Dec. 16, 1969 F. R. LINDA ET AL 3,484,515

METHOD OF APPLYING HANDLES TO CONTAINERS

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FIG. 1.

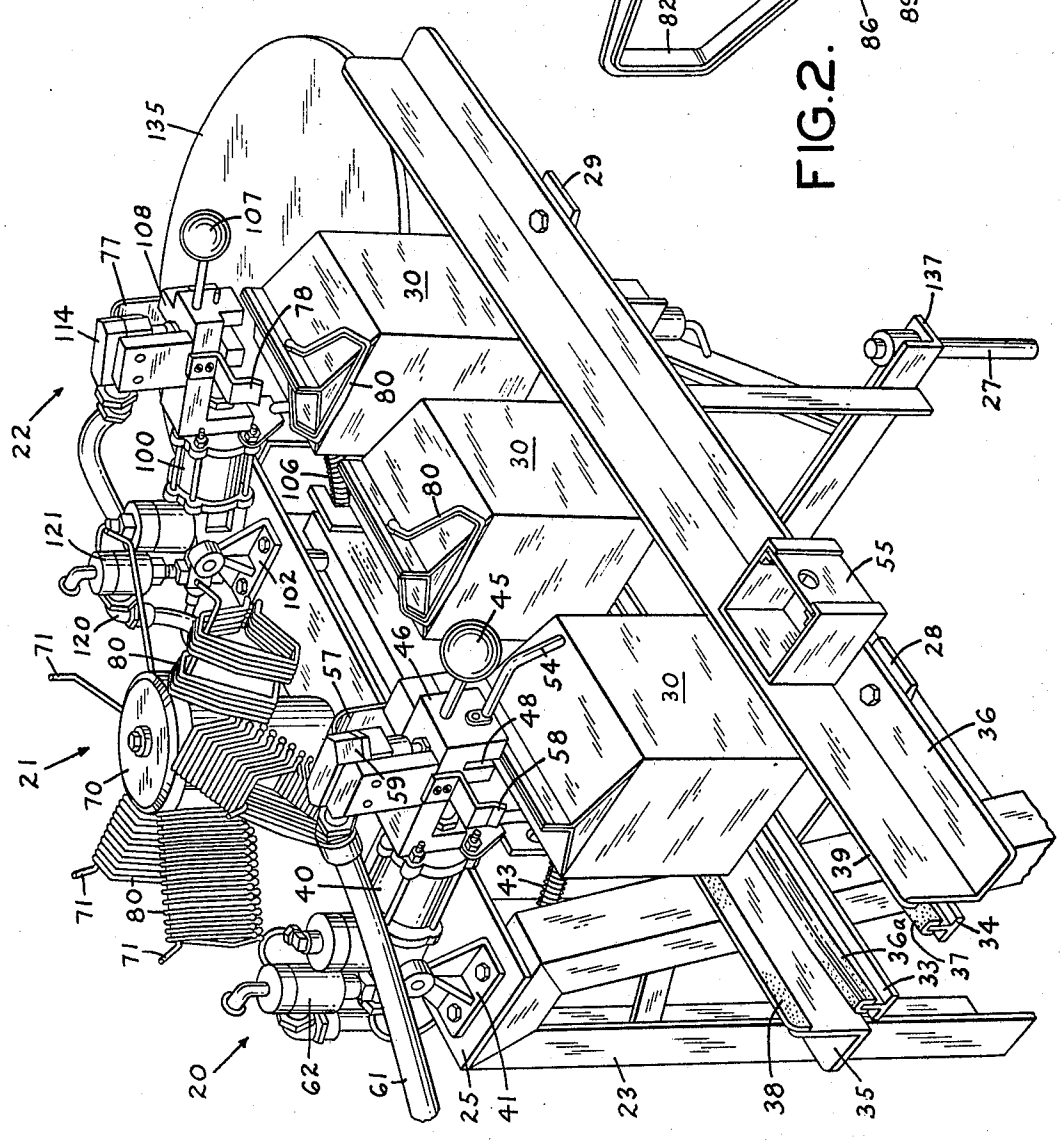
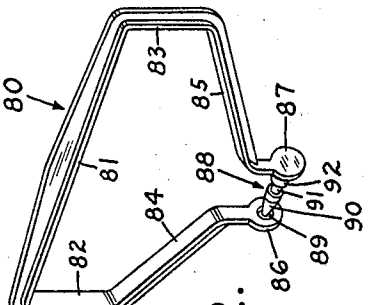


