June 18, 1957 A. L. VAN NEST ET AL 2,795,842

DEVICE FOR INSERTING PROTECTOR BLOCKS INTO PROTECTOR BLOCK SHELLS

Filed April 2, 1956

2 Sheets-Sheet 1

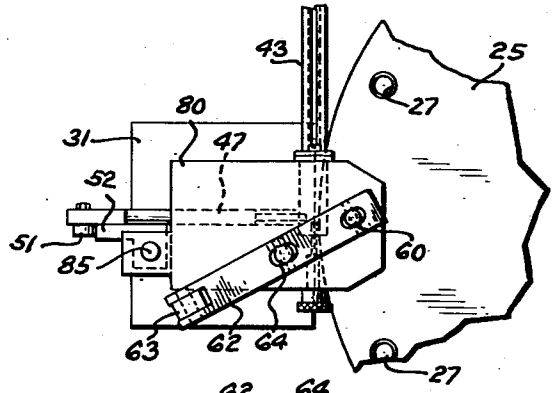


FIG. 1

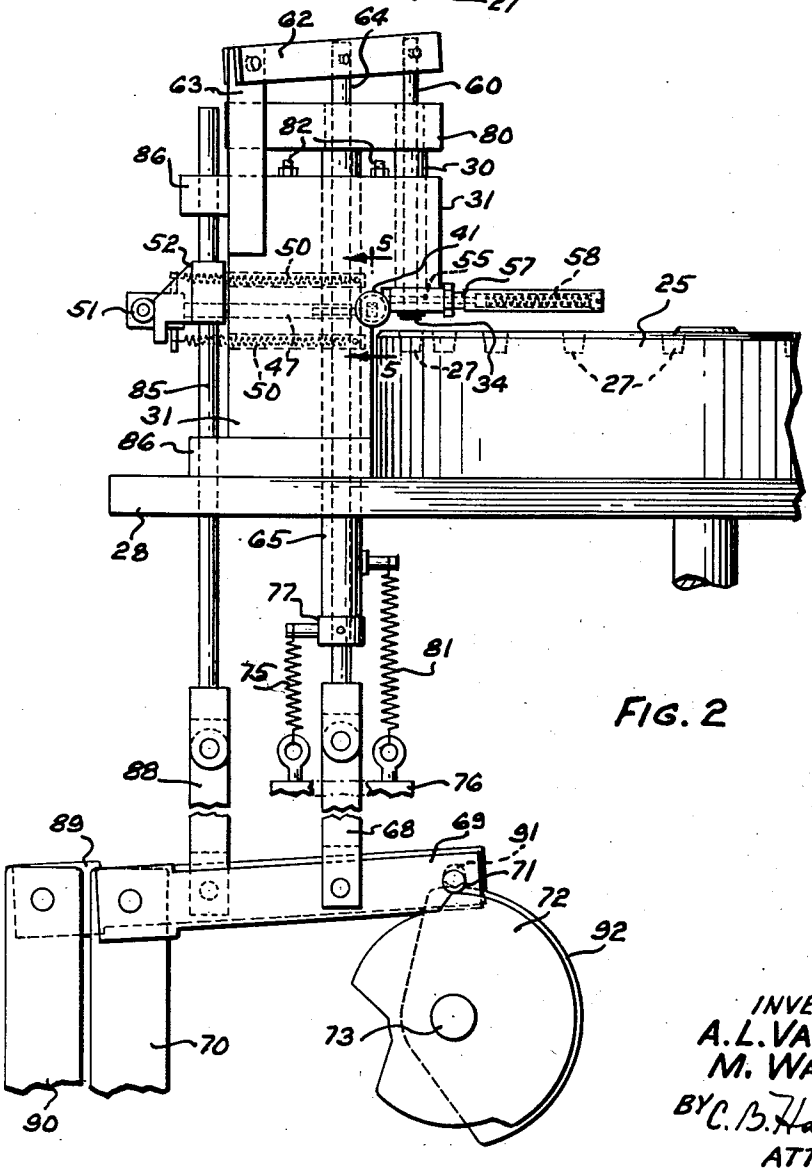


FIG. 2

INVENTORS
A. L. VAN NEST
M. WALLBERG
BY C. B. Hamilton
ATTORNEY

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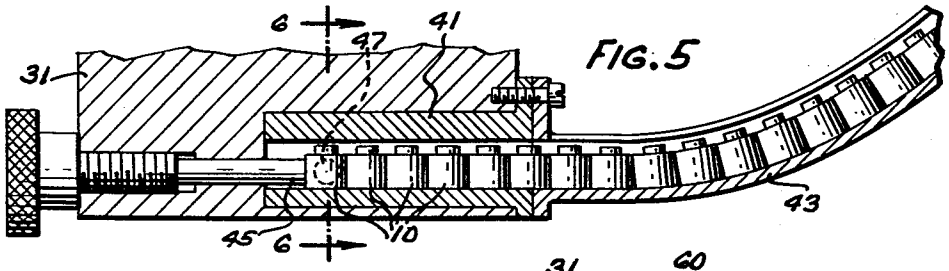


