United States Patent [19]

Skeeters

[11] **3,882,819**

[45] **May 13, 1975**

[54] **DEVICE FOR COATING ELEMENTS OF CONTINUOUS LENGTH**

[75] Inventor: **William Ronald Skeeters,** Shelbyville, Tenn.

[73] Assignee: **Hasbro Industries, Inc.,** Pawtucket, R.I.

[22] Filed: **Apr. 17, 1974**

[21] Appl. No.: **461,747**

[52] **U.S. Cl.** **118/405**

[51] **Int. Cl.** **B05c 3/12**

[58] **Field of Search** ..... 118/DIG. 18, 404, 405, 118/DIG. 11, DIG. 12; 425/113, 114; 117/115

[56] **References Cited**

UNITED STATES PATENTS

515,951	3/1894	Cobb	118/DIG. 18
2,111,853	3/1938	Fourness et al.	118/405 UX
2,260,860	10/1941	Newton et al.	118/405 X
2,341,450	2/1944	Knaus	118/405
3,044,098	7/1962	Stalson	118/DIG. 18
3,170,968	2/1965	Rokunoke et al.	118/405 UX

FOREIGN PATENTS OR APPLICATIONS

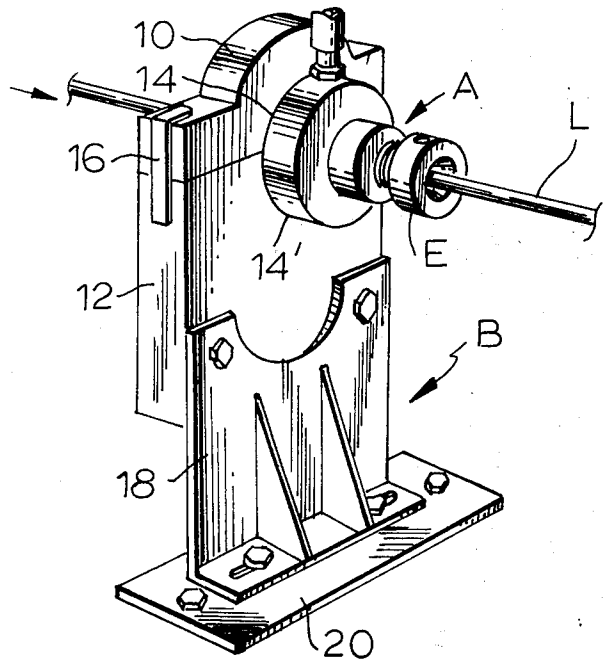
724,760	2/1955	United Kingdom	118/405

Primary Examiner—Morris Kaplan
Attorney, Agent, or Firm—Shapiro and Shapiro

[57] **ABSTRACT**

A device which includes a die member to apply a coating to the surface of an element of continuous length employs valve means associated with the die member to allow the coating composition to flow to the die member or to cut off the flow so that the continuous element may pass through the device in uncoated condition when desired.

