Aug. 30, 1966 J. N. IANUZZI ETAL 3,268,992

CAPPER FOR RESISTOR BODIES

Filed Nov. 3, 1964 6 Sheets-Sheet 1

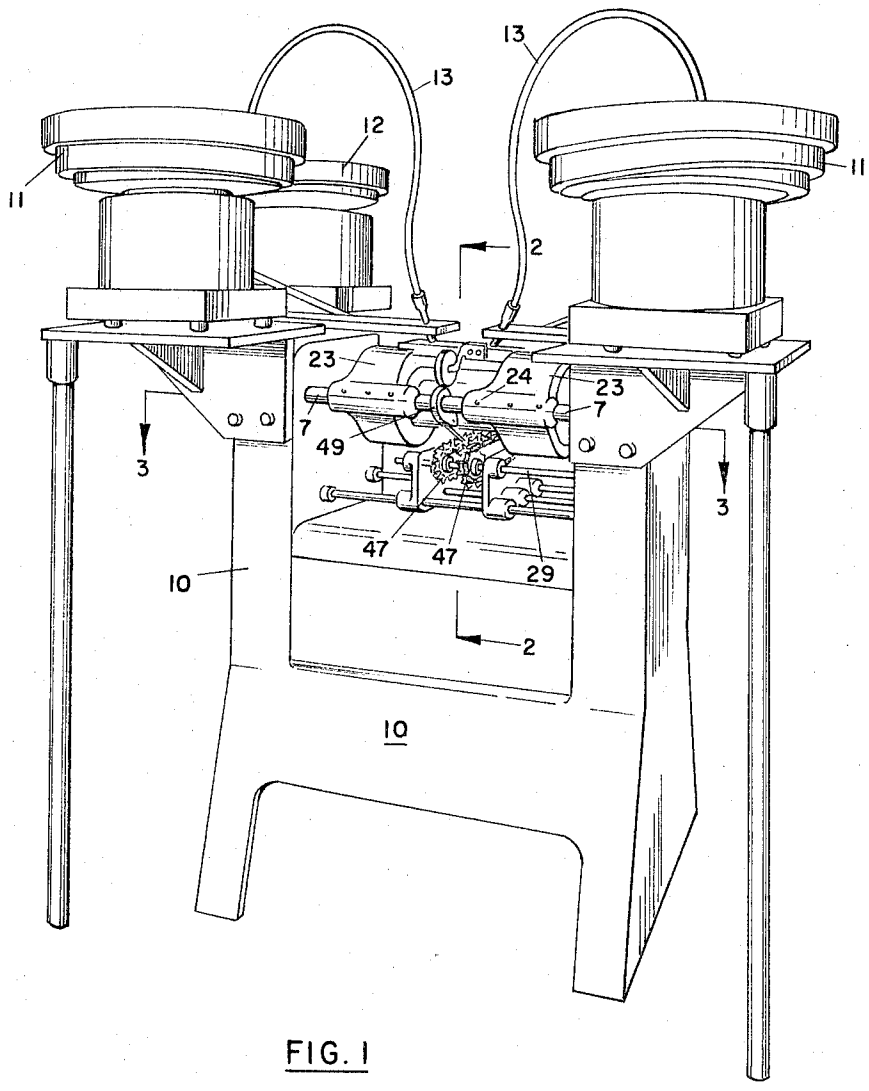

FIG. 1

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CAPPER FOR RESISTOR BODIES

Filed Nov. 3, 1964 6 Sheets-Sheet 2

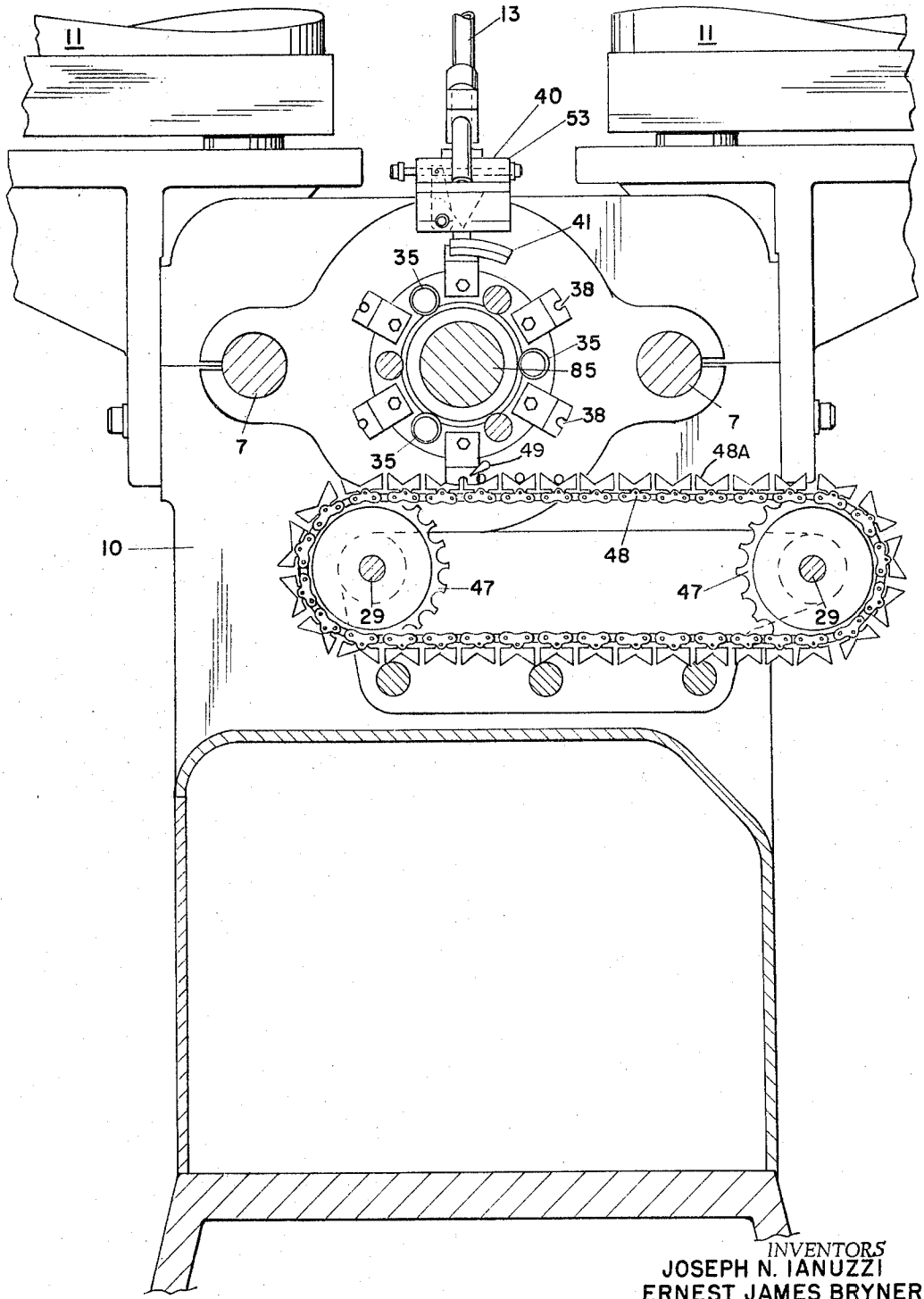

FIG. 2

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CAPPER FOR RESISTOR BODIES

Filed Nov. 3, 1964 6 Sheets-Sheet 3

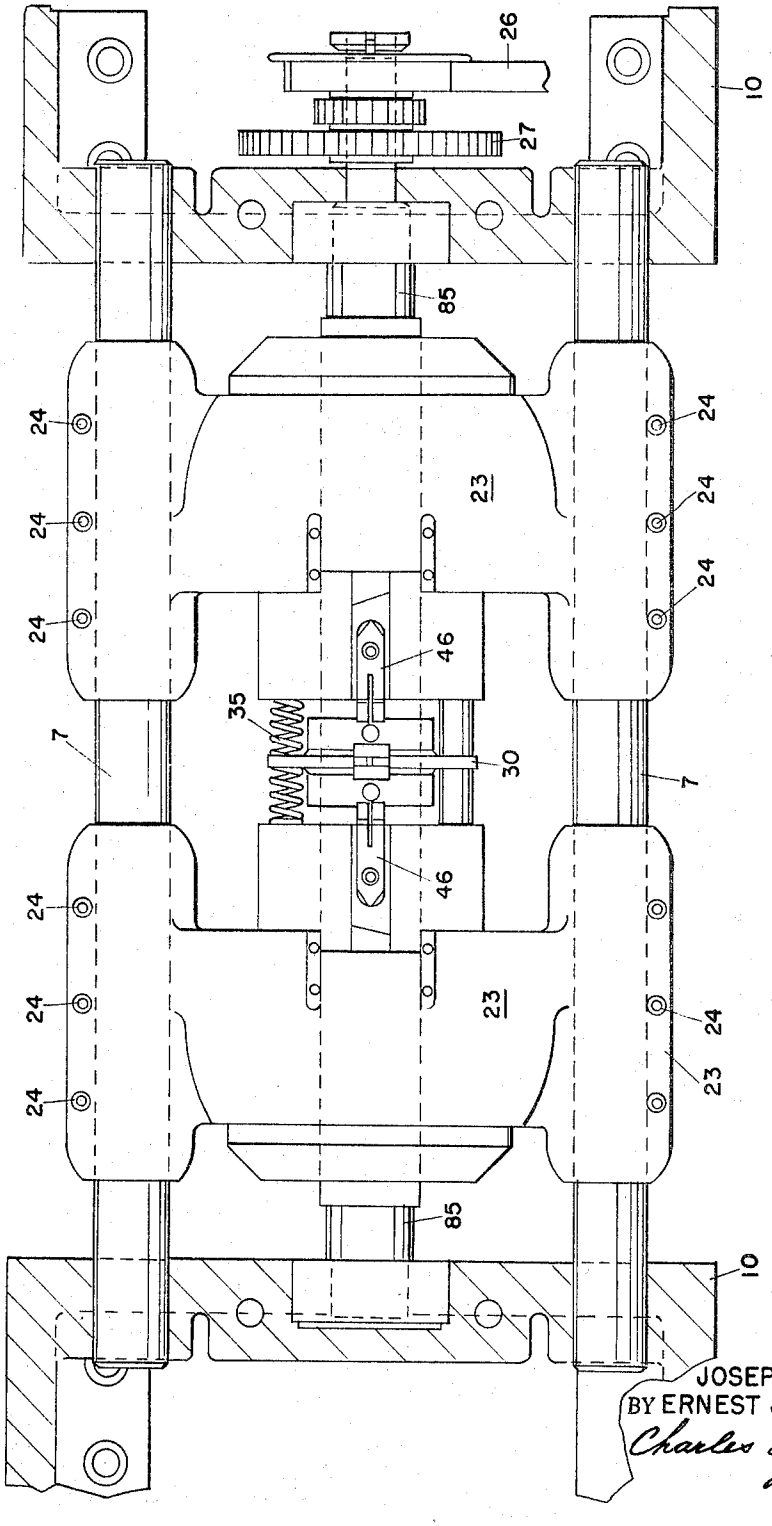

FIG. 3

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CAPPER FOR RESISTOR BODIES