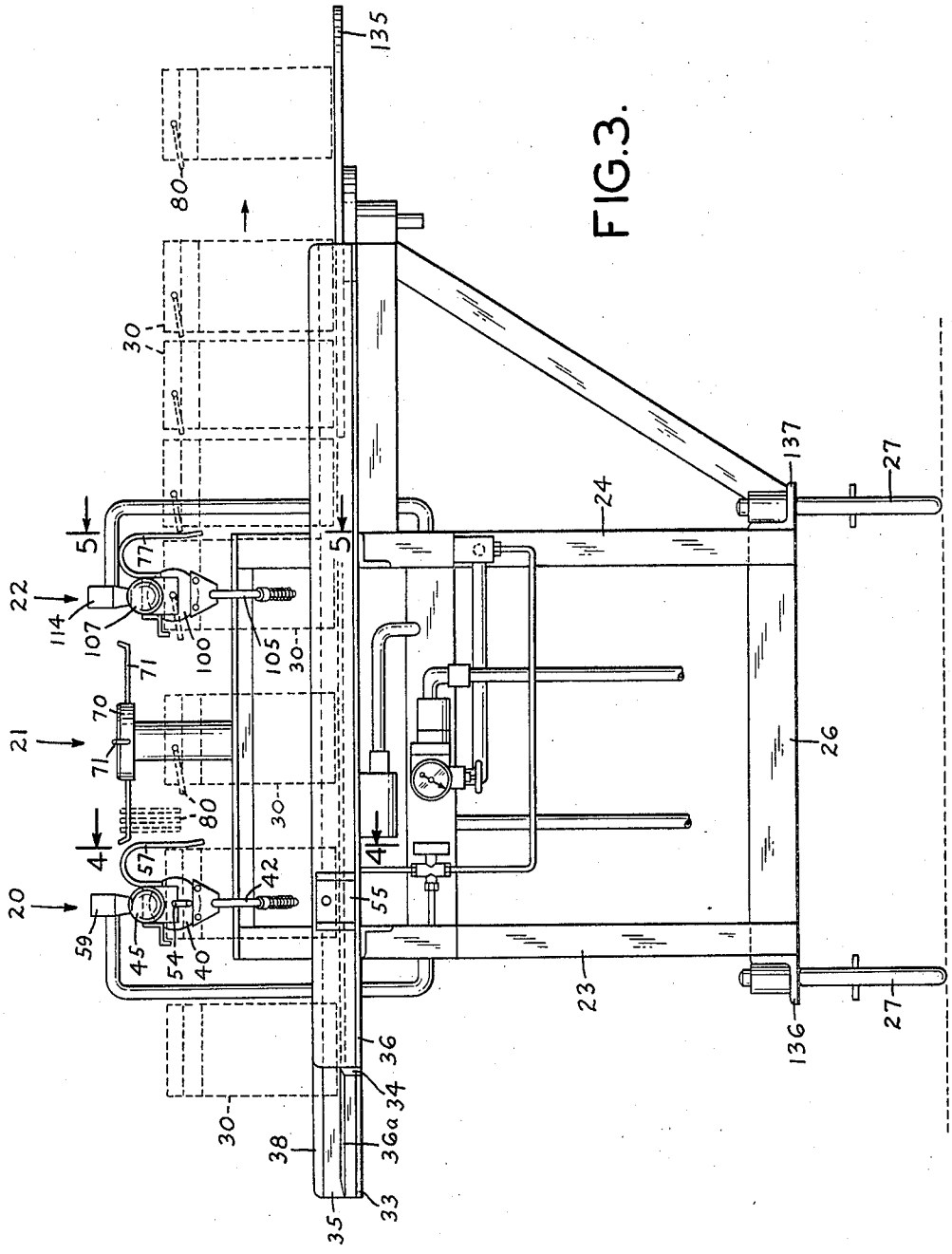
FIG. 2.



METHOD OF APPLYING HANDLES TO CONTAINERS

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FIG.3.



METHOD OF APPLYING HANDLES TO CONTAINERS

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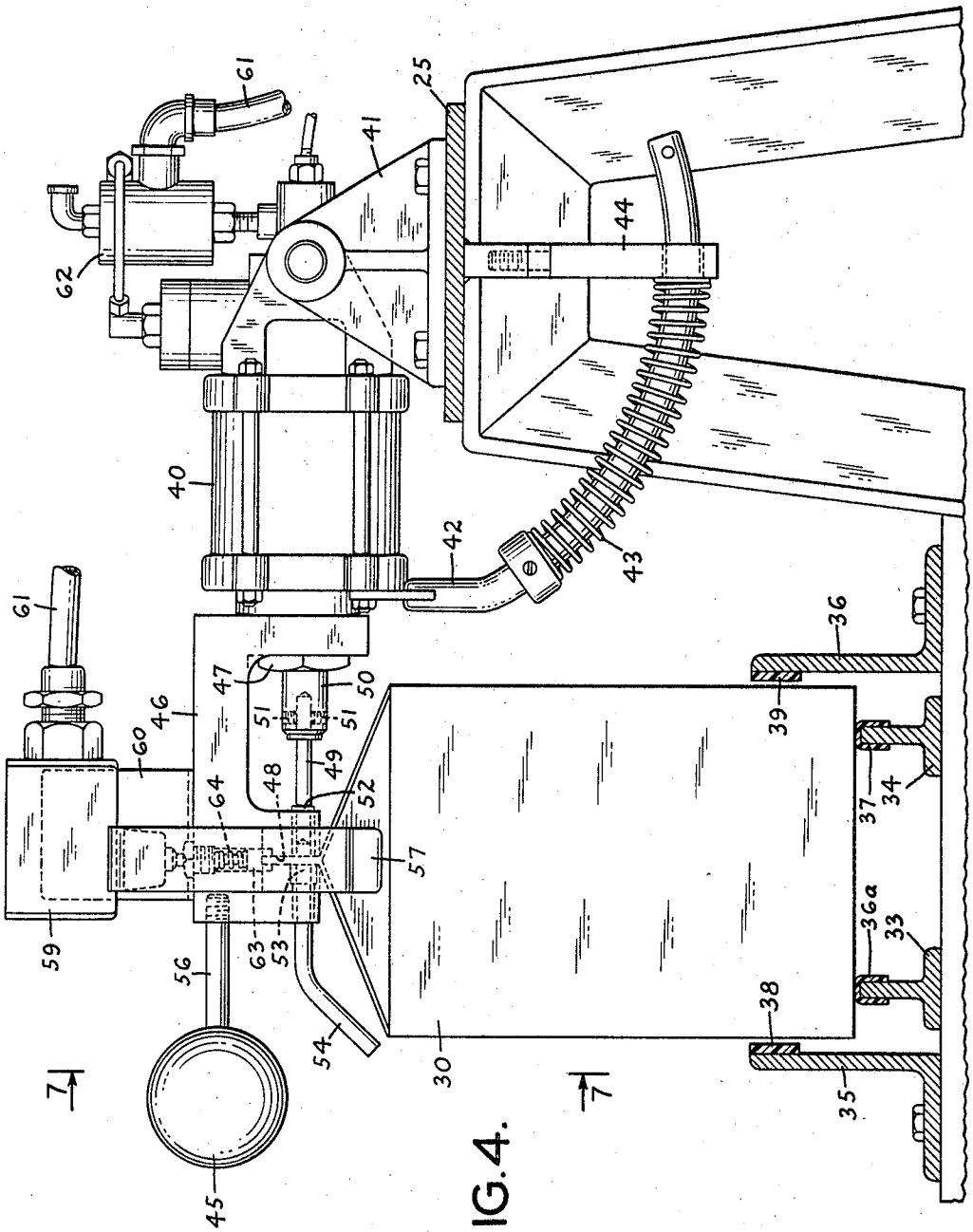


FIG. 4.