9 Claims, 3 Drawing Figures



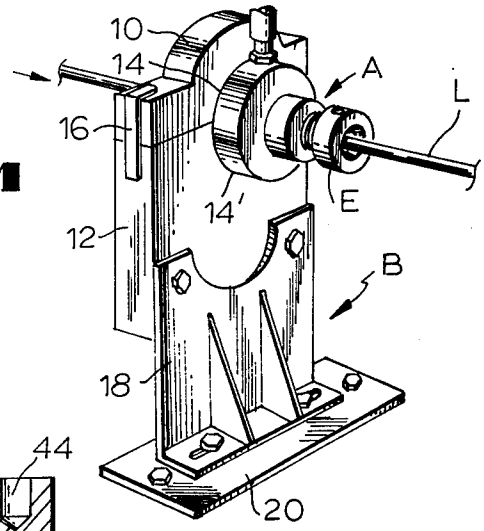


FIG. 1

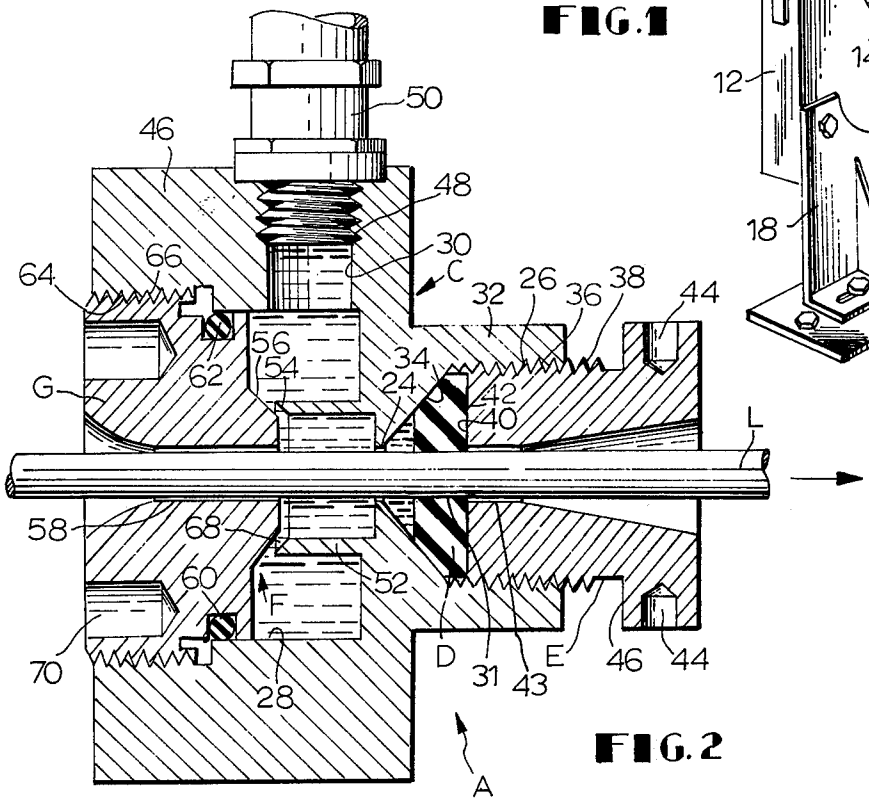


FIG. 2

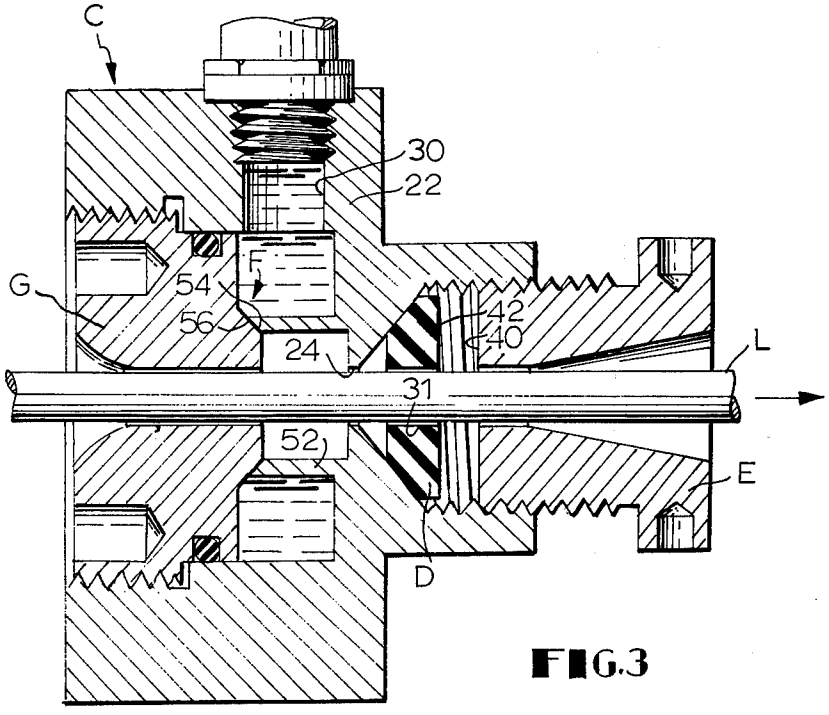


FIG. 3

DEVICE FOR COATING ELEMENTS OF CONTINUOUS LENGTH

The invention relates to coating devices, and is more particularly directed to devices for coating elements of continuous length.