FIG. 5

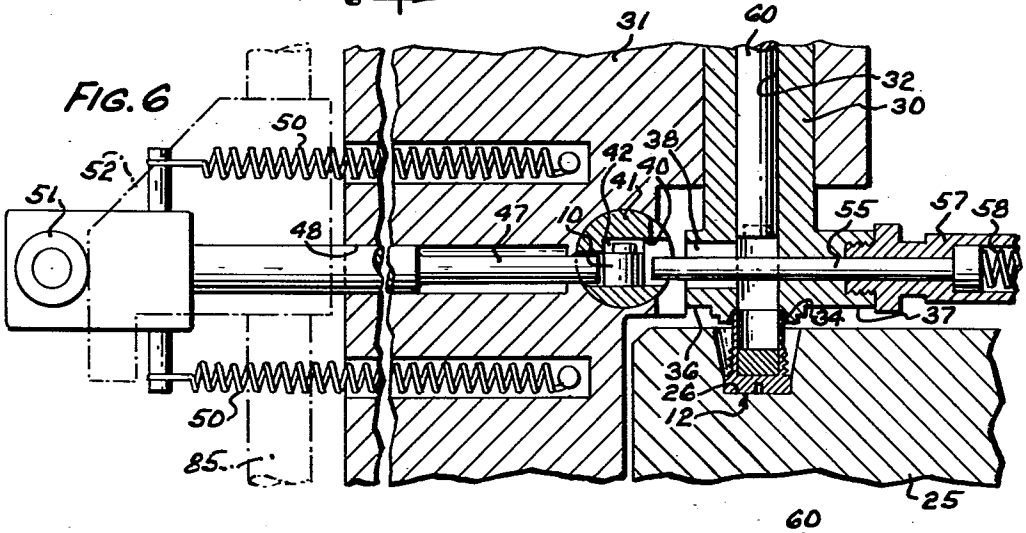


FIG. 6

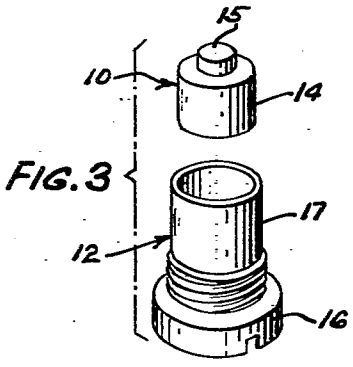


FIG. 3

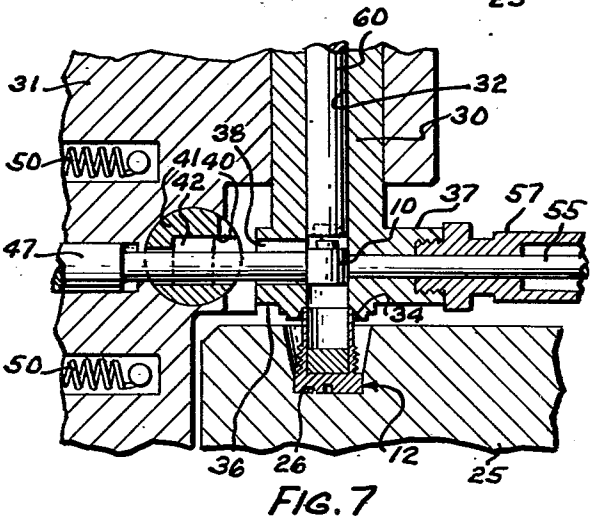


FIG. 7

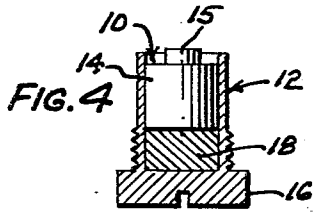


FIG. 4

INVENTORS
A. L. VAN NEST
M. WALLBERG
BY C. B. Hamilton
ATTORNEY

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DEVICE FOR INSERTING PROTECTOR BLOCKS INTO PROTECTOR BLOCK SHELLS

Arden L. Van Nest, and Marshall Wallberg, Indianapolis, Ind., assignors to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York

Application April 2, 1956, Serial No. 575,622

7 Claims. (Cl. 29—211)

This invention relates to an assembling mechanism for placing one part within another, and more particularly to a device for inserting protector blocks into protector block shells.

An object of the invention is to provide an improved mechanism for placing one part within another.

Another object of the invention is to provide a device for carefully inserting fragile articles into tubular parts.

A device illustrating certain features of the invention may include a holder for supporting a protector block shell and moving it to a predetermined position below an aligning tube which has a bore for guiding the protector block into the shell and which has a lateral opening for movement of the protector block into the bore. A seat on the aligning tube coaxially aligns the shell with the bore as the aligning tube is moved down into engagement with the shell, and a chute guides a row of the protector blocks and locates the end one adjacent to and in alignment with the lateral opening in the tube and in the path of a transfer member which moves the protector block from the chute through the lateral opening into the bore of the aligning tube and yieldably holds it in position therein. A spring pressed plunger mounted on the aligning tube extends across the bore and through the lateral opening for engaging the