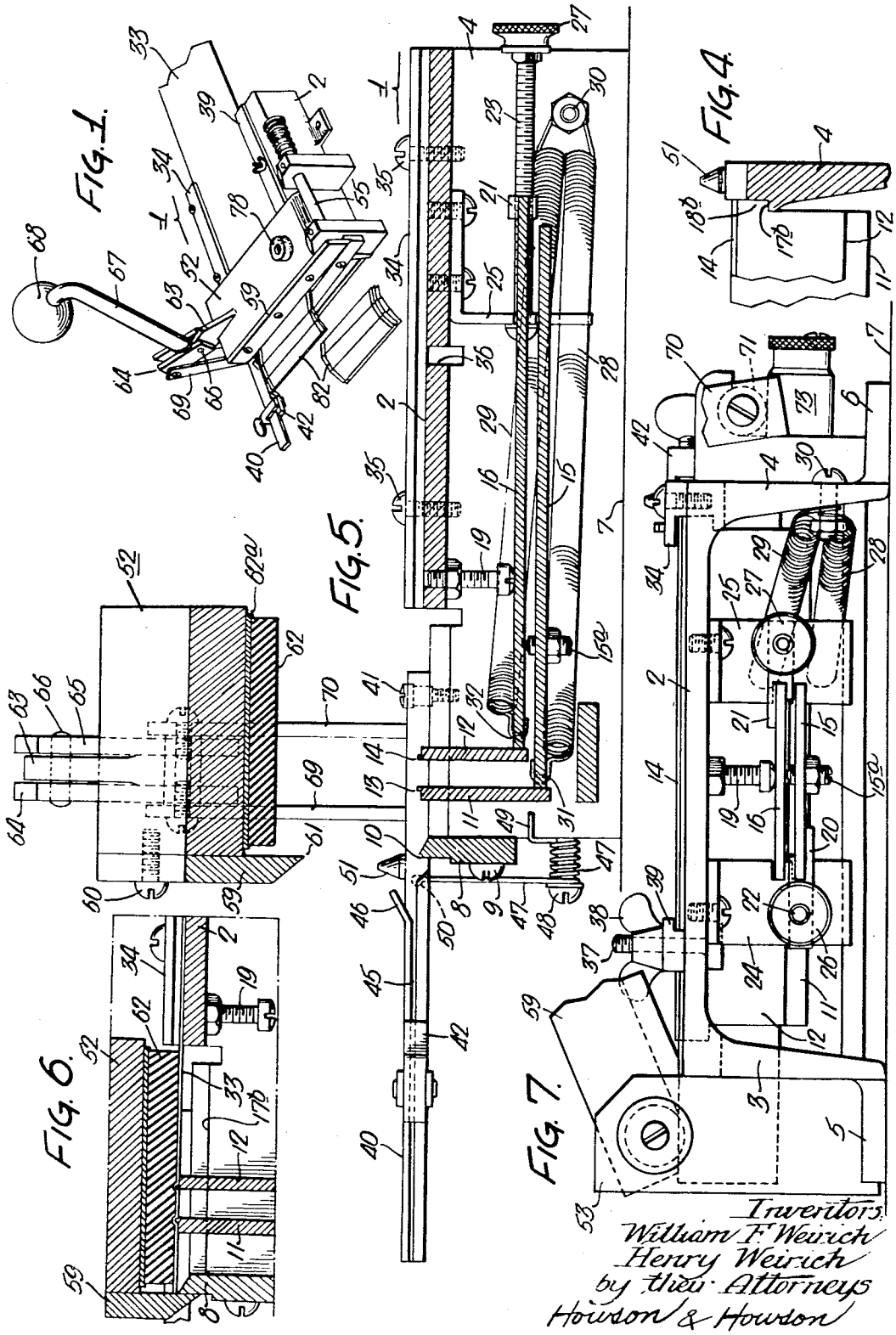
April 10, 1956 W. F. WEIRICH ET AL 2,741,166