Filed Nov. 3, 1964 6 Sheets-Sheet 4

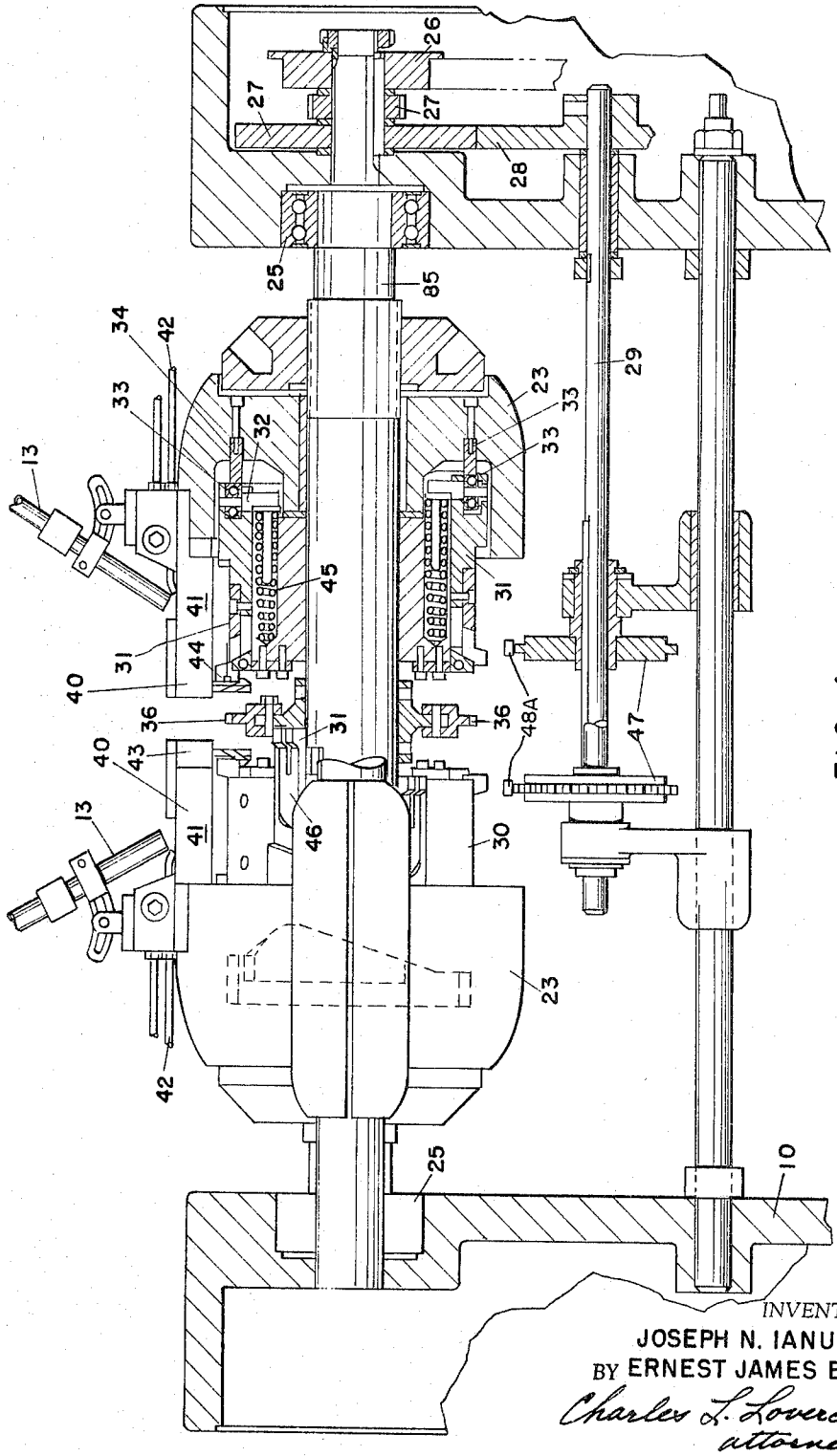

FIG. 4

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CAPPER FOR RESISTOR BODIES

Filed Nov. 5, 1964 6 Sheets-Sheet 5

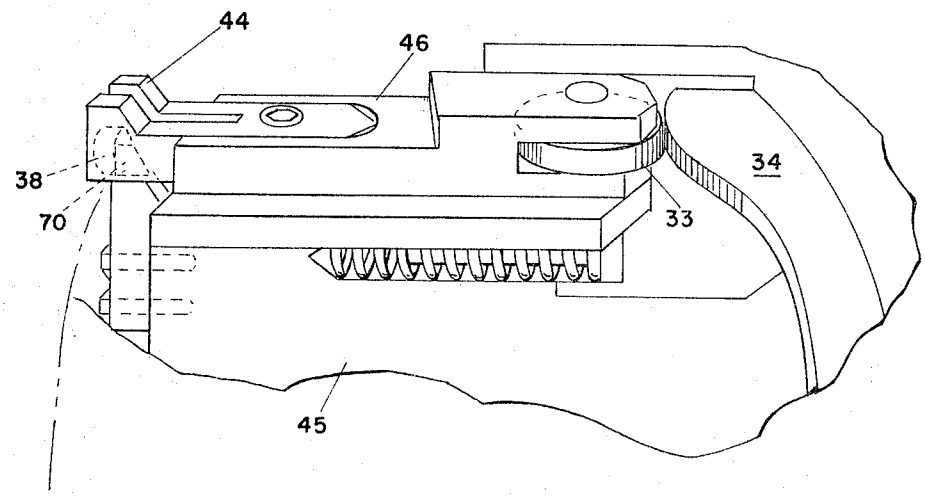

FIG. 5

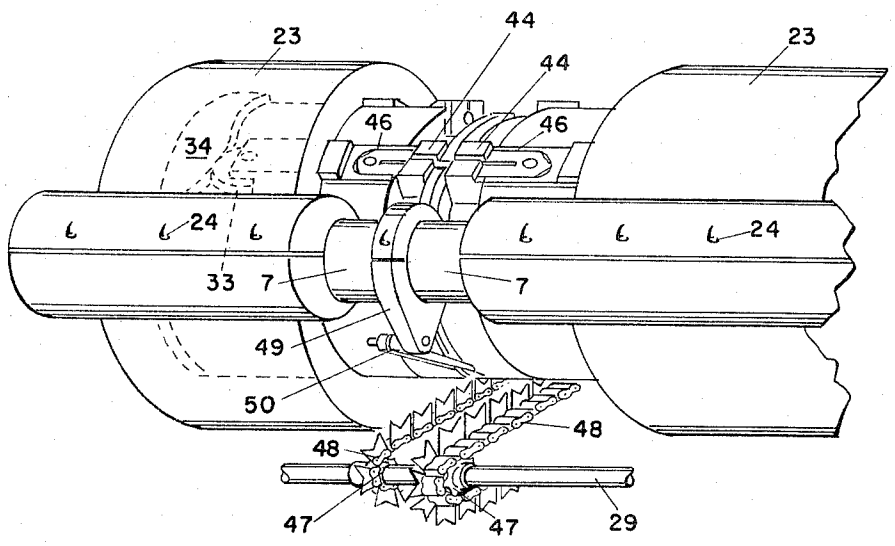

FIG. 6

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CAPPER FOR RESISTOR BODIES

Filed Nov. 3, 1964 6 Sheets-Sheet 6

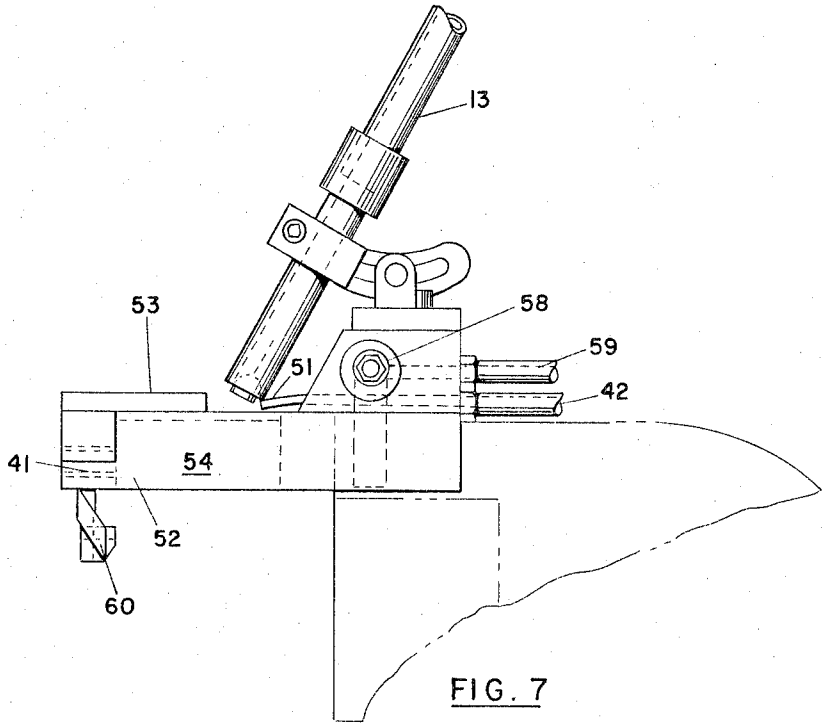

FIG. 7

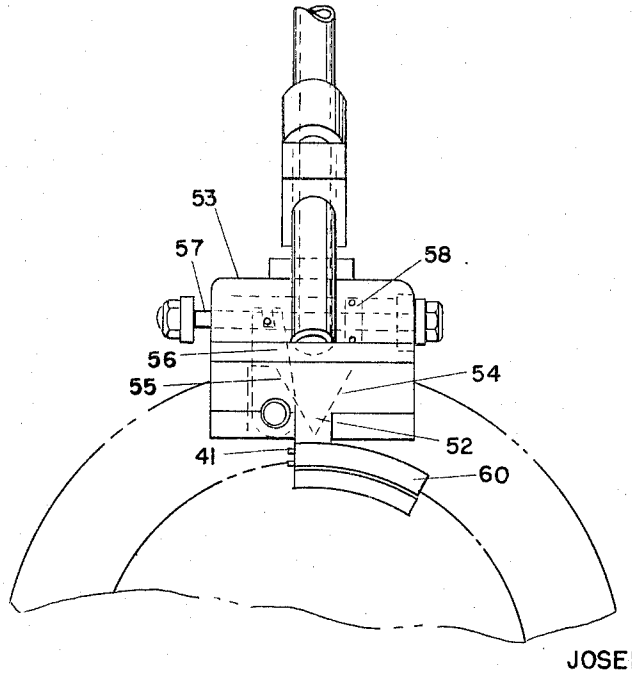

FIG. 8