protector block to yieldably press it against the transfer bar and prevent it from tilting as it is moved from the chute into the aligning tube, and after the protector block is positioned in the aligning tube, a rod therein is actuated to push a protector block from the tube into the protector block shell.

Other objects and advantages of the invention will become apparent by reference to the following detailed description and the accompanying drawings, illustrating a preferred embodiment thereof, in which—

Fig. 1 is a fragmentary plan view of the device for inserting the protector blocks into protector block shells;

Fig. 2 is a fragmentary side elevational view of the device shown in Fig. 1;

Fig. 3 is a perspective view of the protector block and the protector block shell in spaced relation to each other;

Fig. 4 is a vertical sectional view of the protector block inserted in the protector block shell;

Fig. 5 is an enlarged fragmentary vertical cross-sectional view through the device taken on line 5—5 of Fig. 1;

Fig. 6 is an enlarged fragmentary vertical longitudinal sectional view of the device taken on line 6—6 of Fig. 5 and showing parts of the device in one position; and

Fig. 7 is a fragmentary view of the device similar to Fig. 6 showing some of the parts in a different position.

The present device is designed to insert protector blocks **10** into protector block shells **12** (Fig. 3) to form components (Fig. 4) used in telephone apparatus for protecting the telephone lines from the heavy surges of current. The protector block **10** comprises a sleeve **14** of ceramic material in which a carbon block **15** is bonded and the shell **12** has a base **16** with a tubular portion **17** extending therefrom into which the protector block **10**

is adapted to be inserted and pressed into engagement with a carbon block **18** which has previously been inserted in the shell **12**.

