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CAPPING MEANS USING VACUUM

Filed June 6, 1966

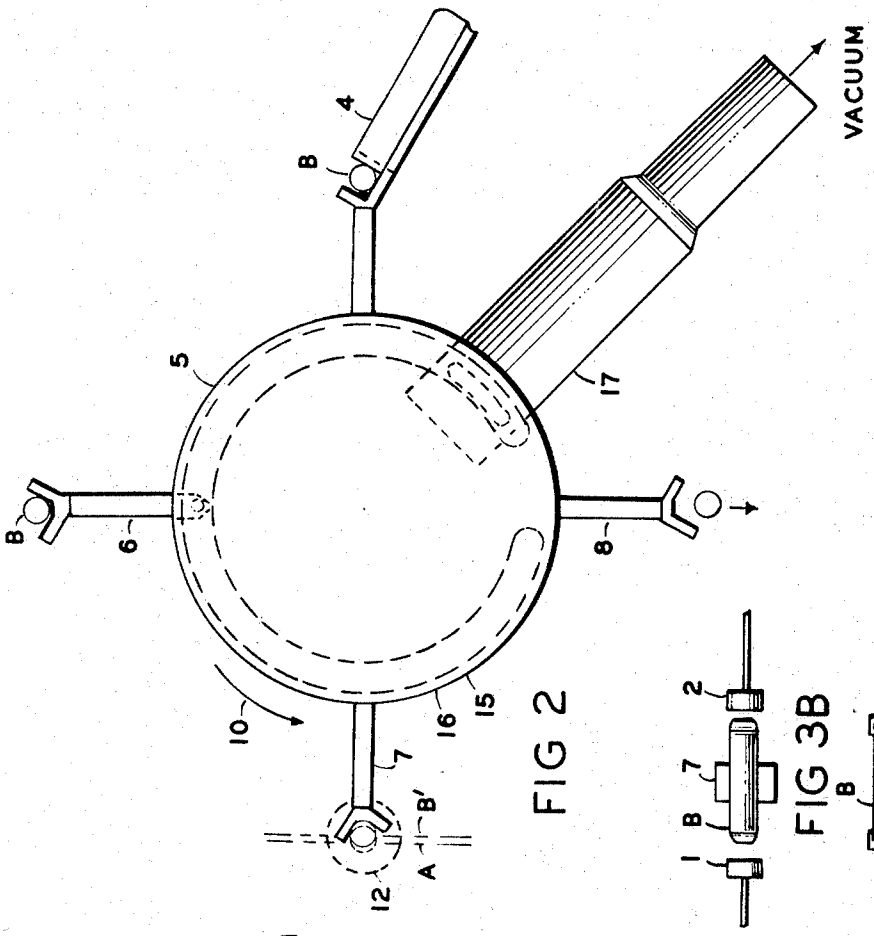

FIG 2

FIG 3B

FIG 3D

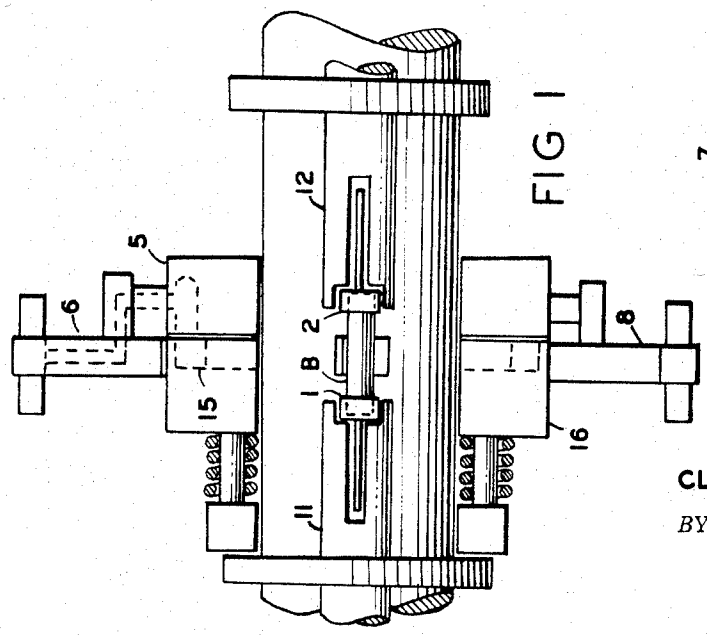

FIG 1

FIG 3A

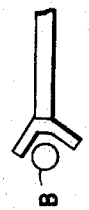

FIG3C

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CAPPING MEANS USING VACUUM

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ABSTRACT OF THE DISCLOSURE

In a machine for placing caps on a body member, vacuum means to transport said body member, whereby material not added to or removed from said body member by frictional movement on body holders, comprising,