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United States Patent Office 3,268,992 Patented August 30, 1966

3,268,992

CAPPER FOR RESISTOR BODIES

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Filed Nov. 3, 1964, Ser. No. 408,535
10 Claims. (Cl. 29—203)

This invention relates to assembly machines and, more particularly, to machines for assembling articles of manufacture such as electrical resistors for circuit components having an elongated cylindrical or non-cylindrical body having a cup shaped terminal cap forced onto each end.

This machine constitutes an improvement over Patent No. 3,054,167.

It is an object of the invention to provide an improved machine for capping bodies.

Another object of the invention is to provide an improved cap feeding device in combination with a capping machine.

A further object is to provide an improved capping device and unloading device in combination with a capping machine.

With the above and other objects in view, the present invention consists of the combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawing and more particularly pointed out in the appended claims, it being understood that changes may be made in the form, size, proportions, and minor details of construction without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:

FIG. 1 is an isometric view of the machine according to the invention;

FIG. 2 is a cross sectional view taken on line 2—2 of FIG. 1;

FIG. 3 is a top view of the machine;

FIG. 4 is a partial longitudinal cross sectional view of the machine;

FIG. 5 is an enlarged isometric view of the capping mechanism;

FIG. 6 is an isometric view of the capping and unloading assembly; and

FIGS. 7 and 8 are enlarged partial views of the loading mechanism.

Now with more particular reference to the drawings wherein like index numbers refer to similar parts of the machine throughout, the machine shown generally has a fixed frame with downwardly extending floor engaging legs as shown. Fixed to these legs are the way support rods **7** which support the end housings **23**. The end housings **23** are adjustably fixed to the way support rods **7** by means of the locking screws **24** which clamp the end housings **23** to the ways.

