Oct. 14, 1941. J. M. HOTHERSALL 2,258,611

CONTAINER CAPPING MACHINE

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Fig 1

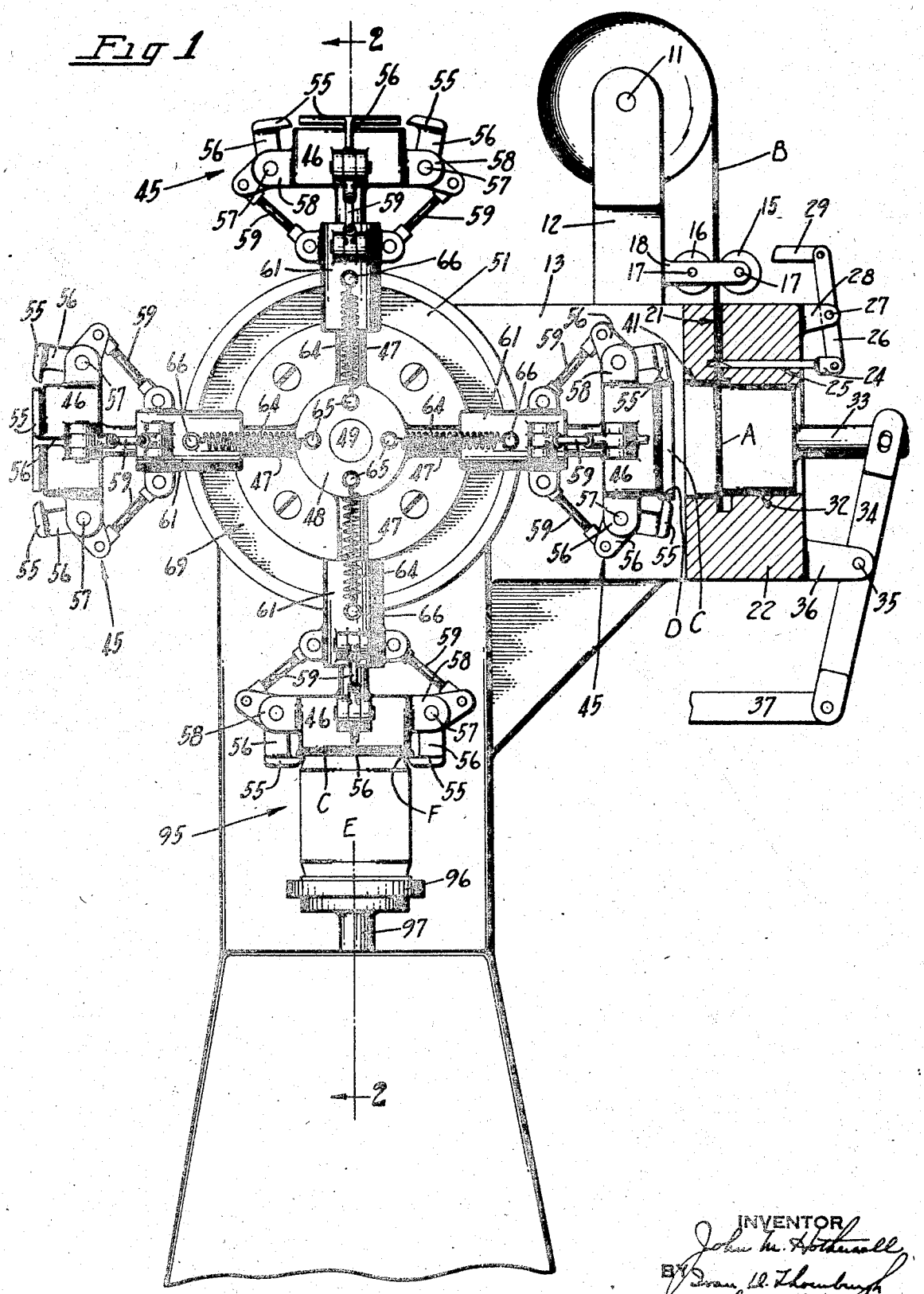

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Fig 2

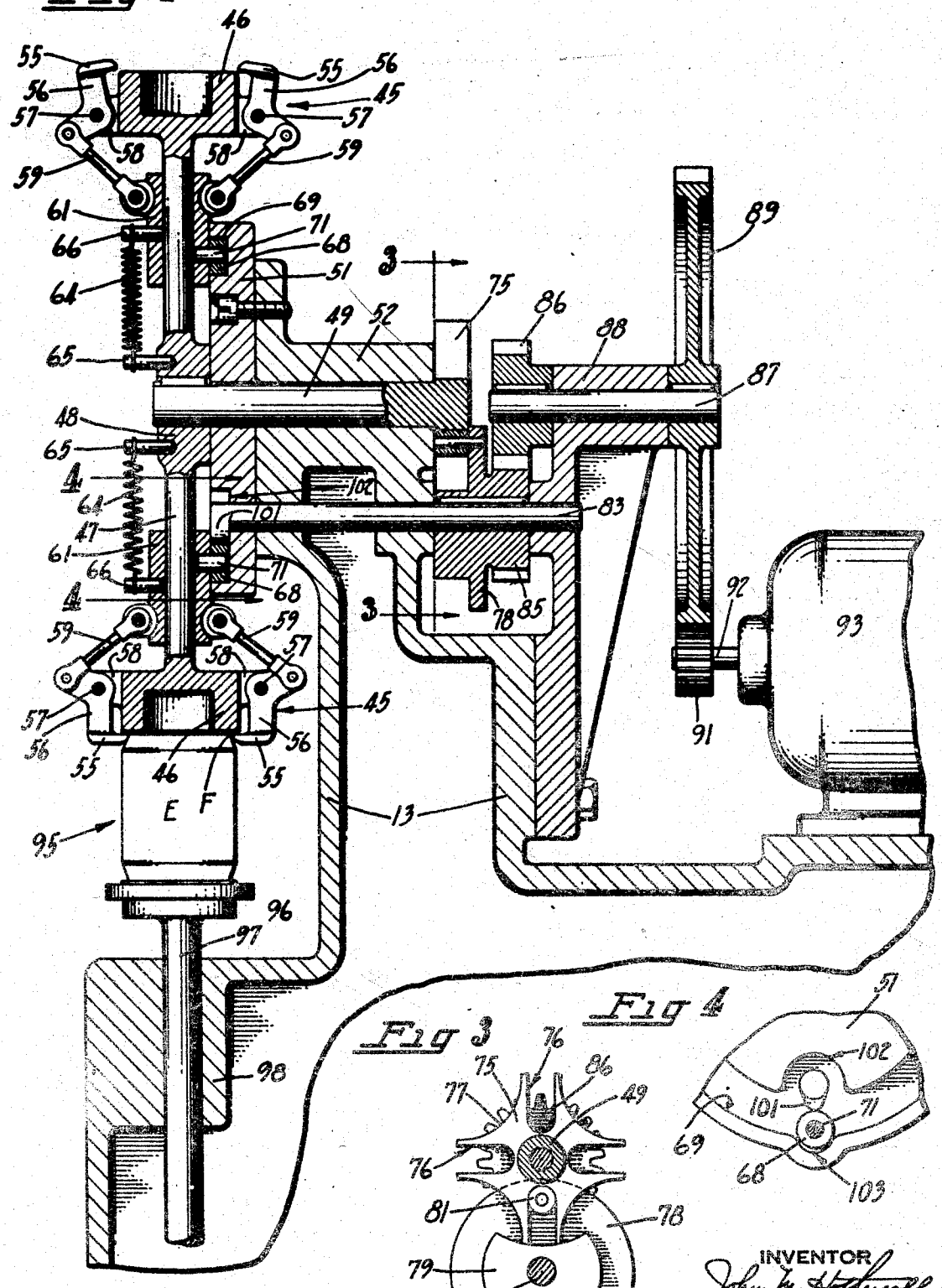

Fig 3

Fig 4

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CONTAINER CAPPING MACHINE

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5 Claims. (Cl. 93—55.1)

The present invention relates to container capping machines and the like and has particular reference to an improved machine for preforming a thin flexible cellulosic or the like overcap and for securing it to a sealed fibre container.

In the manufacture of fibre containers of the character shown in United States Patent 2,085,979, issued July 6, 1937, to John M. Hothersall, and particularly used for milk, the container after being filled and sealed is preferably protected by an overcap of "Cellophane" or the like material which is crimped in place over the top end of the container.

The instant invention contemplates an improved machine which cuts the material for such an overcap from a substantially continuous strip, forms the cut-off piece into an overcap, and then secures the formed overcap in place on the container by crimping it tightly over the edges of the container.

An object therefore of the invention is the provision of an improved container overcapping machine wherein the material for the overcap is severed from a substantially continuous strip of the material, the cut-off piece of material is preformed into an overcap, the overcap is positioned on a container and is then permanently sealed in place to protect the surface it covers against contamination.