a rotatably mounted holding member,
a plurality of vacuum arms mounted in said rotatably mounted member, said vacuum arms being adapted to hold said body member,
said vacuum arms being adapted to be connected to a source of vacuum.

This invention relates to means for putting caps on resistors and other articles and more particularly to means for holding the body member by means of vacuum. Conventional capping machines generally comprise means for holding the body member with clamping fingers and squeezing the caps on the body member with cap dies.

One of the difficulties with this method is that there is generally friction movement between the clamping fingers and the body member so that the material is either scraped off or deposited on the body member. If the body is a resistor, either removing or adding material will change the value of the resistor which is objectionable, since the resistor then would have to be retested and modified or rejected.

The present invention solves this problem by elminating the body holding fingers and holding the body member by means of vacuum. The body member and the inside edges of the caps are chamfered and are so spaced that as the caps are squeezed onto the body member, the body member is then lifted away from the vacuum holding means so there is no frictional movement or abrasion between the body member and its holders.

Therefore the resistors or any other components will not be scratched nor will any material be removed or added to the body member.

Accordingly, a principal object of the invention is to provide new and improved resistor capping means using vacuum holding means.

Another object of the invention is to provide new and improved means for placing caps on body members, wherein the body member is lifted off the holder while the caps are being squeezed on so that there is no frictional movement by the body member and its holder which would cause the removal or addition of a material to the body member.

Another object of the invention is to provide new and improved machines for placing caps on a body member, vacuum means to transport said body member comprising, a rotatably mounted holding member, a plurality of vacuum arms mounted in said rotatably mounted member, said vacuum arms being adapted to hold said body member, said vacuum arms having channels adapted to be connected to a source of vacuum and a valve member connecting said channel to a source of vacuum, said valve member having slot means adapted to connect vacuum to said vacuum arms during certain positions of said arms.

Another object of the invention is to provide a new and

improved machine for placing caps on a body member, vacuum means to transport said body member comprising, a rotatably mounted holding member, a plurality of vacuum arms mounted in said rotatably mounted member, said vacuum arms being adapted to hold said body member, while said vacuum arms having channels adapted to be connected to a sorce of vacuum and a valve member connecting said channel to a source of vacuum, said valve member having slot means adapted to connect vacuum to said vacuum arms during certain positions of said arms, said body is transported to a capping position, cap die means at said capping position adapted to squeeze caps on said body ends, said caps and body being chamfered in relation to one another, the axis of said cap dies being spaced more than a radius of said body member from said vacuum holder so that said body is lifted away from said vacuum holder by said cap dies, whereby material is not added to or removed from said body member by frictional movement on said body holders.

These and other objects of the invention will be apparent from the following specification and drawings of which:

FIGURE 1 is a front view of the embodiment of the invention.

FIGURE 2 is a side view of FIGURE 1.

FIGURES 3A through 3D are diagrams illustrating the operation of the invention.

Referring to the figures, the invention generally comprises means for placing caps **1** and **2** on a body member B of a resistor or other equivalent component with vacuum control.

The embodiment is shown in connection with a rotatable capping machine of the type shown in my prior patents, No. 3,137,929, granted June 23, 1964 entitled: Rotary Capping Means and No. 3,029,500, granted Apr. 17, 1962 entitled: Resistor Capping Means.

However, the improvement of the invention is not limited to rotary machines but may be used in other type capping machines.

The body members are fed along a slide **4**. The holding member **5** has vacuum arms **6**, **7**, **8**, and **9**, rotating in the direction of arrow **10** so that the arm will pick up a body member from the slotted end of the slide **4**. Vacuum is applied to hold the body member on the vacuum arm until the holding member **5** rotates around to the position of the cap clamping dies **11** and **12**. The cap dies are adapted to squeeze caps onto the ends of the body member as illustrated in my above mentioned patents, either automatically or manually.