The assembling device comprises a feed table **25** which has a plurality of recesses or seats **26** for supporting the protector block shells **12** with the open end thereof extending upwardly above the upper face of the turret. The feed table **25** is rotatably mounted on a horizontal frame plate **28** and is indexed by suitable drive mechanism (not shown) to align successive recesses **26** and protector block shells **12** with an aligning member **30** at an assembling station. The aligning member **30** is in the form of a tube mounted for vertical reciprocation in a supporting block **31** secured to the frame plate **28**, and the aligning member has a vertical bore **32** for receiving a protector block **10** therein and guiding it into the shell **12**. At its lower end the aligning member **30** has a seat **34** for engaging the upper edge of the shell **18** to coaxially align it with the bore **32** as shown in Fig. 6. The aligning member **30** has a pair of horizontally disposed bosses **36** and **37** and has a horizontal laterally disposed opening **38** in the boss **36** through which a protector block **10** is moved into the bore **32**.

With the aligning member **30** in its lower position as shown in Fig. 6 the lateral opening **38** is aligned with a lateral opening **40** of the horizontal portion of a hollow guide **41** which is mounted in the block **31** and forms a rectangular guideway **42** for guiding a row of protector blocks **10** therein. The guide **41** and guideway **42** curve upwardly as shown at **43** (Figs. 1 and 5) to form a gravity type feed for feeding a row of the protector blocks **10** into adjacent relation to the aligning member **28**. The end protector block **10** is stopped by a member **45** in the supporting block **31** in alignment with the openings **38** and **40** of the guide **41** and the aligning member **30**, respectively, is transferred from the guideway **42** through the openings **40** and **38** into the bore **32** of the guide member by a transfer bar **47** which is mounted for sliding horizontal movement in a slot **48** in the block **31**.

The bar **47** is stressed for movement to the right as viewed in Fig. 6 by a pair of springs **50** secured at one end to the bar and at the other end to the supporting block **31**, and the bar **47** has a cam roller **51** engageable with a cam **52** which is movable vertically for controlling the reciprocation of the bar **47** of the cam roller. As the bar **47** transfers the protector block **10** from the guideway **42** the protector block is engaged by the end of a plunger **55** which is slidably mounted in an aperture in the boss **37** and in a tubular member **57** secured thereto. The plunger **55** is urged to the left (Fig. 6) by a spring **58** in the tubular member **57** to yieldably press the protector block **10** against the end of the transfer bar **47** and prevent tilting of the protector block as it is being moved into the bore **32** of the aligning member **28**. The transfer bar **47** yieldably maintains the protector block **10** in the bore **38** against the wall thereof.

A pusher rod **60** is slidable in the bore **32** for pushing the protector block **10** from the aligning member **30** into the shell **12** and press it against the block **18** therein. The end of the pusher rod **60** engages the ceramic sleeve **14** of the protector block **10** and is recessed to provide clearance for the upper end portion of the carbon block **15**. During the insertion of the protector block **10** into the shell **12** the rod **60** engages the ends of the transfer bar **47** and the plunger **55** and slides past them. After the protector block **10** has been inserted in the shell **12** the transfer bar **47** is retracted, the rod **60** and the aligning member **30** are raised, and the turret **25** is indexed to position the following shell **12** in the assembling station.

Any suitable mechanism may be provided for actuating the aligning member **30**, the rod **60**, and the transfer bar **47** in timed relation to each other and to the indexing

of the turret. As shown herein the rod **60** is connected through a pin and slot connection to one end of a lever **62** which is pivotally connected at its other end to a bracket **63** secured to the block **31**. The lever **62** is connected at an intermediate portion of the lever through a pin and slot connection to a rod **64** which is slidable in a sleeve **65** which is slidably mounted in an aperture in the supporting block **31**. At its lower end the push rod **64** is pivotally connected to a link **68** which is pivotally connected to a lever **69**. This lever is pivotally supported on a fixed bracket **70** and has a cam roller **71** engaging a cam **72** which is mounted on a shaft **73** driven in timed relation to the indexing of the turret **25**. The rod **64** is urged downwardly by a spring **75**, one end of which is connected to a bracket **76** and the other end of which is connected to a collar **77** fixed to the rod **64**.