Another object is the provision of such a machine wherein the cut-off piece of material is preformed into an overcap by a drawing operation and is simultaneously transferred into a crimping head which thereupon carries the formed overcap into position relative to a container and then seals the overcap in position on the container by a crimping of the edges of the overcap over the edges of the container.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a front elevation of a machine embodying the instant invention, with parts broken away and other parts shown in section;

Fig. 2 is a vertical sectional view taken substantially along the line 2—2 in Fig. 1;

Fig. 3 is a detail in vertical section taken substantially along the line 3—3 in Fig. 2; and

Fig. 4 is a fragmentary detail as viewed substantially along the line 4—4 in Fig. 2.

As a preferred embodiment of the invention, the drawings disclose a machine in which blanks A (Fig. 1) are cut from a strip B of "Cellophane" or the like material and are preformed into overcaps C of square dish shaped construction having a surrounding flange D. The formed overcaps are applied to the tops of fibre milk containers E of the character shown in the above mentioned Hothersall patent. Such containers have a projecting seam edge F over which the flange D of the overcap is crimped tightly in place by pressure applied thereto. The containers usually have an exterior coating of paraffin which acts as an adhesive for retaining the overcap in position when once applied by pressure.

The strip B of overcap material is preferably fed from a supply roll of such material carried on a rod 11 (Fig. 1) secured in a bracket 12 mounted on a frame 13 which constitutes the main frame of the machine. Feeding of the strip from the supply roll is preferably effected by a pair of cooperating feed rollers 15, 16 between which the strip passes. The rollers frictionally engage the strip. These rollers are mounted on short shafts 17 carried in laterally extending side arms 18 of the bracket 12. The rollers are intermittently rotated in unison in any suitable manner in time with the other moving parts of the machine.

Hence every time the feed rollers 15, 16 rotate, they advance the strip B a sufficient distance to supply a length of the material equivalent to one overcap.

The end of the strip B so advanced extends down into a vertical slot 21 of a forming die 22 which is secured to the main frame 13. The forming die includes a flat cut-off knife 24 which slides in a recess 25 which extends across the path of travel of the advance end of the strip B.

The inner end of the knife 24 is provided with a sharp cutting edge. The outer end of the knife is connected to a lever 26 which intermediate its length is carried on a pivot pin 27 secured in a lug 28 formed on the die block. The opposite end of the lever is connected to a link 29 which is actuated in any suitable manner in time with the other moving parts of the machine.

Hence at the proper time in the machine cycle the cut-off knife 24 operates to sever a predetermined length of the strip B from the end which was advanced into the die. It is this cut-off portion of the strip which constitutes a blank A and is the material used for making one overcap C.

The cut-off blank A of "Cellophane" remains in the die in a vertical position in the slot 21 and is directly in front of a square forming plunger 31 which operates in a horizontal slideway 32. The plunger is formed with a stem 33 the outer end of which is connected to an upper bifurcated end of an actuating lever 34. The lever is mounted on a pivot pin 35 carried in lugs 36 formed on the die block 22. The lower end of the lever is connected to a link 37 which may be actuated in any suitable manner

in time with the other moving parts of the machine.

Thus as soon as the blank A is severed from its strip B, the actuating lever 34 slides the forming plunger 31 inwardly in its slideway and against the severed blank thereupon, pushing it into a square forming die recess 41. The forming die recess is disposed in the die 22 adjacent the inner side of the strip slot 21 and is in alignment with the path of travel of the plunger 31.

The die recess 41 is only slightly larger than the plunger that fits into it but is considerably smaller than the blank A. Hence when the plunger forces the blank into the recess it folds the overhanging edges of the blank down over the sides of the plunger and tucks in the corners. It is this folding action that preforms the flanges D on the overcap.

After thus forming the overcap C, the forming plunger 31 continues its inward path of travel and pushes the finished overcap out of the forming recess 41 and into a waiting clinching head 45 (Figs. 1 and 2) of an adjacent sealing mechanism. The forming plunger then returns to its original position in readiness for the next advancement of the strip B.

There are preferably four of the clinching heads 45 and each head includes a hollow square anvil 46 which is formed on the outer end of a radial arm 47 of a rotatable spider wheel or member 48. There are thus four arms on the spider. The spider is mounted on a horizontal shaft 49 which extends through a face cam 51 secured to the main frame 13 and which is carried in a bearing 52 formed in the frame.