BACKGROUND OF THE INVENTION

Recently there has been developed a continuous method for manufacturing pencils. A casing or sheathing composition is continuously extruded over a core of a pigmented or colored lead or a graphite lead. The leads may be cut to length and fed in end-to-end abutting relation, or preferably the lead may also be continuously extruded to receive thereon the co-extrusion of the casing composition. In any event, the continuous length of pencil material must be coated with a lacquer or paint prior to being cut into predetermined lengths. If the pencils are of the type having an eraser at one end thereof the pencils are then subjected to the usual operations of applying a ferrule and an eraser.

At the beginning of a run in making a continuous length extrusion which will ultimately furnish pencils of fixed, predetermined lengths, it is necessary to determine whether the continuous extrusion has the desired characteristics; the diameter must be a predetermined dimension; the cross section must be of proper shape, truly round or hexagonal; and the surface of the extrusion must have the desired characteristics. To apply a micrometer to the extrusion, and to inspect it, it is essential that the extrusion pass through a coating device in dry condition. Then, it is desired to begin coating the extrusion without interrupting its travel. Also, it is desired not to waste any lacquer or paint until the characteristics of the extrusion are such that the extrusion is in readiness for the application of the coating composition thereto.

SUMMARY OF THE INVENTION

A device in accordance with the invention employs a die member to apply a coating to the periphery of an element of continuous length. The device employs valve means associated with the die member to allow the coating composition to flow to the die member or to cut off the flow of the coating composition so that the continuous element may pass through the device uncoated when desired.

The coating device comprises a body member including an intermediate wall having an aperture to allow the passage of the continuous element to be coated. A first axial bore is provided in the body member in communication with and on one side of the aperture. A die member is fitted within the bore. An adjustable pressure member is positioned within the bore for engagement with the die member. A second axial bore is provided in the body member in communication with the aperture and on the opposite side of the intermediate wall. An inlet opening is provided in the body member to allow the coating composition to be fed to the second bore. Valve means is provided within the second bore to allow the coating composition to regulate the flow of coating composition to the die member.

In accordance with the preferred form of the invention, the valve means comprises an annular wall extending axially from the aforementioned intermediate wall into the second bore and surrounding the aperture in the intermediate wall. The free edge of the annular

wall provides a valve element or seat. An adjustable valve member is positioned in the second bore for cooperation with the valve element or seat.

The primary object of the invention is to provide a device for coating an element of continuous length which will enable the continuous length element to pass through the device without receiving a coating to thereby enable the attainment of the aforementioned purposes. Also, it is an object of the invention to provide a device of the type under consideration which is of simple construction, rugged and easy to operate.

These, and other objects and advantages of the invention will be apparent from the following detailed description, taken in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing the coating device of the invention as it may be mounted in a line for processing an element of continuous length;

FIG. 2 is a central, longitudinal cross-sectional view of the coating device having the parts thereof arranged to apply a coating to the surface of a continuous element as it is drawn through the device;

FIG. 3 is a similar view showing the valve means of the device acting to prevent the application of a coating to the moving continuous element.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, the device A for coating an element L of continuous length may be mounted for alignment with any equipment in a line, for example, an extruder (not shown) for applying a casing composition to a writing core, such as a pigmented or a graphite lead. A mounting B for the device A may comprise a clamping member **10** cooperable with a second clamping member **12,** the clamping members having cutout portions **14, 14'** so that the clamping members may tightly embrace the coating device. The clamping members may be secured to one another by the connectors **16,** one of which is shown. The assembly of the coating device and the clamping plates may be connected to a suitable bracket **18** which in turn is secured to a base plate **20.**

Referring to FIGS. 2 and 3, the device A for coating the element L of continuous length comprises a body member C having an intermediate wall **22.** Preferably, and as illustrated, the body member is cylindrical or circular in cross section. The intermediate wall is provided with a central aperture **24** to allow passage of the element L. The aperture has a diameter which is slightly greater than the cross-sectional dimension of the element L.

