable transversely across said notch, means for moving said plate into a plurality of articles to dispose an article in said notch, means for moving said member to secure said article in said notch and means for lifting said member and plate to remove said secured article from the remaining articles.

6. A pick-up device for coiled filamentary sections comprising a movable hopper for holding a plurality of coiled sections, a pair of coil gripper members, means for raising said members, means for moving said hopper beneath said members, means for actuating said members to remove a coiled section from said hopper, means for removing said hopper from beneath said members and means for actuating said members to release a coiled section.

7. A pick-up device for coiled filamentary sections comprising a movable hopper for holding a plurality of coiled sections, a pair of coil gripper members, means for raising said members, means for moving said hopper beneath said members, means for actuating said members to remove a coiled section from said hopper, a receptacle, means for substituting said receptacle for said hopper and means for actuating said members to release a coil for deposit in said receptacle.

8. A machine of the class described comprising a hopper for a plurality of coiled filamentary sections, a pair of pivoted members, one of said members having a notch, the other member movable across said notch, a hopper for a plurality of coiled filamentary sections, means for moving said members to position a coiled section in said notch, means for causing a relative movement of said members to secure said positioned section, means for lifting said members and means for moving said hopper relative to said members.

9. A machine of the class described comprising a hopper for a plurality of coiled filamentary sections, a pair of pivoted members, one of said members having a notch, the other member movable across said notch, a hopper for a plurality of coiled filamentary sections, means for moving said members to position a coiled section in said notch, means for causing a relative movement of said members to secure said positioned section, means for lifting said members, means for moving said hopper relative to said members and means for moving a receptacle to receive said lifted coil and means for releasing said coil.

ARTHUR M. GRIFFITH.