Surrounding the anvil 46 of each head 45 are four clinching jaws 55, one for each side of the square anvil. It is these jaws which receive the formed overcap C from the forming plunger 31 and which thereupon hold the overcap for future application to a container as will be hereinafter explained.

The jaws 55 are formed on bell cranks 56 mounted on pivot pins 57 carried in lugs 58 which project from the anvil. The bell cranks of each head are connected by links 59 to a sleeve 61 which slides on its corresponding spider arm 47.

The clinching jaws 55 of each head are normally maintained in an open or spread apart position by a tension spring 64. There is one of these springs for each head. One end of the spring is hooked over a pin 65 secured in the hub of the spider 48. The other end is hooked over a pin 66 which is secured in the sleeve 61.

The jaws 55 are locked against movement or are moved by a cam roller 68 which operates in an annular groove 69 formed in the face cam 51. These cam rollers are carried on pins 71 secured in each of the head sleeves 61.

The spider 48 on which the clinching heads 45 are mounted is intermittently rotated to bring a head into alignment with the die 22 to receive its overcap C as hereinbefore explained. This rotation of the spider is effected by a Geneva mechanism best shown in Figs. 2 and 3. The mechanism includes a Geneva wheel 75 which is formed on the inner end of the spider shaft 49 and which is provided with actuating slots 76 and locking surfaces 77. The Geneva wheel meshes with an actuating disc 78 which is formed with a locking cam 79 and carries a roller 81. The disc is mounted on a continuously rotating disc shaft 83.

Rotation of the disc shaft 83 is preferably brought about by a gear 85 which is formed integrally with the disc 78. The gear meshes with a gear 86 mounted on the inner end of a driving shaft 87 journaled in a bearing 88 formed in the main frame 13. On its outer end the shaft carries a gear 89 which is driven by a pinion 91 carried on the rotor shaft 92 of an electric motor 93.

Hence during a portion of each revolution of the disc shaft 83 the roller 81 on the disc 78 engages in a slot 76 of the Geneva wheel 75 and thus turns the spider shaft 49 through a partial rotation. Since there are preferably four clinching heads on the wheel this partial rotation is a quarter revolution. During the remainder of the revolution of the disc 78 its locking cam 79 engages a locking surface 77 of the Geneva wheel and thus maintains the spider in a stationary condition.

During the quarter turn of the spider 48 a head 45 is brought into alignment with the die 22 to receive its overcap C and while the spider is held stationary the overcap is inserted into the head as hereinbefore explained.

After an overcap C has been received in the jaws 55 of a clinching head 45, the spider 48 on its next quarter turn brings the head and the overcap carried therein into position at an applying station generally indicated by the numeral 95 (Figs. 1 and 2). At this station the overcap is directly above a container E supported on a lifter plate 96 formed on the upper end of a rod 97 which is slidable in a bearing 98 formed in the main frame 13. The container may be placed on the lifter plate in any suitable manner as by hand. The lifter plate is adapted to be raised toward the head in time with the other moving parts of the machine.

When a container E is in position on the lifter plate 96 the latter moves up and thus pushes the upper end of the container up into the overcap C held in the jaws of the head 45. While in this raised position the jaws move inwardly against the flanges D of the overcap and thus fold them under the projecting seam edges F of the container and tightly press them upwardly against the head anvil 46. This clinching action causes the folded over edges of the overcap to tightly adhere to the paraffin covered surface of the container and thus seals the overcap in place on the container. This applying of the overcap is done while the wheel 48 is stationary.

Closing of the head jaws 55 to effect this overcap sealing operation is brought about by a cam 101 (Figs. 2 and 4) which is formed on the inner end of the Geneva disc shaft 83. The cam is located in a recess 102 formed in the cam 51 adjacent the annular groove 69 at the applying station. Since the cam is formed on the shaft 83 it is rotated in time with the other moving parts of the machine and thus makes one revolution for each quarter turn of the spider 48.

Hence while the spider 48 is stationary the cam 101 engages against the roller 68 of the head at the applying station and depresses the roller into an auxiliary recess 103 formed in the cam 51 directly below the recess 102. This depression of the roller slides the head sleeve 61 downwardly on its spider arm 47 and thus actuates the head bell cranks 56 to shift the jaws 55 into overcap clinching position.