The main shaft **85** is rotatably supported on the frame by means of anti-frictional bearings **25**. The main shaft **85** is rotated by means of the sprocket **26** which is, in turn, driven by a reduction transmission and a motor. The main shaft **85** has a gear **27** fixed thereto which is in meshing engagement with a gear **28** which drives the unloading mechanism through shaft **29**.

The orientation drum **30** is also keyed to the main shaft **85** and it rotates therewith as does the cap loading mechanism **31**.

The cap loading mechanism **31** has the six spaced die slide pins **32** fixed thereto and radially extending thereon and these die slide pins each support an anti-friction bearing in the form of slide rollers **33**. These die slide rollers roll on the cam **34**. Thus, as the cap loading mechanism **31** rotates, the slide rollers **33** force the cap dies to reciprocate. Thus, when the cap is fed into one

of the dies at the top part of the rotation thereof, the cap die is forced toward the resistor body with it and the cap is forced onto the resistor body.

The caps and bodies are fed to the respective loading mechanisms by means of the vibratory feeders **11** which feed the caps through cap feed tubes **13** to the respective dies. The vibratory feeder **12** feeds the cylindrical bodies to the body wheel **36**. The caps and bodies move down to the respective dies through the respective feed tubes **13** and **14**. The cap loading mechanisms are urged away from each other by means of the main drum springs **35**.

Each of the cap dies is supported adjacent a corresponding body receiving notch **36** on the orientation drum or body wheel and in alignment therewith.

Cap die mechanism

The cap die mechanism is shown in FIG. 5. After the cap has been placed into the cap die by the cap positioner **41**, it is ready to be forced onto the end of the body. The cap die is indicated at **44**. It has a cavity **38** therein which conforms to the shape of the cap. The wire lead which is on the end of the cap will be retained in the slot **61** in the cap die **44**. The cap die **44** is attached to the die holder slide **46** which has an anti-friction die slide roller **33**. The die slide roller **33** is on the end opposite to the cap die opening. This roller **33** is attached to a die slide pin **32** and to a die spring guide **62**. The die return spring **45** is slidably attached over the die spring guide **62**. The die return spring **45** is contained in a stationary retainer.

The cam support has a cam **34** on which the roller **33** runs. As the cap drum rotates, the roller **33** will follow the contour of the cam **34** and cause the cap die to move inwardly and force the caps onto the bodies. As the roller **33** comes to the lower part of the cam **34**, the die return spring **45** will cause the die to retract after the die has moved in to cap the resistor.

Stripping fingers **70** are fixed to the cap drums. A slot is cut on the underslide of each die **44**, and the stripping fingers **70** is disposed in the slot. When the die moves forward to cap a resistor body the finger is held in position and performs no function. After capping operations if a cap or debris of any sort remains in the die cavity **38**, the stripping finger **70** will cause it to be ejected from the die as the die is drawn back over the finger **70** by the capping cam.

Cap loading mechanism

The cap loading mechanism is best shown in FIGS. 7 and 8. The caps for the resistors are fed down the feed tube **13** to the cap loader **53**. As the caps leave the feed tube **13**, air which is induced from a nozzle **51** located at the end of the feed tube **13** will force the cap forward and downward into a V-shaped opening **52** in the cap loader. This V-shaped opening **52** is composed of a stationary door **54** and a movable door **55**. The movable door **55** is actuated by a link **56** which is connected to a sliding shaft **57** in the cap loader. The end of the sliding shaft **57** is moved by the piston rod of an air cylinder **58** which is connected to air line **59** and has a piston rod connected to shaft **57**. The cylinder **58** is actuated by a solenoid valve to give it proper indexing with the movement of the drum. As air is forced into the cylinder **58**, the shaft **57** moves and forces the link **56** to open the movable door **55** attached thereto by swinging it around its hinge pin **55** and allows the cap to drop into the cap positioner **41**. The cap is now in position to be received into the cap die **44**. As each cap is placed into the positioner **41**, it is moved into the die by the curved portion of the cap seater **60**. As the drum with the die passes the curved portion of cap seater **60**, the seater is actuated

by its end engaging the main cam and the cap is moved into the die. This procedure is repeated for each cap as it comes down the feed tube into the cap loader.