The upper end of the sleeve **65** and the upper end of the aligning member **30** are secured to a plate **80** and the sleeve **65** is raised to its upper position (Fig. 2) by engagement of the lower end thereof with the collar **77** on the rod **64** in response to upward movement of the rod. A spring **81** connected at one end to the sleeve **65** and the other end to the bracket **76** serves to pull the sleeve **65** and the aligning member **30** downwardly to the position shown in Fig. 6 with the seat **34** of the aligning member **30** in engagement with the shell **12** in response to downward movement of the rod **64**. The plate **80** is stopped in its lower position by stop screws **82** mounted on block **31**. The vertically reciprocable cam **52** for controlling the horizontal reciprocation of the transfer bar **47** is secured to a vertical rod **85** which is mounted for reciprocation in lugs **86** on the block **31** and is pivotally connected to a link **88**. The link **88** is pivotally connected to a lever **89** which is oscillatably supported at one end in a bracket **90** and has a cam roller **91** on its other end which engages a cam **92** on the shaft **73** for actuating the lever **89** and the cam **52**. The cams **52, 72, 92** are shaped to effect the actuation of the various components of the mechanism in a predetermined timed relation to each other.

Thus, during each cycle of operation of the device the turret **25** is indexed to place a shell **12** in the assembling station, the aligning member **30** is moved from the upper position as shown in Fig. 2 to a lower position in engagement with the shell **12** as shown in Fig. 6 to align the shell with the bore **32** in the aligning member and the pusher rod **60** into an intermediate position, after which the transfer bar **47** is actuated to move the endmost protector block **10** from the guideway **42** into the bore **32** of the aligning member during which movement the plunger **55** engages the protector block to yieldably hold it against the end of the transfer bar to prevent it from tilting during its transfer movement, and after the protector block **10** has been moved into the bore **32**, the pusher rod **60** is actuated to push the protector block **10** from the aligning member into the shell **12**. The transfer bar **47** is then retracted and the aligning member **30** and the pusher rod **60** are raised to their upper position as shown in Fig. 2.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of this invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. In a device for inserting articles into tubular parts, means for supporting a tubular part at a predetermined station, an aligning member at said station having a guideway for guiding an article into the tubular part and having a lateral opening for movement of the article laterally into the guideway, means for guiding an article to and supporting it in a predetermined position adjacent to and in alignment with the lateral opening of the aligning member, means for moving the article from said guide means through said lateral opening into the guideway of the aligning member and for yieldably holding it therein, and means for moving the article from the aligning member into the tubular part.

2. In a device for inserting articles into tubular parts, a holder for supporting a tubular part a member having a guideway for guiding an article into the tubular part and having a lateral opening for movement of the article into the guideway, means for supporting the holder and the member for movement relative to each other into a predetermined position adjacent to each other with said guideway in alignment with the tubular part, guide means for guiding a row of the articles and positioning the end article in a predetermined position adjacent to and in alignment with the lateral opening in said member, a transfer element mounted for reciprocable movement in alignment with said end article, yieldable means for actuating said transfer element to move the end article from the guide means into the guideway of the member and yieldably retain it therein, and means for pushing the article from the guideway of said member into the tubular part.

3. In a device for inserting articles into tubular parts, a holder for supporting a tubular part, a member having a guideway for guiding an article into the tubular part and having a lateral opening for movement of the article into the guideway, means for supporting the holder and the member for movement relative to each other into a predetermined position adjacent to each other with said guideway in alignment with the tubular part, guide means mounted on the supporting means for guiding a row of articles and positioning the end article in a predetermined position adjacent to and in alignment with the lateral opening in said member, a transfer element mounted for reciprocable movement on said supporting means in alignment with said end article, yieldable means for actuating said transfer element to move the end article from the guide means into the guideway of the member and yieldably retain it therein, a plunger mounted on the member in alignment with said transfer element, resilient means for moving the plunger across the guideway and through the lateral opening for engaging the article being moved into the guideway to yieldably press the article against the transfer element to prevent it from tilting as it is moved into the guideway of said member, and means for pushing the article from the guideway of said member into the tubular part.