DEVICE FOR CUTTING AND FORMING SLOT INSULATION MATERIALS

Original Filed May 18, 1950 3 Sheets-Sheet 1



Inventors
William F. Weirich
Henry Weirich
by their Attorneys
Howson & Howson

April 10, 1956 W. F. WEIRICH ET AL 2,741,166

DEVICE FOR CUTTING AND FORMING SLOT INSULATION MATERIALS

Original Filed May 18, 1950 3 Sheets-Sheet 2

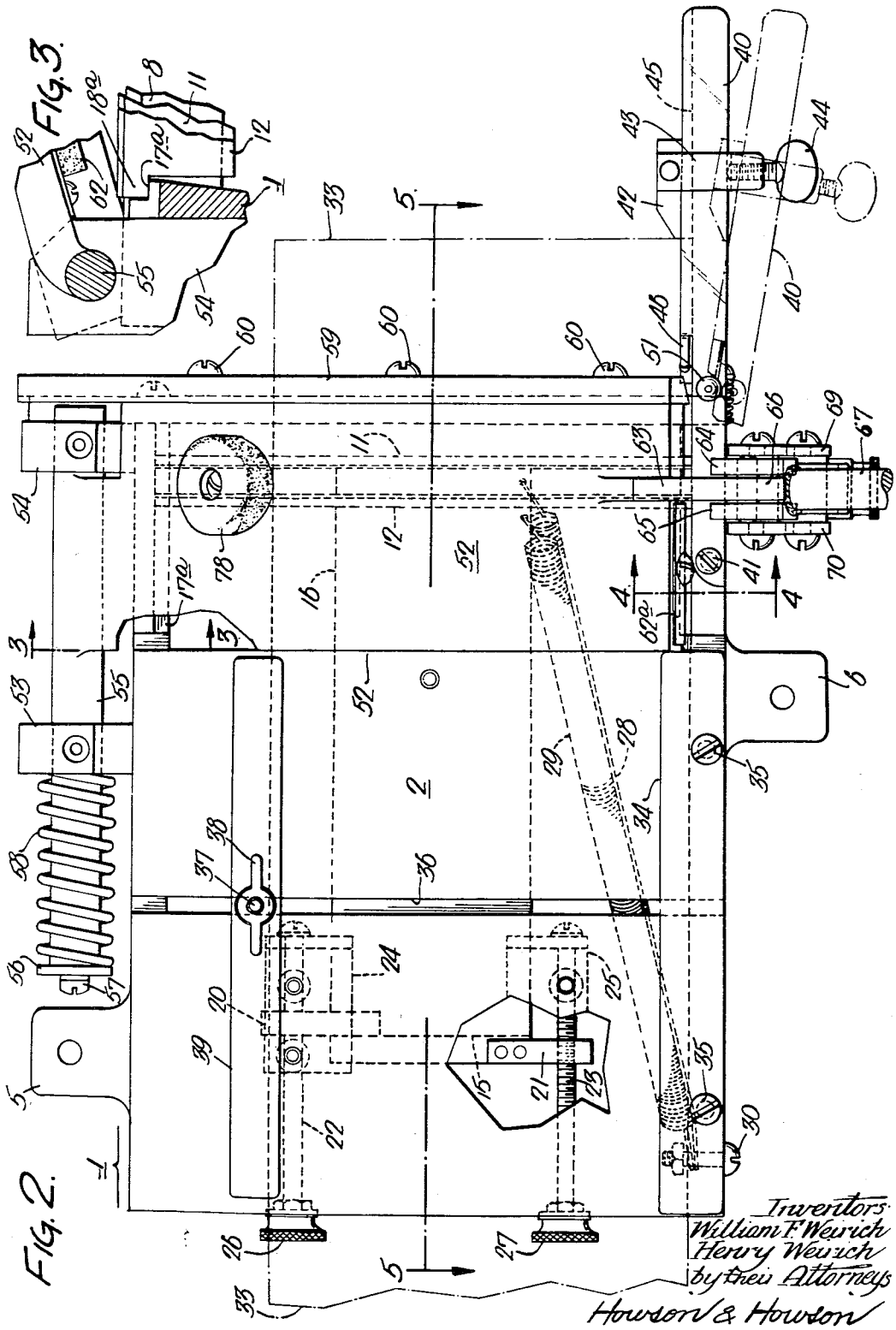


FIG. 3.

FIG. 2.

Inventors
William F. Weirich
Henry Weirich
by their Attorneys
Howson & Howson

April 10, 1956 W. F. WEIRICH ET AL 2,741,166

DEVICE FOR CUTTING AND FORMING SLOT INSULATION MATERIALS

Original Filed May 18, 1950 3 Sheets-Sheet 3

FIG. 9.