METHOD OF APPLYING HANDLES TO CONTAINERS

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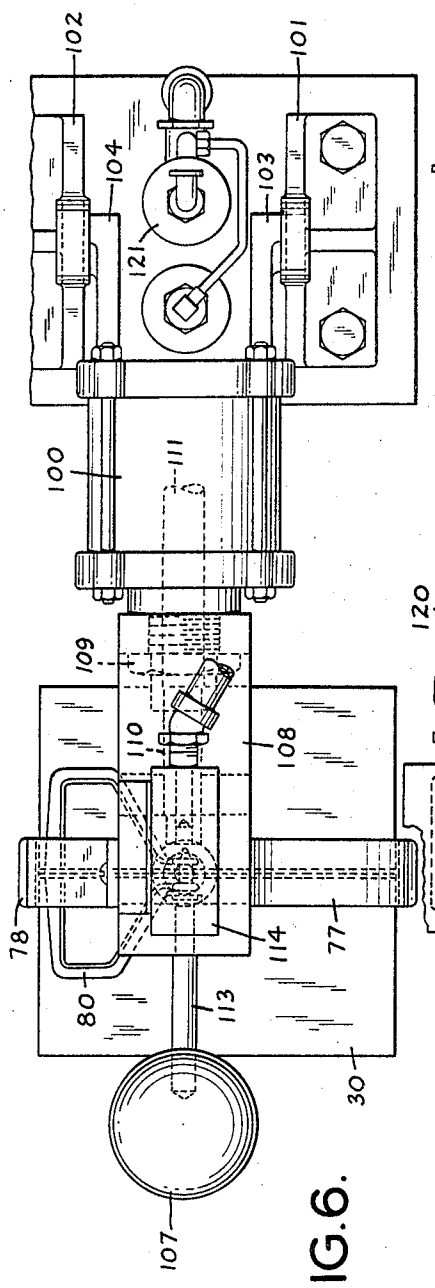


FIG.6.

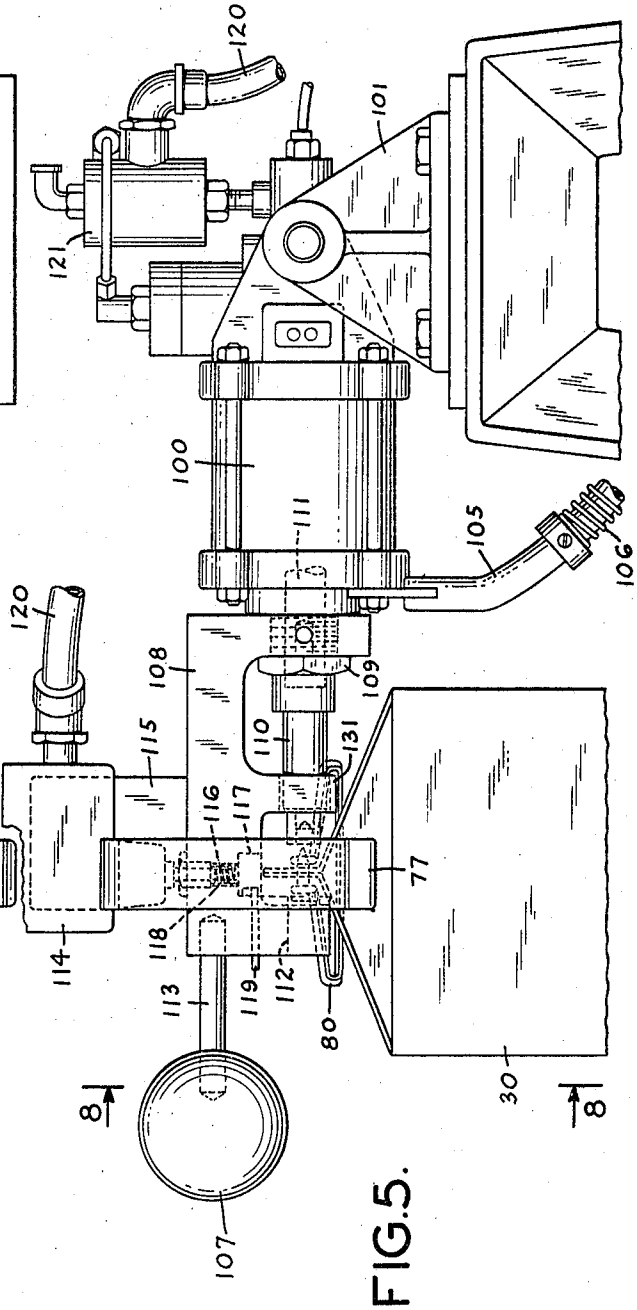


FIG.5.

METHOD OF APPLYING HANDLES TO CONTAINERS

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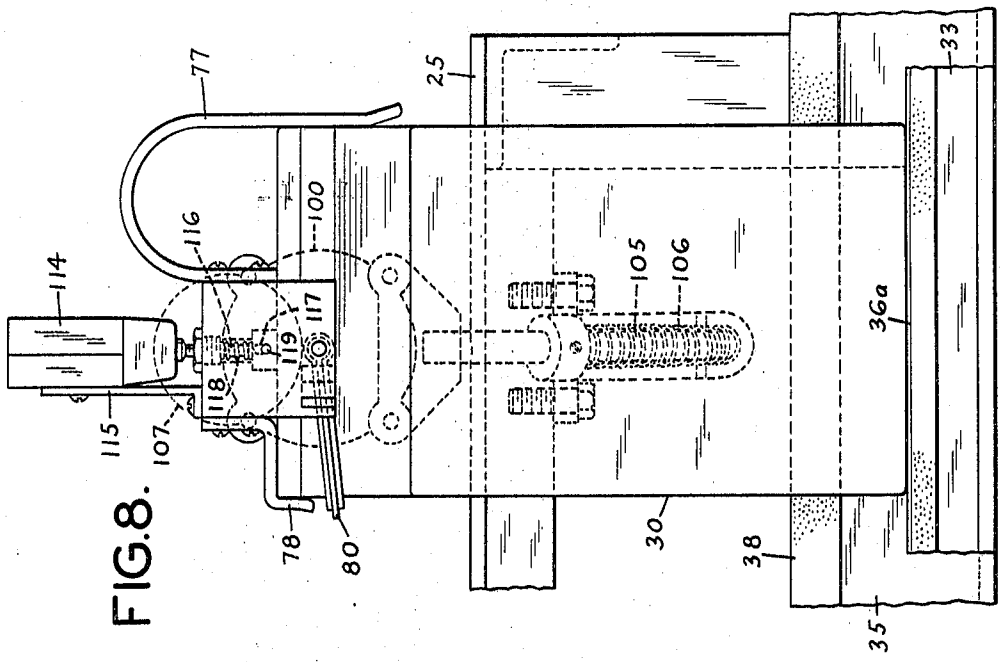