Unloading mechanism

The unloading mechanism is made up of laterally spaced belts **48** supported on pulleys **47**, which are driven by shafts **29** in synchronism with the rotation of the main shaft. Each alternate link of belts **48** has a bracket **48A** attached thereto. Each bracket 48A has an upwardly facing V-shaped surface. As the shaft **85** rotates, each resistor body has a notch **38** therein which is moved into the V-shaped surface of the bracket **48A** by stripper bracket **49**. The stripping mechanism includes the stripper arm **50**, which is swingably attached to the stripper bracket **49**, which is in turn fixed to one of the support rods **7**. The stripper arm slides along the side of the outer periphery of the orientation wheel **36** and lifts the capped bodies therefrom as they pass.

The link roller conveyor which is made up of belts **48** is supported on conveyor sprockets **47** and has the outwardly facing V-shaped notched members **54** therein. The notches in the notch members **54** receive the capped bodies and will convey them to a suitable repository.

The foregoing specification sets forth the invention in its preferred practical forms but it is understood that the structure shown is capable of modification within a range of equivalents without departing from the invention which is to be understood is broadly novel as is commensurate with the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A machine for capping elongated bodies comprising:
a frame,
a body wheel and a cap wheel supported on said frame and rotatable together about a common axis,
means restraining said cap wheel and said body wheel to rotate together,
spaced support means for supporting said bodies on said body wheel,
spaced cap dies on said cap wheel,
said cap dies each having a cavity therein facing said body wheel,
feeder means for feeding caps to said cap dies,
said feeding means comprising two door members supported on said machine and defining a V-shaped trough,
a cap positioner supported adjacent said trough,
said cap positioner having a cap seater disposed below said trough,
means to feed caps into said trough,
means to swing one said door whereby a cap is deposited on said cap seater,
means on said cap seater adapted to move caps into said cavity as said cap wheel and body wheel rotates, and
means for moving each of said cap dies toward said body wheel as said wheels rotate.

2. The machine recited in claim **1** wherein

an unloading means is supported on said machine,
said unloading mechanism comprising a stripper arm supported on said machine,
and means adapted to receive said bodies from said stripper arm.

3. The machine recited in claim **1** wherein
said machine has two said cap wheels, one on each side of said body wheel,
each said cap wheel having said cap dies supported thereon.

4. The machine recited in claim **1** wherein
said means for moving said cap dies toward said body wheel comprises a fixed cam member supported on said machine and a follower member connected to each said cap die,
each said follower member engaging said cam member.

5. The machine recited in claim **3** wherein
said means for moving said cap dies toward said body wheel comprises a fixed cam member supported on said machine and a follower member connected to each said cap die,
each said follower member engaging said cam member.

6. The machine recited in claim **1** wherein
said feeder means for feeding said caps comprises a tube,
feed means for feeding caps into said tube,
and means to force said caps through said tube to said trough.

7. The machine recited in claim **1** wherein
said cap dies each have a slot communicating with said cavity therein,
said slots each being on the side of said dies adjacent said trough when said dies are in loading position,
said slots being parallel to said slots,
said slots being adapted to receive lead wires attached to caps fed into said cavities.

8. The machine recited in claim **1** wherein
said cap seater is fixed to said machine,
said means on said cap seater to move said caps into said cavities comprises an inclined surface on the side of said cap seater adjacent said cap dies,
said inclined surface being inclined toward said dies in the direction of rotation of said wheels.

9. The machine recited in claim **8** wherein
unloader means is provided on said machine on the side of said wheels opposite said feeding means.

10. The machine recited in claim **9** wherein
two said cap wheels are provided on said machine, one on each side of said body wheel.

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