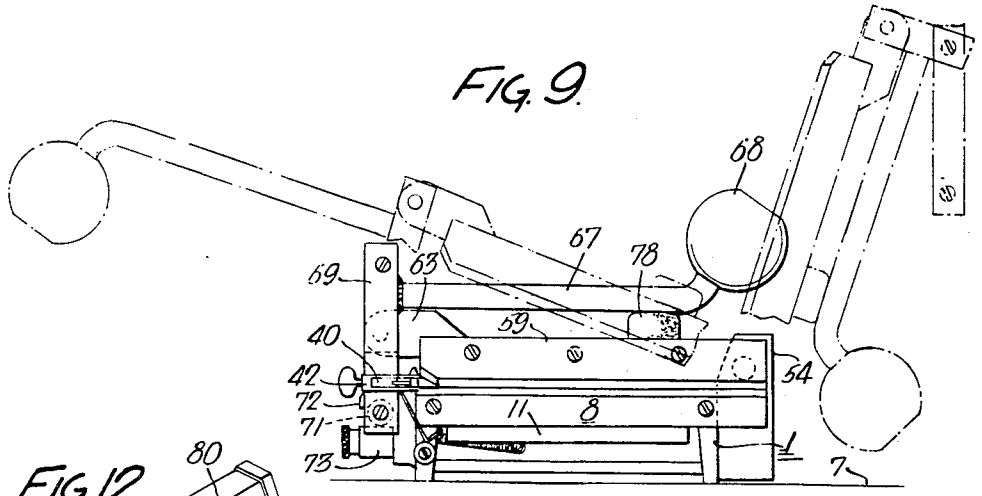


FIG. 12.

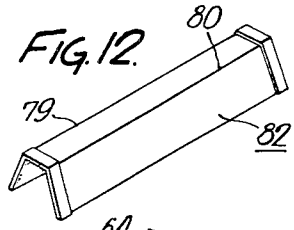


FIG. 11.

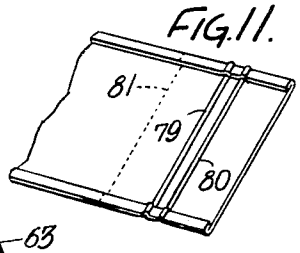


FIG. 10.

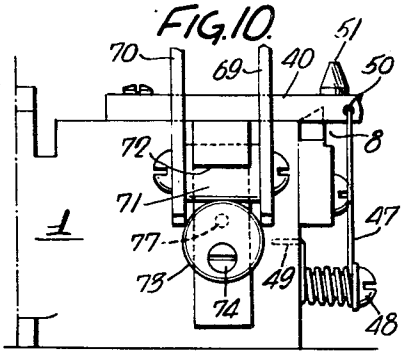


FIG. 8.

Inventors:
William F. Weirich
Henry Weirich
by their Attorneys
Howson & Howson

United States Patent Office 2,741,166
Patented Apr. 10, 1956

2,741,166

DEVICE FOR CUTTING AND FORMING SLOT INSULATION MATERIALS

William F. Weirich, Philadelphia, and Henry Weirich, Lenni, Pa.

Original application May 18, 1950, Serial No. 162,646. Divided and this application July 15, 1952, Serial No. 298,392

5 Claims. (Cl. 93—1)

This invention relates to a novel device for cutting and forming slot insulation members to be used in the winding slots of electrical machines such as electric motors. As formed by our novel device, such members are cut to size and are creased so that they may be easily inserted in the winding slots of a machine.

This application is a division of our prior application Serial No. 162,646, filed May 18, 1950, now U. S. Patent No. 2,675,873.

One object of the invention is to provide a simple, highly efficient and easily operable device for cutting and forming such creased members from a band or strip of material.

Another object of the invention is to provide such a device having provisions for adjustment to vary the size of the cut members at will and also to vary the location of the crease or creases therein.

Still another object of the invention is to provide a device of the above-mentioned character wherein the parts are readily removable for replacement.

Other objects and features of the invention will be apparent from the detailed description which follows.

It is the practice to supply slot insulation material to users in band or strip form and in a roll. The rolled band is composed of special paper having substantial stiffness, and the band has its longitudinal edges turned or folded inwardly to provide longitudinal side flanges. In the past, it has been necessary for the user to cut successive pieces carefully from the band or strip and then carefully fit each cut piece to the winding slot in which it is to be used, it being necessary to crease the piece so that it will seat in the slot and form an insulating liner therein. This has been a cumbersome, time-consuming and expensive procedure, not to mention possible inaccuracy of the manual operations involved.

By the present invention, there is provided a novel device which is easily operable and which is adapted to cut and form successive members from a band or strip accurately and rapidly. The device supplies these members properly creased to fit the winding slots, and the user has only to insert the members in the slots. The device effects great saving in time, energy and cost of producing such members from the band or strip material.

The invention may be fully understood by reference to the accompanying drawings wherein there is illustrated a preferred embodiment and wherein:

Fig. 1 is a miniature perspective view showing the device in operation;

Fig. 2 is a plan view of the device, substantially on full scale;

Fig. 3 is a fragmentary sectional view taken on line 3—3 of Fig. 2;

Fig. 4 is a fragmentary sectional view taken on line 4—4 of Fig. 2;

Fig. 5 is a longitudinal sectional view taken on line 5—5 of Fig. 2;

Fig. 6 is a similar fragmentary sectional view showing the movable knife-carrying member in operative position;

Fig. 7 is an end elevational view taken from the left-hand end of the device as it appears in Fig. 2;

Fig. 8 is an end elevational view taken from the opposite end of the device;

Fig. 9 is a similar view, showing the movable member in operative position;

Fig. 10 is a fragmentary elevational view taken from the left side in Fig. 8;

Fig. 11 is a perspective view of a portion of the band or strip from which the slot insulation members are formed, showing the strip following a cutting and creasing operation and prior to the next operation; and

Fig. 12 is a perspective view of one of the slot insulation members.

Referring more particularly to the drawings, there is provided a supporting base structure, designated generally by reference character **1**, which is adapted to receive a band or strip of material for the cutting and forming of slot insulation members as hereinafter described. This supporting structure preferably is of generally rectangular shape, as may be seen in Fig. 2, and it is adapted to be disposed horizontally. In the form illustrated, the structure comprises a table portion **2** and depending sides **3** and **4** (Figs. 7 and 8) which may have attachment lugs **5** and **6**, adapted to rest on a horizontal surface such as indicated at **7**. The lugs **5** and **6** may be provided with apertures, as shown in Fig. 2, to receive fastening screws or the like for anchorage of the device.

The sides **3** and **4** extend beyond the table portion **2**, and at the extended ends of the sides there is provided a knife element **8** (Figs. 5 and 8) which may be in the form of a separate element removably secured to said ends by means of screws **9**. The upper edge of element **8**, as may be seen in Fig. 5, is formed to provide a knife edge **10** which extends fully across the end of the supporting base structure. In spaced relation to the knife element **8** and to each other are two creasing elements **11** and **12** (Fig. 5) which are parallel to the associated knife element and which also extend the full width of the supporting base structure. These elements are provided with blunt upper edges **13** and **14** respectively, and their purpose is to crease the tape or strip transversely thereof during operation of the device as hereinafter described. These creasing elements are adjustably supported on the base structure so that they are individually adjustable.

As may be seen in Fig. 5, the creasing element **11** is secured, for example by welding, to a supporting plate **15**, and the creasing element **12** is similarly secured to a supporting plate **16**. As may be seen in Figs. 3 and 4, the supporting base structure has a pair of side shoulders **17***a* and **17***b*, and each of the creasing elements **11** and **12** has side extensions **18***a* and **18***b* which slidably rest on said shoulders. To assure seating of the extensions on the shoulders, a screw **19** (Fig. 5) depends from table **2** to prevent upward movement of the upper plate **16**, and a screw **15***a* extends upward from plate **15** to prevent the latter from rising. The supporting plates **15** and **16** for the creasing elements extend toward the opposite end of the device, and these plates carry laterally-extending threaded members **20** and **21** (Fig. 2) respectively through which screws **22** and **23** extend. At their inner unthreaded ends, the screws are rotatably supported by brackets **24** and **25**, and at their outer ends, the screws carry knurled heads **26** and **27** fixed thereon by which the screws may be manually turned, although there is no longitudinal movement of either screw. As shown in Fig. 7, the side of plate **15** opposite the member **20** is slidably supported in a recess of bracket **25**. The side of plate **16** opposite member **21** likewise is slidably supported in a recess of bracket **24**. Springs **28** and **29** are anchored to a fixed bolt **30** on the base structure and engage the plates **15** and **16** at **31** and **32**, respectively. These springs may be

parts of a single spring member or they may be two separate springs. They serve to urge the respective creasing elements and their supporting plates rearwardly, while the threaded nut-like elements **20** and **21** on the supporting plates establish the respective positions of the plates, and hence the positions of the creasing elements **11** and **12**. By rotating the screws **22** and **23** through the medium of the knurled heads **26** and **27**, the creasing elements are individually adjustable in relation to each other and to the fixed knife element **8**.

The table portion **2** (Fig. 2) of the supporting base provides a horizontal surface along which the band or strip, shown at **33**, may be moved. At one side of the table surface, there is provided a fixed guide **34** which is removably secured to the supporting structure by means of screws **35**. Transversely of the table portion **2** is a slot **36** through which a bolt **37** extends, the latter being provided with a wing nut **38**. An adjustable guide **39** is movable transversely of the table portion **2** and is held in any position of adjustment by means of the bolt **37** which extends through said guide. The two guides **34** and **39** serve to guide the band or strip **33** in proper relation to the cutting and creasing elements during the operation of the device as hereinafter described.

As may be seen in Figs. 2 and 5, at one side of the supporting base structure in cooperative relation with the knife element **8** and the creasing elements **11** and **12**, there is provided an arm **40** which is pivoted on the extended side **4** by means of a pivot pin **41** and which extends beyond the knife element **8**. This arm carries a stop **42** which is adjustably supported on the arm by means of a yoke **43** and an associated wing screw **44**. The arm **40** is provided with a recess or slot **45** along its inner side to receive the band or strip **33** which abuts against the stop **42**. At the mouth end of the slot **45**, there is an upwardly turned finger **46** (Fig. 5) to insure entrance of one edge of the band or strip **33** into said slot. The purpose of the stop **42** is to stop the band or strip in proper position so that a certain length thereof will be cut during each operation of the device. The arm **40** is urged inwardly by means of a spring **47** (see Fig. 5) which is wound about a pin **48** supported by the extended side **4**, one end of the spring being turned as at **49** to engage said side, and the other end of the spring extending into an aperture in the arm **42** as at **50**. The spring urges the arm **40** inwardly to its operative position, as shown in Fig. 2, against the associated knife element and creasing elements. However, the arm is deflectible outwardly, against the action of the spring, as indicated by the dot-and-dash representation in Fig. 2. To this end, the arm **40** is provided with an upwardly projecting cone element **51**, the function of which will be explained presently. The reason for the outward deflectibility of the arm **40** is to enable the cut piece of the band or strip **33** to fall freely after the cutting thereof.

Hingedly mounted on the supporting base structure is a transverse member **52** (Figs. 2 and 8) which is hinged at the side of said structure opposite the side at which the arm **40** is mounted. As may be seen in Fig. 2, there are provided spaced bearing supports **53** and **54** which are secured to the base structure **1**, for example by being welded thereto. These supports rotatably support a rod or shaft **55** to which the member **52** is secured, for example by welding attachment. The shaft **55** extends beyond support **53** and carries an end plate or disk **56** secured by a screw **57**. A helical spring **58** surrounds the shaft **55** and its ends abut against the bearing support **53** and the end plate **56**. This spring takes up any lengthwise play of the shaft and insures good cooperation between the knife elements which sever or shear the band or strip **33**. The hinged member **52** carries a knife element **59** which is removably secured to said member by screws **60**. This knife element has a depending knife edge **61** (see Fig. 5) which cooperates with the knife edge **10** of the stationary knife element **8**. Also mounted on the member **52** is a resilient pad **62** which serves, during operation of the device (Fig. 6), to press the band or strip against the creasing edges **13** and **14**. The pad **62** may be formed of rubber, and it may be secured in any suitable manner, for example by cementing it to a facing plate **62a** fastened to member **52** by screws. It should be noted that the resilient pad enables the creasing edges to perform their creasing function.