FIG.8.

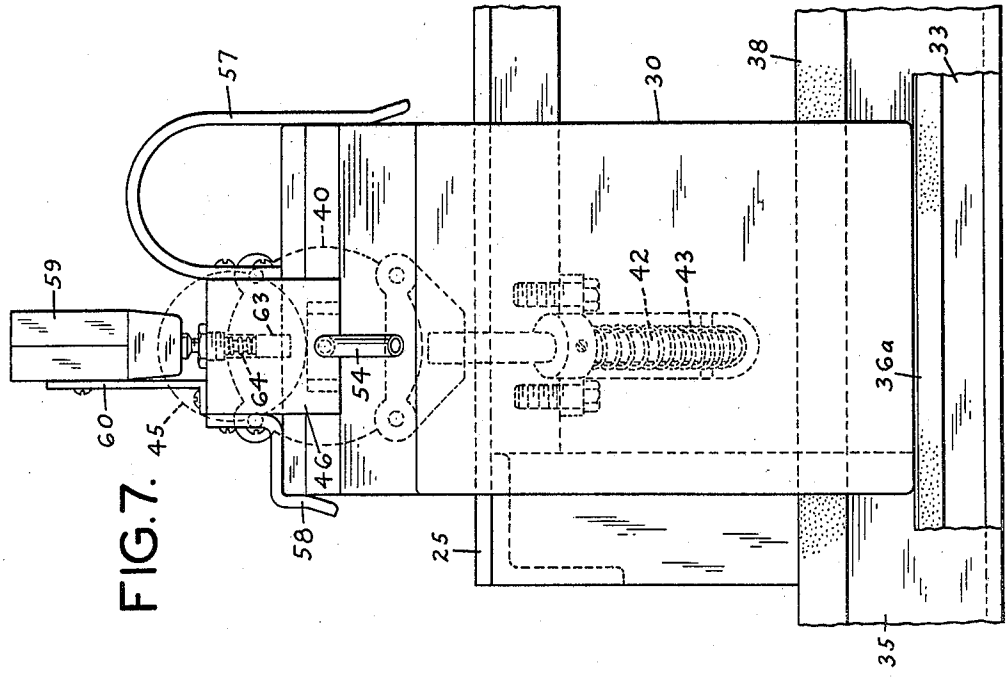


FIG.7.

METHOD OF APPLYING HANDLES TO CONTAINERS

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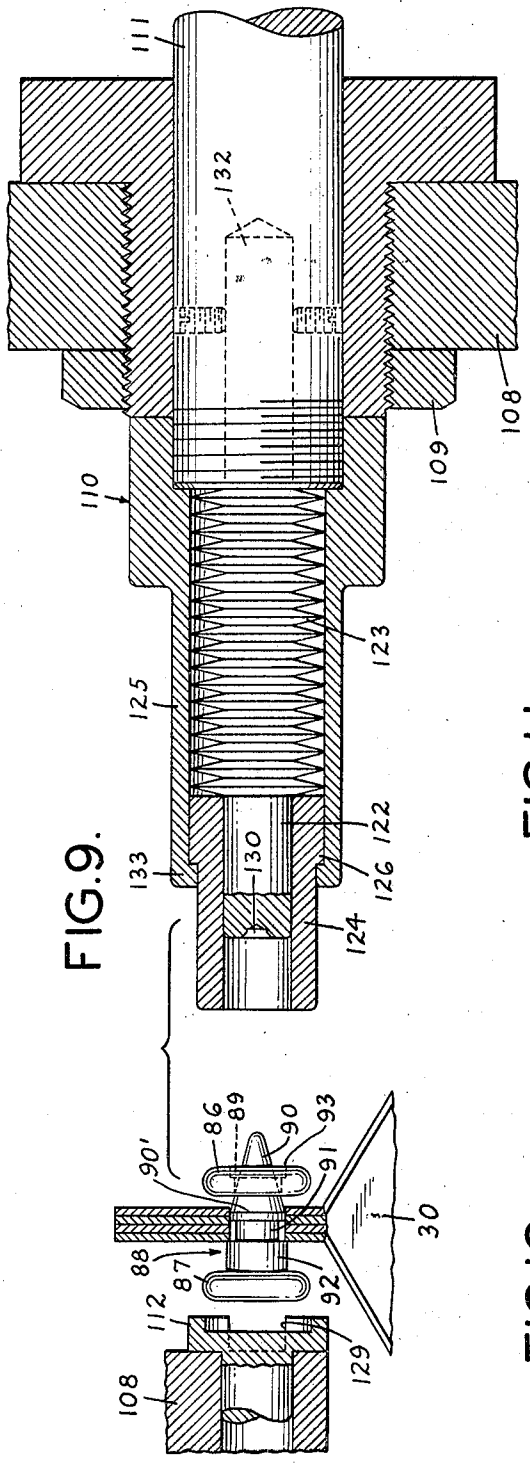


FIG.9.