The body member C is provided with a first axial bore **26** in communication with and on one side of the aperture **24.** A coating or die member D is positioned within the axial bore. An adjustable pressure member E. also is positioned within the bore **26** for engagement with the coating member. The body member C is provided with a second axial bore **28** in communication with the aperture **24** on the opposite side of the intermediate wall **22.** An inlet opening **30** is provided in the body member to allow a coating composition to be fed to the bore **28.** Valve means F is provided in the bore **28** for regulating the flow of coating composition to the aperture **24** and to the coating member D.

In greater detail, and as shown in FIGS. 2 and 3, the die member D is frusto-conical and is made of a suitable elastomeric material, such as rubber, neoprene, a butadiene polymer, or any other elastomeric material which is resistant to lacquers, paints or the like. The die member has a central opening **31.** The shape of the opening corresponds to the configuration or cross section of element or extrudate L. The configuration may be round, hexagonal or any other suitable shape. The internal surface of wall **32** of the body member which defines the bore **26** is matingly contoured at **34** for engagement by the periphery of the frusto-conical die member, the wall tapering down or converging toward the aperture **24.** The internal surface of the wall adjacent the converging area **34** is of substantially constant diameter and internally threaded at **36.** The adjustable pressure member E is matingly threaded at **38.** The front face **40** of the adjustable pressure member is engageable with the side **42** of the frusto-conical die member having the larger diameter so that pressure may be applied in an axial direction to thereby control the diameter of the opening **31** extending through the die member. The pressure member has a central opening **43** in alignment with the opening **31** of the die member and the aperture **24.** Preferably, the adjustable pressure member is provided with means cooperable with a tool for rotating the member. As shown, such means may be in the form of radially extending recesses **44** provided in a flange **46** designed to accommodate a tool having projections (not shown).

The frusto-conical member D, and the mating surface **34** of the body member and the adjustable pressure member E are related so that the thickness of the coating which is wiped onto the traveling element L depends upon the degree of axial pressure applied to the die member by the adjustable pressure member. The element of continuous or indeterminate length travels through the device in the direction indicated by the arrow in FIGS. **1, 2** and **3.** Rotating the pressure member to increase axial pressure on the coating member reduces the diameter of the opening **31** to thereby reduce the thickness of the coating applied to the traveling element L. Rotating the pressure member in the opposite direction to relieve the axial pressure on the die member increases the size of the opening **31** to increase the thickness of the applied coating, and further rotation of the pressure member in such direction increases the size of the opening **31** to allow the element L to move through the device with minimal friction.

The bore **28** is defined by a circumferential wall **46** having a larger diameter than the wall **32** defining the bore **26.** The aforementioned inlet opening **30** extends through the wall **46,** and may have an internally threaded portion **48** to receive a threaded nozzle member **50** connected to a source of a coating composition such as a lacquer, paint or the like (not shown). The coating composition may be delivered through the inlet opening **30** and into the bore **28** under pressure.