At the end of the transverse member **52** opposite the hinge mounting thereof, there is provided an extension **63** to which a pair of arms **64** and **65** are pivoted at **66**. Secured to the arms **64**, **65**, as by welding, is a handle **67** which is preferably provided with a knob **68**. Pivotally secured to arms **64**, **65** are a pair of arms **69** and **70** which carry a roller **71** (Figs. 8 and 10) adapted to engage a hook **72** projecting from the extended side **4**. A retaining cylinder **73** is eccentrically mounted on a projecting screw pin **74** below hook **72**, and a spring **75** surrounds said pin and is disposed in a recess in the cylinder **73**, this spring urging the cylinder into firm engagement with the side of the supporting base. A recess **76** in the base and a cooperating detent **77** on the cylinder **73** serve to establish the operative position of the cylinder. By pulling the cylinder outward against the action of spring **75** sufficiently to remove detent **77** from recess **76**, the eccentrically mounted cylinder may be rotated to permit removal of the roller **71** from under the hook **72**. This permits the hinged member **52** to be moved out of the way whenever it is desired to adjust the elements on the supporting base structure.

During operation of the device, the roller **71** is held beneath the hook **72**, and the movable member **52** is actuated by manipulation of the handle. During closing movement of the member **52**, the handle **67** is swung inwardly and is brought down against a cushion stop **78** which is mounted on top of the member **52**, as may be clearly seen in Figs. 8 and 9. Such movement of the handle causes lowering of the knife element **59**. Reverse movement of the handle causes raising of said knife element.

Referring particularly to the cutting and creasing operation, a previously creased portion of the band or strip **33** is severed, and at the same time the adjacent portion of the band is creased. With the hinged member **52** in raised position, the operator moves the band or strip **33** until its end abuts against the stop **42**, and then actuates the handle **57** to effect downward movement of member **52**. As this member lowers, the knife elements **8** and **59** sever the projecting portion of the band, and at the same time the creasing elements **11** and **12** function to crease the portion of the band which is next to be severed. Fig. 11 shows a portion of the band or strip **33** with creases **79** and **80** formed therein, and with the line of the next cut indicated at **81**. Fig. 12 shows one of the slot insulation members **82** formed by the device, said member having transverse creases **79** and **80** therein.

As mentioned above, the stop-carrying arm **40** is deflectible to permit each cut member to fall freely. As shown in Fig. 8, the movable knife member **59** is beveled at **83** for engagement with the cone element **51**. After the severing operation is completed, the portion **83** of the movable knife element engages the cone **51** to cam the arm **40** outwardly to a position such as shown in dot-and-dash outline in Fig. 2. This frees the cut portion of the tape or strip, permitting it to fall. As the movable knife element **59** is raised, the arm **40** is permitted to return to its operative position under the impetus of its biasing spring **47**.

It will be apparent from the foregoing description, that the device is fully adjustable so that it may be used to produce slot insulation members of different sizes and with the creases properly located therein. With the device adjusted for the production of slot insulation members of a particular size, the operator may actuate the de-

vice very rapidly to produce such members at a high rate.

While a preferred embodiment of the invention has been illustrated and described, it will be apparent that the invention is not limited thereto but is capable of various modifications, especially with respect to structural details.

We claim:

1. A hand-operated device for creasing and cutting successive sections from a band or strip of insulation material to form slot insulation members, comprising a supporting structure having a table portion over which said band may be moved, a stationary transverse knife element mounted at the discharge end of said structure, a pair of transverse creasing elements mounted on said structure ahead of and in proximity to said knife element, guide means on said table portion to guide said band in proper relation to said elements, a member hinged to a side of said supporting structure in cooperative relation with said elements, a handle on said member for operating the same, a knife element on said member cooperative with said first knife element to cut successive sections from said band, and a resilient pad on said member for pressing said band against said creasing elements to crease a section of said band while a previously-creased section is being cut from the band.

2. A device according to claim 1, including means mounting said creasing elements for individual adjustment to vary their spacing relative to each other and to said knife element.

3. A device according to claim 2, including side rails on the supporting structure on which said stationary knife element and said creasing elements are mounted.

4. A device according to claim 3, including a pair of adjustable members disposed below said table portion and connected respectively to said creasing elements, and manual means for adjusting each of said members to thereby adjust each of said creasing elements.

5. A device according to claim 4, including spring means to urge each of said members in one direction, and an adjustment screw operatively connected to each of said members.

References Cited in the file of this patent

UNITED STATES PATENTS

267,849	Elmer	Nov. 21, 1882
631,392	Binder	Aug. 22, 1899
657,418	Inman	Sept. 4, 1900
1,772,785	Smith	Aug. 12, 1930
2,595,325	Baumgartner	May 6, 1952