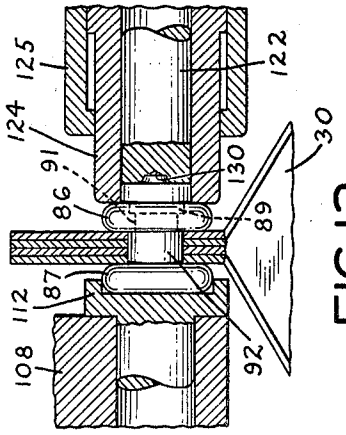


FIG.12.

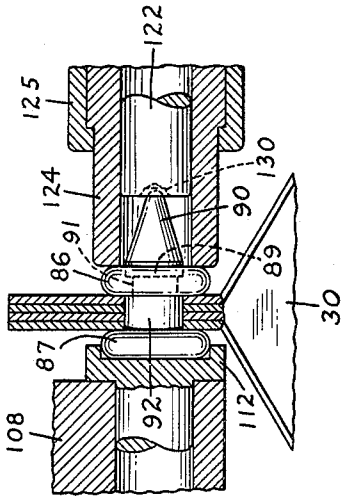


FIG.11.

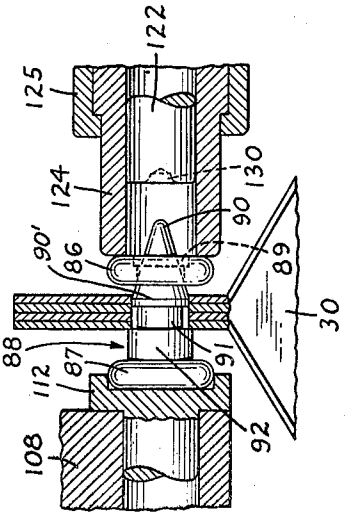


FIG.10.

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3,484,515

METHOD OF APPLYING HANDLES TO CONTAINERS

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Continuation-in-part of application Ser. No. 565,045, July 6, 1966. This application July 3, 1967, Ser. No. 650,989

Int. Cl. B29c 3/00

U.S. Cl. 264—242 4 Claims

ABSTRACT OF THE DISCLOSURE

A method for installing handles on paperboard cartons of the gable top variety. The handle has a unitary loop of material terminating, at one end, in the male element of a snap fit closure and, at the other end, in the female eye element of the closure. The male element has a conical surface, a shoulder, an annular groove and a cylindrical stud body. The method involves punching a hole in the gable ridge with a diameter approximately equal to the maximum cone diameter, placing the handle with the male element through the punched hole up to the cylindrical stud body and with the eye mated with the conical surface, simultaneously snapping the eye into the annular groove and pressing the stud body through the punched hole in an interference fit, and then cold heading the conical tip while maintaining the stud body in axial alignment with the female eye.

RELATED APPLICATIONS

This application is a continuation-in-part that discloses and claims subject matter disclosed and claimed in our earlier filed copending application Ser. No. 565,045, filed July 6, 1966, now Patent No. 3,373,924, which application in turn in part discloses and claims subject matter disclosed and claimed in our earlier filed application Ser. No. 521,362, filed Jan. 18, 1966, now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to a method for attaching handles to containers, particularly to gable top paperboard containers of the type used for merchandising and carrying milk or other heavy fluids.

In the aforementioned copending application Ser. No. 565,045 there is disclosed and claimed a type of plastic handle readily adapted for application to large paperboard containers of the type widely used for merchandising milk in half-gallon or gallon quantities. Very generally speaking, the handles of that application are designed and constructed to be attached to the containers by the use of mating male and female members. In the detached conditions such members are in loose contact. When attached to the container, the male member is inserted through a punched hole in the gable ridge of the container and mates on the opposite side of the ridge with the female member. In order to avoid leakage, it is important that the fit between the male member and the punched hole be an interference or "press" fit. The two members are so shaped and proportioned that there is obtained a snap lock between them. However, in order to provide a more permanent attachment of the handle, it is desirable to obtain a secondary locking of the members. This is readily achieved by heading or setting the protruding portion of the male member in a manner analogous to the riveting process for metal elements.

The complete method of attaching the handles requires four distinct steps and in general, when the process is mechanized, there are required three or four operating stations with easy transportation of the containers from

station to station, since it is usual to fill the containers before applying the handles thereto. First, it is necessary to perforate the gable ridge of the container to receive the male member or stud of the handle; second, the stud of the handle must be inserted through the perforation; third, the female member must be pressed over the stud to establish the snap lock; and fourth, the protruding end portion of the stud must be headed to form a permanent lock. The second step may be divided into two sequential parts, first inserting the stud into the perforation and then forcing the stud completely through the gable ridge.

While the method of the invention can be carried out by hand, with the use of suitable hand tools, it is desirable to minimize hand operations. Hence it is an object of the invention to readily attach handles of the type described to gable top containers by the use of a minimum of manual manipulation.

It is a further object of the invention to accomplish both the punching of the container and the locking together of the attaching portions of the handle by power-driven mechanism.

A still further object of the invention is to establish both the snap lock of the attaching male and female members of the handle and heading of the protruding male member in a continuous power-driven operation.

In the illustrated embodiment of the invention the gable ridge of the filled container is perforated by a power punch, provided with a chute and container for collecting the punchings. This latter feature is particularly desirable where the fluid being handled is milk, since the standards for dairy operation, including legal requirements, demand neat and sanitary conditions. The second station in which the handles are manually applied to the containers is provided with a magazine of the turret type for holding a supply of handles so that they can be rapidly and readily placed in position on the container for the ultimate fastening thereto. At the final station, the power-driven mechanism brings the male and female members into snap lock relationship and in a continuous motion, permitted by a resilient connection between the snap lock tool and the heading tool, forms the final head of the protruding stud of the male attaching portion.

BRIEF DESCRIPTION OF THE DRAWING

These and other objects and features of the invention may be more readily understood by reference to the following detailed description of one illustrative embodiment of the invention as shown in the drawing in which:

FIG. 1 is a perspective view of a complete machine comprising an embodiment of the invention.

FIG. 2 is a perspective view to an enlarged scale of a typical handle applied by the machine of FIG. 1.

FIG. 3 is a front elevational view of the machine of FIG. 1, with the containers and handles shown in phantom by dotted lines.