The valve means F comprises an annular wall **52** which extends axially from the intermediate wall **22** into the bore **28** and surrounds the aperture **24.** The free edge **54** of the annular wall is formed to provide a valve element. As shown, the free edge is beveled to provide a valve seat for cooperation with an adjustable valve member G. The valve member is provided with a surface **56** having a mating bevel so that the pressure engagement of the beveled surfaces **54** and **56** will prevent the flow of coating composition to the aperture **24** and to the coating member B, as shown in FIG. **3.**

The adjustable valve member G has a central opening **58** in alignment with aperture **24.** It is formed with an annular groove or recess **60** within which an O-ring **62** is positioned to provide a sliding seal with the smooth internal surface portion provided by the bore **28.** Also, the valve member G is externally threaded at **64** for mating engagement with the internally threaded portion **66** of the bore. Thus, the adjustable valve member may be rotated so that it moves in an axial direction to engage the valve seat **54** (FIG. **3**), or it may be backed off from the valve seat to allow the coating composition to pass from the inlet **30** through the opening **68** between the valve members, into the area within the annular wall **52,** through the aperture **24** and to the die member D. Like the adjustable pressure member E, the adjustable valve member G may be provided with means cooperable with a tool (not shown) to enable rotating the valve member. As illustrated, such means may take the form of spaced recesses **70** extending axially into the end wall of the valve member to receive mating projections on the tool.

While the coating device hereinbefore described is particularly useful to apply various colored lacquers or paints to an extrusion which will ultimately furnish pencils, it will be apparent that the device is useful for operation upon any suitable element of continuous length. The continuous extrusion may omit a central marking core to furnish an extrusion which, when cut to desired lengths, furnishes barrels for mechanical pencils and ball point pen barrels. The central longitudinal opening extending through the cut segments receives the mechanically operated lead or ball point pen refills. Also, the described coating device may operate upon elements of continuous length which need not be extrusions, for example, wire, or any other element of continuous length.

It is believed that the advantages and improved results furnished by the coating device of the invention and its associated valve means will be apparent from the foregoing description of a preferred embodiment of the invention. Various changes and modifications may be made without departing from the spirit and scope of the invention as sought to be defined in the following claims.

I claim:

1. A device for applying a liquid coating composition to an element of continuous length comprising a body member including an intermediate wall having an aperture to allow passage of the element to be coated, a first axial bore in the body member in communication with and on one side of the aperture, a die member within said bore, an adjustable pressure member within said bore for engagement with the die member, a second axial bore in the body member in communication with the aperture and on the opposite side of the intermediate wall, an inlet opening in the body member to allow a coating composition to be fed to the second bore, and valve means within said second bore for regulating the flow of coating composition to the die member, the valve means comprising an annular wall extending axially from said intermediate wall into said second bore and surrounding said aperture, the free edge of the annular wall providing a valve element, and an adjustable valve member in the second bore cooperable with said valve element, the die member, adjustable pressure

member and valve member having openings therethrough in alignment with said aperture.

2. A device according to claim 1, wherein the second axial bore is defined by a circumferential wall, said inlet opening extending therethrough.

3. A device according to claim 1, wherein the die member is frusto-conical, of elastomeric material and has a central opening, and the wall of the body member defining the first bore at the area adjacent the frusto-conical member is matingly contoured, the wall converging toward said aperture.

4. A device according to claim 3, wherein the wall of the body member defining the first bore adjacent the converging area is of substantially constant diameter and internally threaded, and the adjustable pressure member is matingly threaded, the pressure member being engageable with the side of the frusto-conical die member having the larger diameter to apply pressure in an axial direction to thereby control the size of the central opening-extending through the die member.

5. A device according to claim 1, wherein the adjustable pressure member is provided with means cooperable with a tool for rotating the member.

6. A device according to claim 1, wherein the free edge of said annular wall is beveled to provide a valve seat and the adjustable valve member is provided with a mating bevel whereby the pressure engagement of the beveled surfaces will prevent the flow of coating composition to the aperture and to the die member.

7. A device according to claim 6, wherein the adjustable valve member is externally threaded, and a portion of the internal surface of the circumferential wall defining the second bore is matingly threaded.

8. A device according to claim 7, wherein the adjustable valve member is provided with means cooperable with a tool for rotating the member.

9. A device according to claim 7, wherein the adjustable pressure member and the adjustable valve member are each provided with means cooperable with a tool for rotating the members.

* * * * *