4. In a device for inserting articles into tubular parts, a holder for supporting a tubular part, an aligning member having a guideway for guiding an article into the tubular part and having a lateral opening for movement of the article into the guideway, means for supporting the holder and the aligning member for movement relative to each other into a predetermined position adjacent to each other and with the member in engagement with the tubular part, means on said member for aligning the tubular part with the guideway, guide means mounted on the supporting means for guiding a row of articles and positioning the end article in a predetermined position adjacent to and in alignment with the lateral opening in said aligning member, a transfer element mounted for reciprocable movement on said supporting means in alignment with said end article, yieldable means for actuating said transfer element for moving the article from the guide means into the aperture of the aligning member and for yieldably retaining it therein, a plunger mounted on the aligning member in alignment with said transfer element, resilient means for moving the plunger across the guideway and through the lateral opening for engaging an article being moved into the guideway to yieldably press the article against the transfer element to prevent it from tilting as it is moved into the guideway of said aligning member, and means for pushing the article from the member into the tubular part.

5. In a device for inserting articles into tubular parts, a holder for supporting a tubular part, an aligning mem-

ber having a bore for guiding an article into the tubular part and having a lateral opening for movement of the article into the bore, means for moving the aligning member relative to the holder into engagement with the article therein, means on said aligning member for aligning the tubular member with said bore, means for positioning an article adjacent to and in alignment with the lateral opening in said aligning member, a transfer element mounted on said supporting means for moving the article from said positioning means into the bore of said aligning member and yieldably retaining it therein, yieldable means for actuating said transfer element in timed relation to said aligning member, a spring pressed plunger mounted on said aligning member for movement across the bore and through the lateral opening for engaging an article being moved into the bore of the aligning member to yieldably press the article against the transfer element to prevent the article from tilting as it is moved into the aligning member, a pusher slidably mounted in the bore of the aligning member for pushing the article therefrom into the tubular part, and means for actuating said pusher in timed relation to said aligning member.

6. In a device for inserting articles into tubular parts, a holder for supporting a tubular part, an aligning member having a bore for guiding an article into the tubular part and having a lateral opening for movement of the article into the bore, means mounting the aligning member for reciprocable movement relative to the holder into engagement with the article therein, said aligning member having a seat for aligning the tubular member with said bore, means for actuating said aligning member, means for feeding a row of the articles and positioning the end article adjacent to and in alignment with the lateral opening in said aligning member, a transfer element mounted on said supporting means for moving the article in one direction from said positioning means into the bore in said aligning member, resilient means for moving the transfer bar in said one direction, means for actuating said transfer member in the opposite direction and controlling the movement thereof in said one direction, a spring pressed plunger mounted on said aligning member for movement across the bore and through the lateral opening for engaging an article being moved into the bore of the aligning member to yieldably press the article against the transfer element to prevent it from tilting as it is moved into the aligning member, a pusher slidably mounted in the bore of the aligning member for pushing the article therefrom into the tubular part, and means for actuating said pusher.

7. In an assembling device, a carrier for intermittently advancing successive tubular parts to an assembling station, an aligning member at said assembling station having a bore for guiding an article into the tubular part and having a lateral opening for movement of the article into the bore, means for supporting the aligning member for reciprocable movement relative to the carrier into engagement with the article therein, said aligning member having a seat for aligning the tubular member with said bore, means for actuating the aligning member in timed relation to the carrier, gravity feed means mounted on said supporting means for feeding a row of the articles and positioning the end article adjacent to and in alignment with the lateral opening in said aligning member when said aligning member is in engagement with said tubular part, a transfer element mounted on said supporting means for moving the article in one direction from said gravity feed means into the bore in said aligning member, resilient means for moving the transfer element in said one direction, means for actuating said transfer member in the opposite direction and controlling the movement thereof in said one direction in timed relation to said carrier, a plunger mounted on said aligning member in alignment with the transfer element, resilient means for moving the plunger across the bore and through the lateral opening for engaging an article being moved into the bore of the aligning member to yieldably press the article against the transfer element to prevent it from tilting as it is being moved into the aligning member, a pusher slidably mounted into the bore of the aligning member for pushing the article therefrom into the tubular part, and means for actuating said pusher in timed relation to the carrier.

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