FIG. 4 is a side elevational view to an enlarged scale taken along the line 4—4 of FIG. 3.

FIG. 5 is a partial side elevational view to an enlarged scale taken along the line 5—5 of FIG. 3.

FIG. 6 is a plan view corresponding to the elevational view of FIG. 5.

FIG. 7 is a front elevational view taken along the line 7—7 of FIG. 4.

FIG. 8 is a front elevational view taken along the line 8—8 of FIG. 5.

FIG. 9 is a cross-sectional view to a greatly enlarged scale of the fastening and heading tool of the heading station shown in FIGS. 5, 6, and 8; and

FIGS. 10, 11 and 12 are cross-sectional views showing the fastening and heading tool in various positions during its operation.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring particularly to FIGS. 1 and 3, the handle attaching machine of the illustrated embodiment of the invention comprises three stations, namely, a punching station **20**, a handle application station **21**, and a heading station **22**. The mechanism for these three stations is supported on a framework comprising in general two end A-frame members **23** and **24**, interconnected by a top mounting plate **25**. Bottom framing is provided by angle irons **136** and **137** welded to the members **23** and **24** respectively, and a steel bar **26** welded to the angle irons **136** and **137**. Legs **27** carried by the angle irons **136** and **137** support the entire machine from the floors. Cross braces may be provided for stability.

Brackets **28** and **29** secured to the A-frame members **23** and **24** carry a track for supporting and transporting the containers such as **30**. This track comprises supporting or slide rails **33** and **34** and guide rails **35** and **36**.

The supporting rails **33** and **34** are provided with weld strips **36***a* and **37** to prevent abrasion of the containers as they pass thereover. Nylon or similar material may be used for these strips. The material sold under the trade name Polypenco Nylatron obtainable from the Polymer Corporation of Reading, Pennsylvania, has been found quite satisfactory for this purpose. The guide rails **35** and **36** are also provided with facings **38** and **39** of similar material for the same purpose. Facings **38** and **39** may extend over the edges of the guide rails.

Following the heading station there is provided a turntable **135**. The surface of this table is at the level of the supporting rails **33** and **34** so that the finished containers can be readily received thereon.

The punching station is provided with an air motor **40** of the pneumatic piston-driven type for driving the punch. As shown in more detail in FIG. 4, this motor and its driven mechanism are pivotally supported at the rear by two brackets **41**. In order to maintain the punching mechanism in a normally non-operative position, there is provided a spring balance arm **42** attached at its front end to the motor **40** and supported in the rear by the spring **43** from a bracket **44** attached to the main frace. The spring maintains the punching mechanism normally in an upper position as shown in FIG. 1, and it is brought to the operating or punching position as shown in FIG. 4 by pulling down on a knob-like handle **45**.

The construction of the punching mechanism can probably be best understood by reference to FIGS. 4 and 7 in which it is shown in larger scale than in the overall assembly drawings of FIGS. 1 and 3. A yoke **46** is secured to the head of the air motor **40** by a nut **47**. The left hand arm of the yoke **46** is provided with a notch **48** which fits over the gable ridge of the container when the mechanism is in the lowered position as shown in FIG. 4. Contact between the top of slot **48** and the top of the gable ridge serves to position the yoke **46** relative to the top of the gable ridge.

The actual punching is performed by a punch pin **49** which is secured in a hole in the piston rod **50** of the air motor by means or set screws **51**. This pin rides in a bushing **52** mounted in the left hand arm of the yoke **46** and after piercing the gable ridge of the container engages a die block **53** also carried by the left hand arm of the yoke **46**.

A spout **54** attached to the face of the left hand arm of the yoke **46** and having its opening aligned with the hole in the die block **53** provides a guide for discharging the punchings into a container **55** shown in FIG. 1. The use of this spout and container is most desirable if not necessary where the containers are used for dispensing milk. In such a case the machine will be used in a dairy where the sanitary standards would not permit the punchings to be scattered on the floor.

The actuating handle **45** is attached to the yoke **46** by means of a rod **56**. Guide brackets **57** and **58** (FIGS. 1 and 7) attached to the yoke **46** are so dimensioned as to position the container with respect to the punch mechanism so that the hole will always be at the proper position in the gable ridge. Bracket **57** preferably acts as a spring to push the container against bracket **58** which affords a positive location. It is desirable that the positive location of the container be achieved relative to the gable ridge end adjacent the handle attachment location. In this way the handle will not be mislocated if, as sometimes happens, the gable panels are offset from each other.

As shown in FIG. 1, the handles are attached adjacent the left sides of the containers. If the handles were attached adjacent the right sides in this embodiment of the invention, a single positive container locating stop at the right end of the container would afford adequate container locating.

The operation of the air motor is achieved through the use of a microswitch **59** mounted on the top of the yoke **46** by means of a bracket **60**. The microswitch is connected through a cable **61** to a mechanism generally designated **62** and which may include a timing device and a solenoid operated air valve which controls the supply of compressed air to the air motor **40**. The microswitch is operated by a switch pin **63** carried in a hole through the yoke **46**. Normally, the switch pin **63** is retracted by spring **64** but when the mechanism is brought into the operating position the lower end of the swtch pin **63** engages the gable ridge of the container and is pushed upward to operate the microswitch to its closed position. This is illustrated in the operating position of the mechanism shown in FIG. 4. As shown in this figure while the microswitch has been operated the air motor **40** has not yet functioned to advance its piston rod **50** and the punch pin **49**. It is desirable that the microswitch **59** operate a non-recycling timer which in turn will operate the solenoid operated air valve a short time after the microswitch has been operated. This time delay, which may be of the order of ¼ to ½ second, insures that the air valve will not be actuated before the yoke is fully down on the gable ridge. The air cylinder is released and the punch pin **49** is retracted by the timer after the hole has been punched in the gable ridge. Typically the forward extension and retraction of the piston rod **50** and punch pin **49** will require about ½ second.

As shown particularly in FIG. 3 the air motor **40** and an additional motor for the heading station to be later described require air conduits, pressure regulating valves, gauges and the like. While these are illustrated, particularly in FIG. 3, they are conventional and will not be described.