One of the improvements of the invention is that the axis of the capping members are so spaced with respect to the vacuum arms that when the caps are squeezed on the ends of the body members, the body members are lifted out of contact with the vacuum arms and supported only by the capping dies. This is made possible due to the fact that the ends of the body member and internal sides of the caps are chamfered.

Therefore, there is no frictional movement of the body member with respect to its holder. This would be objectionable since it either removes or adds material to the body member which in case of a resistor changes the resistance.

This arrangement also provides a self centering of the body member and the caps so that the caps are forced onto the ends of the body member in the correct alignment.

More specifically, the holding member **5** is clamped onto a rotatable shaft **14**. The vacuum arms **6**, **7**, etc. have a Y shape to accommodate the body member B. The vacuum arms have a central channel for the vacuum

which communicates with the slot **15** in the valve member **16**. The valve member **16** is a circular member which fits on the shaft **14** but it does not rotate. Vacuum is applied to the slot **15** by means of the stationary pipe **17** which is connected to a source of vacuum.

In the showing of FIGURE 2, the slot **15** in the valve **16** is stationary. The arms mounted on the holding member **5** rotate in the direction of the arrow **10**. As the arms rotate past the area where the pipe **17** is connected, vacuum is applied via slot **15** to the arms. Thereafter, the arms for instance, arm **9** will pick up body member B on the slide **4**. The slide **4** preferably has a pusher member to insert the body member into the arm. The arm then rotates around to the position by the arm **7**.

If the machine is of the type which is indexed, the holding member **5** stops in this position and the caps are squeezed on by the cap dies **11'** and **12'** in conventional manner such as shown in my above mentioned Patent No. 3,029,500.

If the machine is of the continuous type, the cap dies will also be mounted on the rotatable shaft **14** and the caps will be acted on both before and after the position shown by the arm **7**.

In either event, as shown in FIGURES 3A through 3D, the cap dies are so spaced with respect to the slide **4** and the vacuum arms so that the body members are picked up by the caps in the cap dies and removed from the grip of the vacuum holding arm.

The axis A of the cap dies is offset from the axis B' of the body member B when held by the vacuum.

FIGURES 3A and 3B show two views of the body member B, being held by the vacuum arm **7** before the caps are applied. FIGURES 3C and 3D show the space relation of the body member and the cap dies as the caps are being applied and squeezed onto the ends of the body member B. Note that the ends of the body member and/or the internal surface of the caps are chamfered. The axis of the cap dies are spaced away from the holding arms so that when caps start to be squeezed onto the body member, the body member is moved away from the arm and are supported by the caps.

This provides two advantages, one it permits the alignment in the caps without any restraining force exercised by any holding fingers. The second advantage is since the caps are holding the body member away from the vacuum arm, there is no frictional movement or grinding into the holder. Therefore, no material is being removed or deposited on the body member which would affect its resistance value.

We claim:

1. In a machine for placing caps on a body member, vacuum means to transport said body member comprising,

a rotatably mounted holding member,

a plurality of vacuum arms mounted in said rotatably mounted member, said vacuum arms being adapted to hold said body member,

said vacuum arms being adapted to be connected to a source of vacuum, said body member being transported to a capping position,

cap die means at said capping position adapted to squeeze caps on said body ends,

said caps and body being chamfered in relation to one another,

the axis of said cap dies being spaced more than a radius of said body member from said vacuum holder so that said body is lifted away from said vacuum holder by said cap dies,

whereby material not added to or removed from said body member by frictional movement on said body holders.

2. In a machine for placing caps on a body member, vacuum means to transport said body member comprising,

a movably mounted vacuum holding member,

said vacuum member being adapted to hold a body member,

said vacuum chamber being adapted to be connected to a source of vacuum, said body member being transported to a capping position,

cap die means at said capping position adapted to squeeze caps on said body ends,

said cap and body ends being chamfered in relation to one another,

the axis of said cap dies being spaced more than a radius of said body member from the holding surface of said vacuum holder so that the said body is lifted away from said vacuum holder by said cap dies,

whereby there is no rubbing of said body member on said vacuum holder.

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THOMAS H. EAGER, *Primary Examiner.*

U.S. Cl. X.R.

214—1; 269—21