After such a clinching operation the rotating cam 101 permits the tension spring 64 to draw the cam roller 68 and sleeve 61 upwardly into

their original positions. This action opens the jaws 55 so that they are clear of the container. Thereupon the lifter plate 96 and its container return to their lowered original positions to permit discharge of the overcapped container and to receive a new container to be capped.

As the spider 48 makes another quarter turn to bring the next head into the applying station the cam roller 68 of the leaving head again enters the locking groove 69 in cam 51 and thereby locks the jaws 55 in open position while the head is carried around toward and through the overcap forming and receiving station.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A machine for applying an overcap to a container having a projecting edge, which comprises in combination devices for feeding a strip of sheet overcap material along a predetermined path of travel, a stationary die adjacent said path of travel for pre-forming from said strip a dish shaped overcap having a surrounding flange, an intermittently rotatable spider member having radially extending arms each terminating in a clinching head for receiving a pre-formed overcap and for positioning it onto a container, clinching jaws on each of said clinching heads for holding said received overcap, a sleeve member slidably mounted on each of said spider arms and operatively connected to said jaws, and means operative in time with the intermittent rotation of said spider member for moving said sleeve members on and relative to said spider arms to move said jaws against the flanges of successively positioned overcaps for bending the flanges of the latter around successive container ledges to permanently secure the overcaps in position on the containers.

2. A machine for applying an overcap to a container having a projecting ledge, which comprises in combination a stationary overcap pre-forming die, a pair of intermittently rotated feed rollers disposed adjacent said die for feeding a strip of sheet overcap material a predetermined distance into said die, a cut-off knife in said die for severing a blank from said strip, a reciprocating plunger cooperating with said die to form said blank into an overcap having a surrounding flange projecting laterally therefrom, an intermittently rotating clinching head having clinching jaws thereon for receiving the pre-formed overcap thus produced and for positioning it onto a container, and means slidably mounted relative to said clinching head and movable in timed relation with the intermittent rotation of the latter for moving said clinching jaws into operative engagement with the flange of the positioned overcap for bending said flange around the container ledge to secure the overcap in position on the container.

3. A machine for applying an overcap to a container having a projecting edge, which comprises in combination stationary overcap die forming means for producing an overcap having a surrounding flange to be secured to a container, a clinching head located adjacent said overcap forming means for receiving a pre-formed overcap therefrom, devices for shifting said clinching head into a position adjacent a container, a lifter pad for pushing said container into said overcap, clinching jaws on said clinching head engageable with the flange of said formed overcap, means slidably mounted relative to said clinching head and connected to said jaws, and devices engageable with said slidably mounted means and movable in synchronism with the shifting movement of the clinching head for actuating said jaws to fold the said flange of the overcap into sealing engagement with said container.

4. A machine for applying an overcap to a container having a projecting edge, which comprises in combination stationary overcap die forming means for producing an overcap having a surrounding flange to be secured to a container, a spider member disposed adjacent said forming means, and including a plurality of radially extending arms each having a clinching head at its outer end, clinching jaws on said heads, means including a sleeve slidably mounted on a said arm of the spider member for normally holding said jaws in open position, actuating devices for intermittently rotating said spider member to bring a head into position adjacent said forming means to receive between said jaws a preformed overcap from said forming means, said actuating devices also shifting said head and its overcap into position adjacent said container, elements for inserting the projecting edge of said container into said flanged overcap while the spider wheel is stationary, and means for moving said sleeve on and relative to its said spider member arm to close said jaws on the flange of the overcap while the head is stationary to fold said flange around the projecting edge of the container and to press the flange into sealing engagement therewith.

5. A machine for applying an overcap to a container having a projecting edge, which comprises in combination overcap forming means for producing an overcap having a surrounding flange to be secured to a container, a spider wheel disposed adjacent said forming means and having a plurality of radial arms, a clinching head having an anvil formed on the outer end of each spider arm, a plurality of movable jaws surrounding said anvil, a spring held slide on each of said spider arms having link connections with said jaws, a cam roller on each of said slides, a stationary cam in which said cam rollers operate to maintain said jaws in a normally open position, means for intermittently rotating said spider wheel to bring a clinching head adjacent said forming means to receive a preformed overcap in the open jaws of said head and for further rotating said spider wheel to bring the head and its overcap into position adjacent an end of a container to be capped, a lifter pad for pushing the end of the container into the overcap and against said head anvil, and auxiliary cam devices operating in a recess of said holding cam and operable against the cam roller on said slide for shifting said slide on its spider arm to close said jaws on the flange of said overcap to clinch it fast to said container.

JOHN M. HOTHERSALL.