The second or handle application station of the machine comprises a turret-like magazine **70** having a plurality of radial arms **71** on which the handles may be readily hung for application to the containers. The mechanism **70** is rotatable so that the handles may be applied to the hanger **71** from the rear of the machine and readily rotated to the operating position by the operator in front of the machine. For efficient operation all handles on the magazine should be oriented identically.

The preferred type of handle which the machine illustrated is designed to install as shown in perspective FIG. 2 is that described and claimed in the aforementioned copending application, Ser. No. 565,045.

Briefly, the handle **80** is of a five-sided or pentagonal loop shape with a substantially horizontal hand grip side **81** joined at its extremities with two perpendicular sides **82** and **83**. These in turn are joined respectively to two inward sloping sides **84** and **85**. The sloping sides **84** and **85** terminate in respective tabs **86** and **87**. The male tab **87** is provided with a stud **88** which engages a hole **89** in the female tab **86**.

As is shown more clearly in the enlarged view of FIG. 9, the stud **88** comprises at its extremity a pilot portion **90** which should be tapered and is preferably conical in

shape. The base of the pilot portion **90** is an annular shoulder **90'** whose diameter is approximately equal to or slightly smaller than the diameter of the hole punched in the gable ridge to afford a slip fit. For example, if the punched hole had a diameter of 0.193" (which with manufacturing tolerances might be from 0.1928 to 0.1931"), the annular shoulder **90'** might have a diameter, with manufacturing tolerances, lying in the range of 0.188" to 0.193". Thus the pilot portion **90** and shoulder **90'** can relatively easily be pushed through the hole punched in the gable ridge. This permits pilot portion **90** to engage hole **89** in female tab **86** so that hole **89** will be aligned with a cylindrical intermediate portion **91** of stud **88**. The portion **91** is formed as an annular groove in stud **88** and has a diameter substantially equal to that of hole **89**. Inwardly of the annular groove **91** the stud **88** has a cylindrical body portion **92** which projects integrally from tab **87**. The body portion **92** has a diameter substantially greater than that of the punched hole in the gable ridge so that a substantial force is necessary to push the body portion **92** through the punched hole. Typically the body portion **92** of stud **88** may have a diameter about .005" to .010" greater than the punched hole diameter.

It is desired that there be an interference or "press" fit between the body portion **92** of stud **88** and the punched hole in the gable ridge to avoid leakage from the container. With the polyethylene coated paperboard materials usually employed in making gable top milk containers of the gallon size, this construction (with the dimensions referred to) will require a force of the order of 80 pounds to force the stud body portion **92** through the hole in the gable ridge.

As shown in FIG. 9, the hole **89** in female tab **86** is provided with a recess **93** into which annular shoulder **90'** fits when the tabs **86** and **87** are brought into interlocking relation.

The handle **80** is so shaped and proportioned that the closure tabes **86** and **87** are urged into contact with each other. This has certain advantages particularly the avoidance of interlocking between different handles thus making them much easier to manipulate. The use of the conical shaped termination for the stud **88** not only contributes to the snap locking feature but also has an additional advantage. This is the fact that while the tabs are normally urged into contact with each other, the stud **88** is only partially inserted in the female tab **86**. Consequently, they can be very readily separated for the insertion of the stud **88** through the hole in the gable ridge of the container. A minimum of manipulation and a very small force are required to snap the stud **88** through the hole.

After a handle such as **80** has been inserted in the punched hole in the gable ridge the container carrying such handle is advanced to the heading position.

The overall mechanism of the heading position is quite similar to that of the punching station with the obvious exception of the tooling elements.

Thus, referring particularly to FIGS. 5, 6 and 8, there is provided an air motor **100** for operation of the mechanism. This is pivotally supported at its rear by brackets **101** and **102** carried by the top plate **25** of the general assembly. The arms **103** and **104** of the air motor have axial terminations which engage bearings in the brackets **100** and **102**. This is similar to the support for the motor **40**.

A spring balance **105** attached at its upper end to the frame of the air motor **100** holds the entire mechanism in its normal upper position by the action of the spring **106**. This position of the mechanism is illustrated in FIG. 1. In FIGS. 5, 6 and 8 the mechanism has been brought into the operating position by pressure applied to the handle **107** by the operator.

A double yoke **108** is mounted on the face of the air motor **100** by means of a nut **109**. The tool mechanism **110** which will be later described in more detail with reference to FIG. 9 is attached to and carried by the piston rod **111** of the air motor. The outer cylindrical member of this tool **110** rides in a bushing **131** carried by the central arm of the double yoke **108**. A stud setting socket button **112** is carried by the left hand arm of the double yoke **108**. This acts as an anvil in the locking and heading operation. The knob **107** is secured to the yoke **108** by the rod **113**.

In a manner similar to the control of the punching mechanism the control of the air motor **110** is effected by a microswitch **114** which is supported from the yoke **108** by a bracket **115**. A switch actuating pin **116** having an enlarged head portion **117** which engages the top of the gable ridge actuates the microswitch **114** when the mechanism is moved into the operating position in which it is shown in FIGS. 5, 6, and 8. In the normal upper position of the mechanism the actuating pin is held in a non-operating position by the spring **118**. Movement of the actuating pin is confined by a locking pin **119** inserted through a hole in the left hand arm of the yoke **108** and having its inner end riding in a slot in the head **117** of the actuating pin **116**.

The microswitch is connected through a cable **120** to a non-recycling timer and solenoid operated air valve mechanism **121** which controls the application of compressed air to the motor **100** in essentially the same manner as in the punching operation described above. However it is desirable to have a time delay in release of the compressed air of about 3 seconds. This holding time provides better cold heading. The operator does not need to hold the head down because the head will be held down by the weight of the container until the air is released and retraction of the tool mechanism **110** frees the container.

At the heading station there are provided guide brackets **77** and **78** for positioning the container with respect to the heading mechanism. The brackets **77** and **78** function in the same way as is described above with respect to brackets **57** and **58**. Similarly, contact between the yoke and the top of the gable ridge serves to afford proper vertical positioning of the yoke **108**.

As indicated above, the tool portion of the mechanism of the heading station is best illustrated in enlarged view of FIG. 9. A heading pin **122** is supported in a hole **132** in the piston rod **111** of the motor **100** being secured therein by set screws. Surrounding the heading pin is a series of spring washers **123**. These may for example be Belleville spring washers of the type manufactured by the Associated Spring Corporation. Instead of using spring washers a helical spring or similar resilient coupling may be used. Riding on the end of the heading pin **122** there is a cylindrical snap lock sleeve **124**. The sleeve **124** and the spring washers **123** are held in assembled relation on the pin **122** by a retaining sleeve **125**. A set screw (not shown) may be provided to prevent sleeve **125** from rotating with respect to piston rod **111**. Threads are formed on the inside of the right hand end of the retaining sleeve **125** and on the end of the piston rod **111** for holding the two members in secured relationship. The sleeve **124** has an enlarged or shoulder portion **126** which rides on the inside of the retaining sleeve **125** and is held therein by the internal flange **133** at the end of sleeve **125**.

The anvil **112** which is recessed to receive the male tab **87** also has a cut out portion **129** to provide clearance for arm **85** of the handle. The left hand end of the heading pin **122** is shaped for piloting and forming the end of the stud **90** in the cold heading operation as indicated by the lines **130** and shown in FIGS. 9–12. A dimple in the end of heading pin **122** serves to hold the piloting tip of the stud in axial alignment during cold heading.

In FIG. 10 the piston rod **111** has been advanced to the position in which the snap locking operation is just beginning. The sleeve **124** has come into contact with the female tab **86**, and male tab **87** has just been seated in anvil **112** via slight shifting of the container to the left.

In FIG. 11 the piston rod has further advanced to the position in which the snap lock has been completed, the body portion **92** has been pressed through the hole punched in the gable ridge, and simultaneously, the female tab **86** has been forced over the conical portion **90**, and snap locked on the small diameter neck portion **91**. In this position the heading pin **122** is just coming into contact with the piloting tip of the conical portion **90** of the stud **88**.

In FIG. 12, the piston rod has completed its travel and the conical end **90** of the stud has been upset to produce a locking cap **130**, whose radial expansion has been limited by the inside cylindrical wall of sleeve **124**. Thus there is produced a second positive lock between the two members of the handle similar to a riveting operation where metallic members are concerned. It will be noted that as the heading pin **122** is advanced to this final position the locking sleeve **124** is forced rearward within the retaining sleeve **125** against the pressure of the springs **123** as illustrated. For proper cold heading it is important that the stud **88** be held in axial alignment as the piston rod advances and the piloting end of the stud is deformed. For this purpose the recess in the end of heading pin **122** should be shaped and proportioned, as with the dimple shown, to hold the piloting tip of the conical portion of the stud and prevent the latter from being moved out of axial alignment with the balance of the stud.

While the apparatus described is highly desirable for attaching the handle to the container, this operation can be performed manually with the assistance of simple tools. Likewise the operation can be performed with other forms of apparatus, e.g., more sophisticated automatic machinery.

In a manual operation, a hole of the proper diameter would first be punched in the gable ridge. As a second step, the handle would then be positioned above the gable ridge and the piloting end of the stud would be inserted through the punched hole and the eye of the female end of the handle would be mated with the piloting end of the stud. The third step would involve forcing the body portion of the stud through the punched hole in the gable ridge to achieve an interference fit. A fourth step, which preferably would be conducted simultaneously with the third step, would be to snap the eye ring of the female end over the annular shoulder and into engagement with the annular groove to provide a snap fit. Finally the conical portion of the stud would be cold headed while the piloting tip was held in axial alignment with the balance of the stud.

The terms and expressions that have been employed herein are used as terms of description and not of limitation, and there is no intention in the use of such terms and expressions to exclude any equivalents of the features shown and described or portions thereof, but it is recognized that various modifications are possible within the scope of the invention claimed.

What is claimed is:

1. The method of attaching handles to the gable ridge of containers of the gable top type by means of attaching ends formed as male stud and female ring members, said male member having, in axial alignment, a cylindrical base section, an annular groove adjacent said base section, an annular shoulder adjacent said groove and a tapered piloting end extending from said shoulder to a free end, said female member having a circular opening having a diameter substantially equal to the diameter of said groove but being substantially smaller than the diameter of said shoulder, comprising the steps of:

(1) punching a circular hole in said gable ridge, said hole having a diameter substantially equal to the diameter of said shoulder but being substantially smaller than the diameter of said base section whereby when said base section is forced through said hole in a subsequent step an interference fit is achieved therebetween;

(2) placing a handle in juxtaposition with said gable ridge and with said piloting end, shoulder and groove of said stud extending through said hole so that said piloting end of said stud engages said circular opening;

(3) forcing said base section through said hole in said gable ridge;

(4) forcing said piloting end of said stud through said circular opening to cause said circular opening to be aligned with said annular groove in a snap engagement;

(5) cold heading said piloting end of said stud; and

(6) holding the tip of said piloting end in axial alignment with the balance of said stud during said cold heading step.

2. The method set forth in claim **1** in which said tapered piloting end is conical in shape.

3. The method set forth in claim **11** in which the diameter of said cylindrical base section is of the order of 0.005″ to 0.010″ greater than the diameter of said punched hole.

4. The method set forth in claim **1** in which said third and fourth steps are conducted simultaneously.

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CHARLIE T. MOON, Primary Examiner

U.S. Cl. X.R.

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PO-1050
(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,484,515 Dated December 16, 1969

Inventor(s) F. R. Linda et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 3, line 20, "weld" should be -- wear --;
line 42, "frace" should be -- frame --;
line 60, "or" should be -- of --;

Col. 4, line28, "swtch" should be -- switch --;

Col. 5, line 38, "tabes" should be -- tabs --;

Col. 8, line 34, "claim 11" should be -- claim 1 --.

SIGNED AND
SEALED
JUN 9 1970

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents