A unit which receives a strip of paper or the like consisting of individual caps joined together at notched joints or connections of narrower widths and feeds and guides the strip to a position where a section of it, including a predetermined number of joined caps, is disposed over and aligns with the upwardly opening mouths of the same number of paper cones or protective containers containing ice cream cones or other edible confections. The individual paper caps of the strip section are all separated and applied to the mouths of the paper cones simultaneously by a capping means which consists of a plurality of simultaneously reciprocable combined shearing and sealing plunger assemblies.

The strip of paper caps is usually supplied in the form of a roll and after a predetermined length or section of the strip is fed and guided into the capping means, the capping means is actuated to impale the strip section and shear it by special impaling and shearing blades at the notched joints to separate the individual caps of the strip section from each other and to simultaneously form and apply the separated caps in sealing positions in the mouths of the paper cones, the strip section being sheared from the remainder of the strip at the last shearing blade.
FEEDER, SHEARER AND APPLICATOR FOR A STRIP OF CONNECTED PAPER CAPS

BACKGROUND OF THE INVENTION

The present invention will be described as being particularly applicable to a machine which receives a series of edible cones and inserts them in protective paper cones, fills the paper enclosed cones with ice cream, applies syrup to the tops of the ice cream cones, deposits nuts on the syrup-covered tops, and seals the open-mouths or upper ends of the paper cones with individual caps supplied and formed from a roll of joined paper caps in strip form. The operations of producing the edible cone articles are similar to those described in the U.S. Pat. No. 2,934,872 to Wise dated May 3, 1960 and the capped package is similar to that disclosed in the U.S. Pat. No. 2,965,949 to Wise dated Dec. 20, 1960. However, the first patent discloses a machine of the rotary turret type wherein successive individual cones are fed to successive stations for the filling, treating and capping operations. The unit of the present invention is applied to a straight-line machine which feeds the filled paper cones as transverse successive rows, each row containing a selected number of cones to be capped and sealed. This unit feeds a section of the strip, having the same number of caps, over the upwardly opening mouths of one of the rows of cones, to a capping means consisting of a plurality of combined shearing and sealing plunger assemblies which substantially simultaneously separate the caps, form them and seal them in the mouths of the paper cones of that row.

SUMMARY OF THE INVENTION

The unit of this present invention feeds and guides the strip of caps into the capping means, over the row of cones to be capped, and impales it to stabilize it and precisely locate it over the respective cones where the caps are sheared from each other and substantially simultaneously formed and sealed in the mouths of the cones. Thus, with this invention, a plurality of the cones are capped and sealed simultaneously and production is greatly increased.

BRIEF DESCRIPTION OF THE DRAWINGS

The best mode contemplated in carrying out this invention is illustrated in the accompanying drawings in which:

FIG. 1 is a plan view of the portion of a package which includes the unit of this invention.
FIG. 2 is a plan view of the unit of this invention.
FIG. 3 is a horizontal view taken along line 3—3 of FIG. 1.
FIG. 4 is an enlarged view, partly cut away, showing a portion of the capping means.
FIG. 5 is an enlarged sectional view taken along line 5—5 of FIG. 4.
FIG. 6 is an enlarged sectional view taken along line 6—6 of FIG. 4.
FIG. 7 is an enlarged sectional view taken along line 7—7 of FIG. 4.
FIG. 8 is an enlarged sectional view taken along line 8—8 of FIG. 3.
FIG. 9 is an enlarged sectional view taken along line 9—9 of FIG. 3.
FIG. 10 is a sectional view taken along line 10—10 of FIG. 9.
FIG. 11 is a view taken at line 11—11 of FIG. 7.
FIG. 12 is a sectional view taken at line 12—12 of FIG. 11.
FIG. 13 is a sectional view taken at line 13—13 of FIG. 11.
FIG. 14 is a sectional view taken at line 14—14 of FIG. 1.
FIG. 15 is a vertical sectional view showing the sealing plunger of FIG. 14 in its final sealing position.

DETAILED DESCRIPTION OF THE INVENTION

With particular reference to FIGS. 1 to 4 of the drawings, the unit of this invention is indicated generally by the numeral 20 and is shown in cooperative relationship with a conveyor 25 which may be of any suitable type designed to bring successive transverse rows of containers or cones C (FIG. 15) into association with the unit 20 where paper caps or lids P are adapted to be applied to and sealed on the upwardly opening mouths of the cones. The cones C are inserted in and are carried by transverse rows of sleeve-like sockets 21 which are carried at longitudinally spaced intervals on the conveyor 25, which is indicated as an endless chain type but may be of the belt type or other suitable type, intermittently moved to bring the rows of cones successively into cooperation with the unit 20. This unit will include a transverse row of combination shearing, forming and sealing plunger assemblies 22 equal in number to the sockets 21 of each successive row. Each row of sockets 21 may be in any suitable number but in the example shown, each row consists of six sleeves for receiving that number of cones. The paper cones C, usually with edible cones therein, are inserted in the sockets 21 and are subjected to the filling and treating operations described in said U.S. Pat. No. 2,934,872 before reaching the unit 20, as they are advanced to successive stations by the conveyor 25, but this unit 20 is not limited to action on that specific edible product but may be used in applying the paper caps P to any suitable containers to be sealed and not only to the specific type of containers illustrated.

The paper caps P for use in the unit 20 are preferably supplied as a roll, as in said patent, consisting of a continuous strip 30 of caps which are joined together at transverse lines or connecting joints aligning with the opposed inwardly extending V-notches 31 as shown schematically in FIG. 9. The individual caps p will be of octagonal form when separated at the narrow connecting joints. The opposed notches 31, at the opposite edges of the continuous strip 30, will also function as index means for feeding the strip by means of an intermittently driven indexing feed roll 35, as will later appear. The caps could be formed of other suitable material but are preferably of paper, as indicated in said U.S. Pat. Nos. 2,934,872 and 2,965,949, preferably with a plastic coating for permitting a heat-seal with the paper cones C which may be of similar material. The final sealed package will be of the nature illustrated in the second patent with the octagonal caps P inserted in the circular mouths of the cones C by means of the circular forming and sealing heads 60, which are complementary to the circular sockets 21 and mouths of the cones therein, forming each cap with an annular flange sealed to the cone and with tabs extending outwardly from the flange due to the octagonal form of the caps. The plunger assemblies 22 include the shearing blades 61 adjacent the heads 60 and will function as later explained.
The conveyor 25 intermittently moves from a loading station (not shown), where the containers C are suitably loaded into the sockets 21, towards an unloading station (not shown) where the capped containers are suitably removed from the conveyor. The unit 20 is toward the unloading end of the conveyor and is positioned at a right angle to the direction of movement of the conveyor. The roll of paper caps is mounted on the machine adjacent the unloading end, and the strip is fed from the roll by means, such as disclosed in the first patent, into association with the indexing feed wheel 35, the intermittent movement of the wheel 35 and the conveyor 25 being in synchronized relationship.

The strip 30 is fed around and beneath the feed wheel or roll 35 which feeds it into the paper guide of the unit 20. This wheel is provided around its circumferential surface with opposed inwardly-directed angled lugs 36 which are complementary to the opposed notches 31 in the edges of the strip 30 with which they engage. Thus, the wheel 35 will pull the strip from the supply roll. The wheel 35 is driven intermittently from a suitable drive unit by means of a continuous chain and sprocket drive 37 and an intermittent indexing drive clutch 38 of a suitable commercially available type.

As the paper strip 30 is pushed by the wheel 35, it enters into a paper guide and shear plate assembly 40 which extends transversely over the conveyor 25 just above the level of the upwardly-opening sockets 21. The assembly includes a bridge support 41 which is carried at opposite sides of the conveyor by upstanding brackets 42 suitably carried by the machine frame indicated generally at 43. As the paper strip leaves the wheel 35, it passes over a paper slide section 44 (FIG. 4) which rests on and is secured to part of frames 43 and bridge 41. This section 44 has formed in its upper surface a longitudinally extending groove 45. This groove is midway of the member 44, is greater than one third the width of the strip of paper 30 which is adapted to be bowed downwardly therethrough (FIG. 5) by means of the retainer 46. This retainer is clamped in position on the member 44 by means of a removable clamp 47 of a suitable type so that it can be removed to facilitate initial threading of the end of the strip into the assembly 40. Adjacent the clamp 47, the retainer 46 carries an upstanding guard 48 to prevent contact with the adjacent knife 61. At its leading edge, the retainer 46 is provided with a wedge-shaped guide finger 49 which extends chordally relative to the wheel 35 over the strip 30 and into a groove 50 (FIG. 3) formed around the circumference of the wheel axially midway thereof.

The leading end of member 44 is tapered downwardly and outwardly at 51 and the leading end of the finger 49 is tapered downwardly and inwardly on its lower surface as at 52 so as to guide the strip 30 between the members 44 and 46. The tapering surface 52 continues on under the body 46 (FIG. 4) so as to provide a flaring guide mouth to guide the paper into position as it passes from the wheel 35. The body of the retainer 46 (FIG. 6) is provided with depending locater ribs 53 which cooperate with recesses at the edges of members 44 to form a central longitudinal extending paper bowing rib 55 which will extend down into the groove 45 transversely midway thereof.

The inlet paper guide section just described receives the leading end of the paper strip 30 and guides it into the main section of the paper guide which is part of the assembly 40 spaced just above the upper run of the conveyor 25 and the details of which are shown best in FIGS. 1, 3, 4 and 7 to 13. This main section of the paper guide is supported by the bridge 41 and includes the shear plate 56 located on and secured to the bridge plate 41, a pair of paper slide bars 57 located on and secured to the plate 56 in parallel relationship, and a pair of cap bars 58 located on and secured to the slide 57 in superimposed relationship. The upper surface of each of the slide bars 57 is provided with a recess or groove 59 extending the full length thereof which is adapted to receive the corresponding edge of the paper strip 30. At the inlet ends of these grooves, the caps 58 are flared upwardly at their lower surfaces to provide a wide throat 65 (FIG. 8) for receiving the leading end of the paper strip 30.

The inlet paper guide section has its plates 44 and 45 (FIG. 8) abutting the adjacent ends of the bars 57 and 58, respectively, of the assembly 40 so that the paper guide groove 45 aligns with the throat 65. As the paper strip 30 is fed through the guide groove 45, it is bowed transversely downwardly (FIG. 6) by means of the rib 55, so as to stiffen it to facilitate pushing of the strip section by means of the indexing and feeding wheel 35. When the paper strip enters the main section of the assembly 40, (FIG. 7) its opposed edges will be located in the parallel outer edges of the guide grooves 59.

The assembly 40 has at longitudinally spaced intervals vertical passages 70, axially aligned with and corresponding in number to the sealing heads 60 and which are of such size as to permit passage of the heads 60 vertically therethrough and which are indicated best in FIGS. 3, 7 to 11 and 13 to 15. Below each of these vertical passages 70, there is secured to the lower surface of the bridge plate 41, an adapter 71 which has opposite depending guide flanges 72 which extend transversely of the paper guide assembly 40 but longitudinally of the conveyor 25. It will be noted that the flanges 72 have inwardly tapering surfaces which are continuations of the surfaces provided by the edges of the openings 70a (FIG. 13) in plate 41 which along with substantially aligning openings in the shear plate 56 produce the sealing head passages 70. It will also be noted that the superimposed cap bars 58 and the paper guide bars 57 are on opposite sides (FIG. 3) of the row of passages 70. Ahead of the first and between the other sealing head passages 70 in the assembly 40 are formed the blade slots or passages 75, which extend down through the shear plate 56 and the support bridge plate 41, the passages extending transversely of the paper guide and longitudinally of the conveyor 25 (FIG. 3). At the first flange 72 of the first adapter 71 the passage 75 (FIG. 8) is just ahead of that flange. The remaining passages 75 align with the spaces 75a respectively between the adjacent depending guide flanges 72 (FIG. 13) of adjacent adapters 71.

The termination of the paper guide provided by the slots 59 is indicated in FIG. 11. At this point there is provided a retainer 76 of arcuate or yoke form directed inwardly and having its inner arcuate edge substantially parallel with the corresponding edges of the last passage 70. It will be noted (FIG. 13) that this retainer is secured in superimposed position on the shear plate 56 and is at a lower level than the paper guide slot 59 and has a bevelled inner guide edge. At the opposite side of that passage 70, a pair of opposed triangular retainers 77 are located to correspond to the notches 31 in the paper strip 30 (FIG. 11) and will be inwardly of passages 70. It will be noted that the retainers 77 are se-
cured on the shear plate 56 and are at a lower level (FIG. 12) than the associated paper guide slots 59, being provided with bevelled upper guide surfaces. The retainers 76 and 77 will function, as will be later described.

The plunger assemblies 22 are supported in a transverse depending row over the paper guide assembly 40, by means of a crosshead 80 which is shown in FIGS. 1 and 2. This crosshead is supported for vertical reciprocating movement on the two support posts 81 at opposite sides of the conveyor 25 which are upstanding from the machine frame 43. It will be noted (FIG. 2) that the crossbeam has a straight transverse central plunger support portion extending transversely over the conveyor 25 along with end portions 80a extending angularly relative to the upper run of the conveyor so that the support posts 81 can be offset on the frame 43 forwardly and rearwardly of the paper guide assembly 40. This will provide space for mounting the feed wheel 35 in the position indicated. The crosshead 80 may be slidable mounted on the posts 81 by bearings 82 and may be moved vertically by means of drive rods 83 having their upper ends connected to the crosshead 80.

The rods are moved in timed relationship to movement of the conveyor 25 and wheel 35 by suitable means similar to that disclosed in the first patent previously mentioned.

Each plunger assembly is shown in detail best in FIG. 14 and comprises the tubular plunger body 85 which is mounted for axially slidable but non-rotative movement in a bearing collar 86 bolted to the lower surface of the crosshead 80. A flange 87 on the plunger body engages with the collar 86 to limit upward movement of the plunger body. The upper end of the plunger is enlarged and slidable fits within a bushing 88 secured within the crosshead. The enlargement provides a stop shoulder 89 which normally is biased into engagement with the collar 86 by means of a compression spring 90. This spring 90 is disposed within the upper end of the plunger body with its upper end engaged by a cap 91 fixed in the upper end of bushing 88. When shoulder 89 contacts the collar 86, which is the normal downwardly biased condition of the plunger, there is a space 92 between the upper extremity of the plunger and the flange of the cap 91 which will permit limited upward axial movement of the plunger into the crosshead upon the exertion of sufficient axial upward pressure on the plunger body to overcome the force of the biasing spring 90.

The lower end of the plunger body 85 has the sealing head removably mounted thereon. The sealing head has an upwardly opening socket which receives a complementary enlargement 93 on the lower end of the plunger body 85. The head is retained on the enlargement normally by means of a retaining spring 94 fitting in a groove within the upper extremity of the plunger head and engaging the shoulder at the upper extent of the enlargement 93.

The lower portion of the head 60 is provided with an inwardly tapered annular sealing surface 95 for cooperating with the complementary tapered surface 96 at the mouth of the upwardly opening socket or cap 21 on the conveyor. In the sealing operation (FIG. 15) these surfaces cooperate and limited axial upward movement against the force of the spring 90 ensures proper cooperation.

The hollow body 85 has an electric heater 97 disposed therein. Leads from this heater pass upwardly through the plunger body to a fuse block bus 98 which is located in a housing 99 on top of the crosshead 80. The knives 61 are of special form so as to outwardsly impale the section of strip 30 to prevent longitudinal and lateral movement thereof and then to shear the individual caps therefrom by a cutting action from the center line outwardly in both directions. The slope of each of the blades is shown best in FIG. 7. Thus, each blade is provided with a depending impaling sharp point 100 midway of the width of the blade. On each side of this point is a shearing edge 101 which extends in receding relationship to the point outwardly and outwardly. Thus, there is a point which will first pierce the strip 30 along its center line and shearing edges at each side thereof which will gradually shear the strip outwardly from the center line in both directions to its outer edges.

Each of the blades 61 is mounted in association with its sealing head being at the side toward the feeding wheel 35. Each blade is disposed in depending position with its lower cutting edge normally spaced above the paper guide assembly 40 in alignment with the transverse passages 75 therein. Each blade is supported by a bracket 102 which embraces and is clamped to the plunger body 85 at a suitable distance above the head 60 carried thereby (FIGS. 4, 7 and 10). The blade is provided with an upwardly opening slot or notch 103 in its upper edge cooperating with a clamping bolt 104 by means of which, along with indicated locating dowels, the blade may be fastened to the collar 102. Vertical adjustment of the blade cutting edge to the desired level is possible by setting collar 102 at different levels.

It will be apparent from the above description that a row of the filled cones C will be moved beneath the unit 20. The mouth 96 of the cones will be in axial alignment with the passages 70 of the assembly 40 and the plunger assemblies 22 thereabove. The paper feed wheel 35 will feed a predetermined length or section of the paper strip 30 into the inlet paper guide section and into the main paper guide section of the assembly 40. As the paper strip is pushed by the wheel 35 into the paper guide section it is bowed transversely downwardly (FIG. 5) to stiffen it to facilitate feeding it into its final position, which is indicated schematically in FIG. 11. The bowed condition is maintained until shearing (FIG. 7) by the location of the guide slots 59. At this time a paper cap P will be over each of the passages 70 (FIGS. 7, and 9 to 11) and will still be connected in the strip 30 since the knives 61 will still be spaced above the assembly 40. The row of plungers 22 will next be moved downwardly. This will cause the knives 61 to shear the strip section into the separate caps P as the plunger heads 60 move downwardly through the passages 70 to form the separate caps and move therein into sealing position within the mouths of the cones C. In downward movement of the plunger assemblies 22, the points 100 of the knives 61 first pierce the paper strip at its longitudinal center line to impale it and hold it in fixed or stabilized longitudinal and lateral position within the paper guide assembly 40. This pushes the paper strip down from the level of the guide slots 59 (FIG. 10) into contact with the slidding plate 56 and at this instant the points 100 will be passing through the slots in the shear plate and eventually the knife edges 101 will pass downwardly into and through the passages 75 shearing the caps completely from the strip section. The impaling of the strip will be at its center line and then there will be a simultaneous...
gradual and progressive shearing from its center line in both directions to its opposite edges. At the same time, the heads 60 are moving downwardly through the passages 70 and are forming the separated caps with an upwardly flange F (FIG. 15) and it will be noted that depending adapter flanges 72 aid in forming this upwardly flange as well as subsequently prevent lifting of the containers out of the sockets 21. The flange F is inserted in the mouth of the cone with which it is engaged, the flange and cone mouth being pressed together between the cooperating tapered surfaces 95 and 96 of the head 60 and socket 21, respectively. Since the heads 60 are heated, there will be a heat-seal produced between the flange F of the cap and the mouth of the container. The flange F will be substantially annular but due to the octagonal shape of the cap P, will have extending tabs as indicated in said patents.

The strip section fed across the conveyor 25 into the assembly 40 by means of the indexing wheel 35 will be severed from the strip roll by means of the last knife 61 adjacent the wheel. At this time the leading end of the strip section will be positioned as indicated in FIG. 11 with the forwardmost cap P associated with the retainers 76 and 77 above the cooperating passage 70. When this cap is forced downwardly toward the passage 70, the retainers 76 and 77 immediately engage therewith to tend to prevent longitudinal movement of the strip as the strip section is severed by the last blade from the roll.

It will be apparent that this invention provides a feeder, shearer, former and sealer for a section of a cap strip, so that a plurality of caps can be applied simultaneously to a plurality of containers thereby greatly increasing production. Although the unit of this invention has been described as being applied to a straight-line conveyor machine, it could be applied to a turret-type machine of the type disclosed in U.S. Pat. No. 2,934,872 if the turret is provided with radial rows of cone receiving support sockets or cups.

Having thus described the invention, what is claimed is:

1. The method of capping a plurality of containers simultaneously which comprises providing a series of caps in strip form in which the individual caps are connected to each other at successive transverse lines, supporting a plurality of the containers as a row of successive containers with their mouths exposed for receiving the caps, feeding the strip of caps into association with the mouths of the containers with the center line of the strip aligned with the centers of the container mouths and with transverse lines of the strip disposed in leading and trailing relationship to each of the successive container mouths of the row so that the respective caps of the strip are in alignment with the mouths, shearing the strip at the successive connecting lines between the caps after they are aligned with the container mouths by first impaling the strip at each successive transverse line and at the center line of the strip to stabilize it laterally and longitudinally and then shearing it simultaneously laterally in both directions from the impaling point gradually and progressively outwardly to the opposed outer edges of the strip at said transverse lines while concurrently displacing the cap perpendicularly to the plane of the strip prior to completely separating the cap, and applying the separated caps to the aligning mouths of the containers.

2. The method of claim 1 in which the feeding of the strip of caps is by a pushing force applied to the strip and simultaneously while pushing the strip to feed it bowing it transversely to stiffen it to facilitate pushing.

3. Apparatus for capping a plurality of containers simultaneously with a series of caps supplied in strip form in which the individual caps are connected to each other at successive transverse lines comprising:

means for supporting a plurality of the containers in a row of successively spaced containers with their mouths exposed for receiving the caps;

means for feeding and guiding a section of the strip having a number of caps corresponding to the number of containers supported in said row into association with the mouths of the containers and with the center of the container mouths and with the longitudinally spaced transverse lines of the strip section disposed in leading and trailing relationship to each of the successive container mouths of the supported row so that the respective caps of the strip section are in alignment with the container mouths; and

means for shearing and applying separated caps of the strip section to the aligning mouths of the support containers; said last-named means comprising transversely-extending blade units supported at spaced intervals corresponding to the longitudinally spaced transverse lines of the cap strip, each of said blade units of the cap strip, each of said blade units including a central projecting impaling point and shearing blades disposed at the opposite sides of the point and having shearing edges which extend laterally outwardly in receding relationship to the point in opposite directions, cap-applying assemblies supported for movement with the respective blade units toward the respective mouths of the supported row of containers with at least the impaling points of said blade units disposed in preceding relationship to said cap-applying assemblies to impale the strip section prior to engagement thereof by said cap-applying assemblies, and means for moving said blade units and the associated cap-applying assemblies toward the container supports so that the strip section is first stabilized laterally and longitudinally by the respective impaling blades which first impale it at its center line at said transverse lines and then shear it by simultaneous engagement of the shearing blades therewith which shear it gradually and progressively laterally outwardly to the opposed outer edges of said strip at said transverse lines to completely separate the caps from each other while they are simultaneously engaged by the cap-applying assemblies to be moved into cooperation with the container mouths.

4. Apparatus according to claim 3 in which:

said supporting means for the containers include a row of supports of selected number which receive and support the containers with their mouths opening upwardly;

said feeding and guiding means include an indexing unit for feeding a section of the strip of predetermined length with a corresponding number of connected caps; and

a guide unit located above the supporting means for the containers for laterally engaging the edges of the strip section, said means for moving said blade units and the associated cap-applying assemblies include a common support mounted for vertical movement from a position above the guide unit downwardly toward said container supports; and
means connected to said support for reciprocating it vertically toward and from said container supports.

5. Apparatus according to claim 4 in which:
said cap-applying assemblies include plunger heads having cap-engaging lower ends;
said impaling points of the blade units respectively, cooperating with said plunger heads projecting below said lower-ends, and said shearing edges of each of the blade units being spaced upwardly from the extremity of the cooperating impaling point and extending angularly upwardly and outwardly relative to said point.

6. Apparatus according to claim 4 in which:
said indexing unit includes an indexing wheel which has indexing portions angularly disposed therearound for interengaging with indexing notches in the edges of the strip to push the strip into said guide unit, said guide unit including a guide channel with an inlet section having a depending rib for engaging the upper surface of the strip and bowing it downwardly.

7. Apparatus for capping a row of containers simultaneously by means of caps formed as a strip of caps connected at transverse joints having notches in opposite edges of the strip, means for supporting the containers in a row with upwardly-opening mouths for receiving the caps as they are separated from the strip, means for feeding the strip of caps over the row of supported containers to align with the mouths thereof, said means comprising a movable pushing means which interfits with the opposed notches at said joints to push the strip, guide means for receiving the strip and guiding it over the supported containers while simultaneously bowing it transversely to stiffen it to facilitate pushing, and plunger assemblies including cutting blades and cooperating plunger heads movable downwardly through spaces in said guide means to shear the strip to separate the caps, to form the caps and apply them in sealing condition to the upwardly-opening mouths of the containers, each of the cutting blades including a central impaling point and shearing edges at each side thereof, said guide means comprising a guide channel and a shearing plate below the guide channel, said shearing plate having sockets through which the sealing heads pass and transverse slots ahead of the respective sockets through which the cutting blades pass, said plunger assemblies carrying the shearing heads and the cutting blades in spaced relationship to properly pass through said respective sockets and slots, and retainers on said shearing plate below said guide channel and adjacent the exit end thereof and adjacent the cooperating socket to engage the notched edges of the leading cap as it is forced downwardly into the socket.

9. Apparatus according to claim 8 including retainers supported below each of said sockets and having depending transverse guide flanges at the edges of the sockets for retaining and guiding the separated cap as it passes from said socket toward the mouth of the associated container.

10. Apparatus according to claim 8 in which the retainers include a pair of opposed lug members for engaging the trailing notched edges of the leading cap and an inwardly directed yoke member for engaging the leading edge of the leading cap.

11. Apparatus for capping a plurality of containers simultaneously with a series of caps supplied in strip form in which the individual caps are connected to each other at successive transverse lines comprising:
means for supporting a plurality of the containers in a row of successively spaced containers with their mouths exposed for receiving the caps, said supporting means for the containers including a row of supports of selected number which receive and support the containers with their mouths opening upwardly; means including an indexing unit and a guide unit for feeding and guiding a section of the strip of predetermined length having a number of caps corresponding to the number of containers supported in said row into association with the mouths of the containers and with the center line of the strip section aligned with the center of the container mouths and with the longitudinally spaced transverse lines of the strip section disposed in leading and trailing relationship to each of the successive container mouths of the supported row so that the respective caps of the strip section are in alignment with the container mouths, said indexing unit including an indexing wheel which has a groove formed around the circumference thereof and indexing portions angularly disposed there around for interengaging with indexing notches in the edges of the strip to push the strip into said guide unit,
said guide unit located above the supporting means for the containers and including a guide channel for engaging the edges of the strip section, said guide channel provided with an inlet section having a depending rib for engaging the upper surface of the strip and bowing it downwardly and a wedge-shaped guide finger projecting chordally toward the wheel and into said groove over the paper strip
that feeds therefrom, said finger merging with said rib; and
means for shearing and then applying separated caps
of the strip section to the aligning mouths of the
support containers;
said last-named means comprising transversely-
extending blade units supported at spaced intervals
corresponding to the longitudinally spaced trans-
verse lines of the cap strip, each of said blade units
including a central projecting impaling point and
shearing blades disposed at the opposite sides of
the point and having shearing edges which extend
laterally outwardly in receding relationship to the
point in opposite sides of the point and having
shearing edges which extend laterally outwardly in
receding relationship to the point in opposite direc-
tions, cap-applying assemblies supported for
movement with the respective blade units toward
the respective mouths of the supported row of
containers, and means including a common sup-
port mounted for vertical movement from a posi-
tion above said guide unit downwardly toward said
container supports and means connected to said
common support to reciprocate it vertically for
moving said blade units and the associated cap-
applying assemblies toward the container supports
so that the strip section is first stabilized laterally
and longitudinally by the respective impaling
blades which first impale it at its center line at said
transverse lines and then shear it by simultaneous
engagement of the shearing blades therewith which
shear it gradually and progressively laterally out-
wardly to the opposed outer edges of said strip at
said transverse lines to completely separate the
caps from each other while they are simultaneously
engaged by the cap-applying assemblies to be
moved into cooperation with the container mouths.

12. Apparatus according to claim 11 in which:
said guide channel has a final guide section which is
a continuation of said inlet section and guides the
strip over the container mouths of the containers
supported by said supports, said guide channel also
including a lower shearing plate over which the
strip is guided,
said shearing plate having sockets through which the
plunger heads pass and transverse slots ahead of
the respective sockets through which said cutting
blade units pass.

13. Apparatus according to claim 12 including:
retainers supported below each of said sockets and
having depending transverse flanges at the edges of
the sockets.

14. Apparatus according to claim 12 including:
retainers on said shearing plate below said guide
channel and adjacent the exit end thereof and adja-
cent the cooperating socket to engage the notched
dges of the leading cap as it is forced downwardly
into the socket.

* * * * *
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION


Inventor(s) AHMED M. E. ABD-ALLA

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

Column 8, line 26, cancel "each of said blade units of the cap strip."

Column 11, line 12-14, cancel "and having shearing edges which extend laterally outwardly in receding relationship to the point in opposite sides of the point".

Signed and Sealed this
Twentieth Day of July 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks