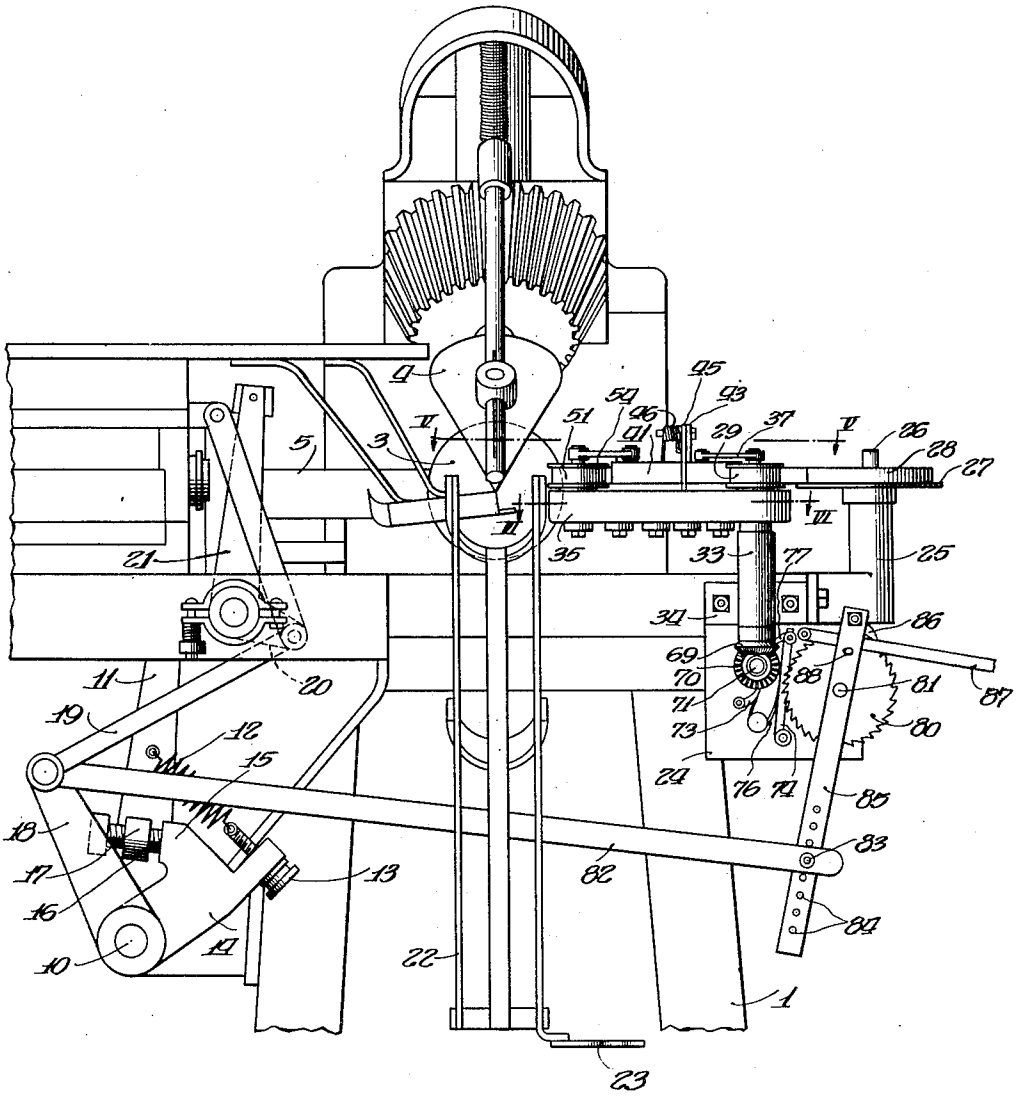
Aug. 22, 1933. R. BARES ET AL 1,923,061

COUNTER FOR CUP MACHINES

Filed Sept. 18, 1931 5 Sheets-Sheet 1

Fig. 1



Inventors

Rudolph Bares.

Andrew C. Wood.

by: Charles Filler Attys.

Aug. 22, 1933. R. BARES ET AL 1,923,061

COUNTER FOR CUP MACHINES

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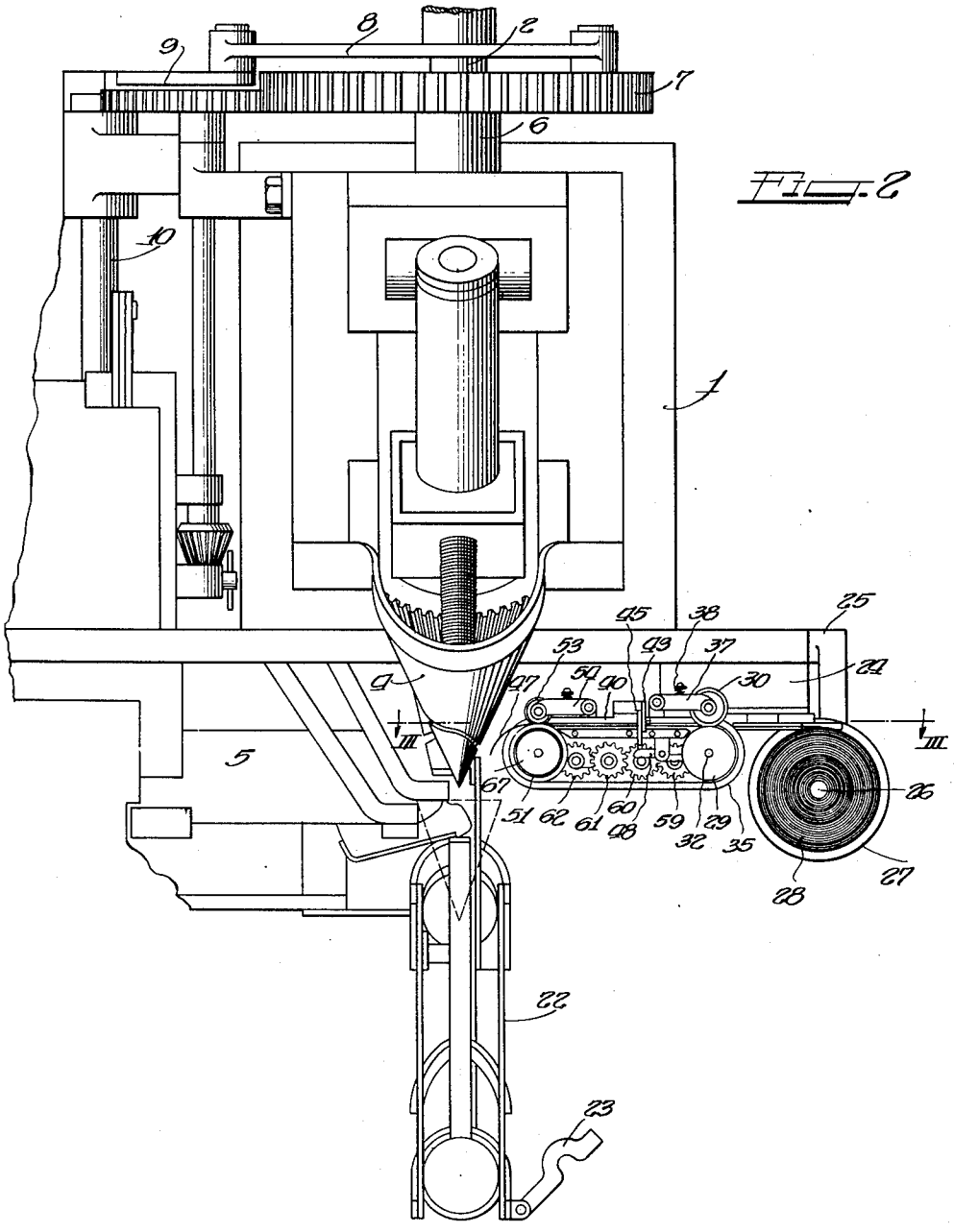


Fig. 2

Inventors
Rudolph Bares.
Andrew C. Wood.
By: Charles Hill & Sons

Aug. 22, 1933. R. BARES ET AL 1,923,061

COUNTER FOR CUP MACHINES

Filed Sept. 18, 1931 5 Sheets-Sheet 3

Fig. 3

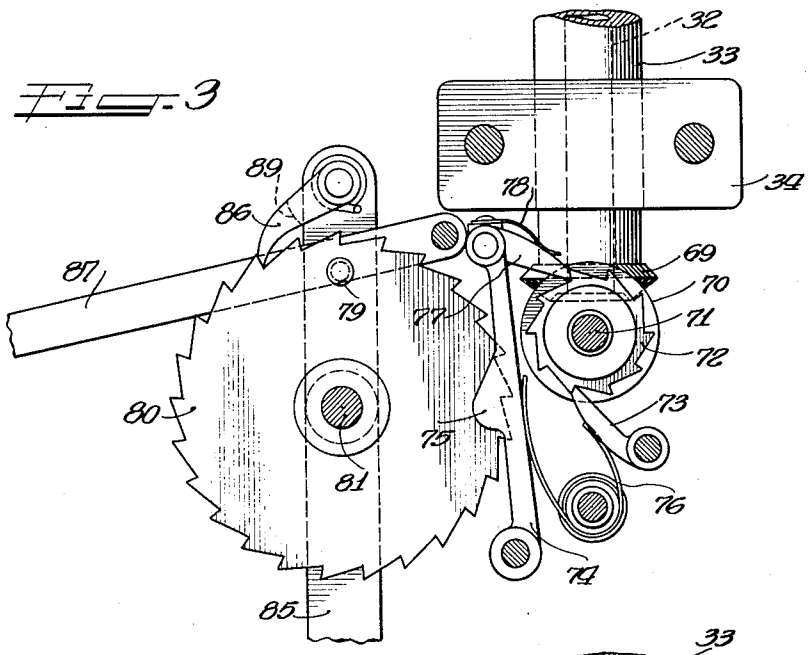
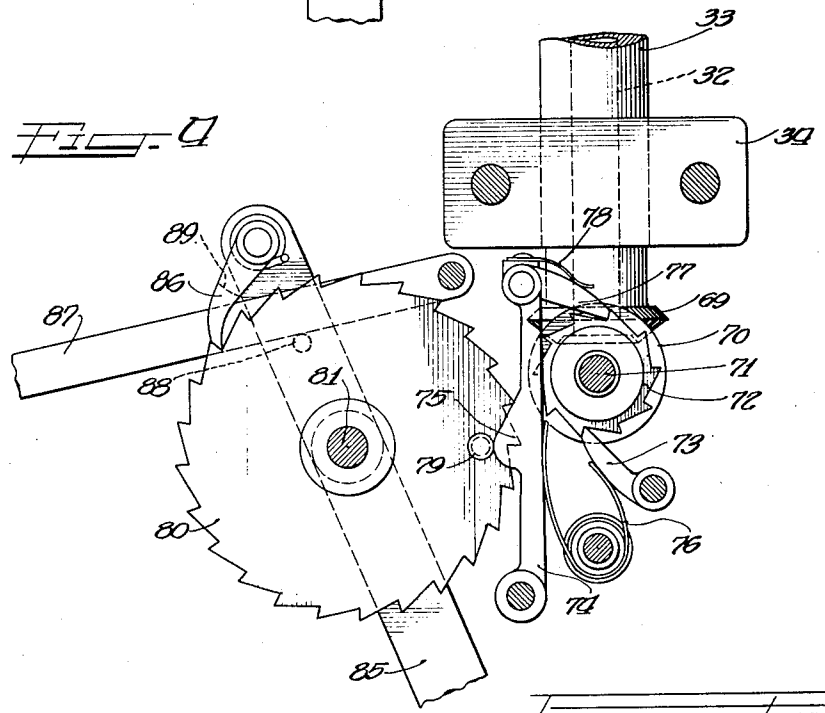


Fig. 4



Inventors
Rudolph Bares.
Andrew C. Wood.
By: Charles Gill Attys.

Aug. 22, 1933. R. BARES ET AL 1,923,061

COUNTER FOR CUP MACHINES

Filed Sept. 18, 1931 5 Sheets-Sheet 4

Fig. 5

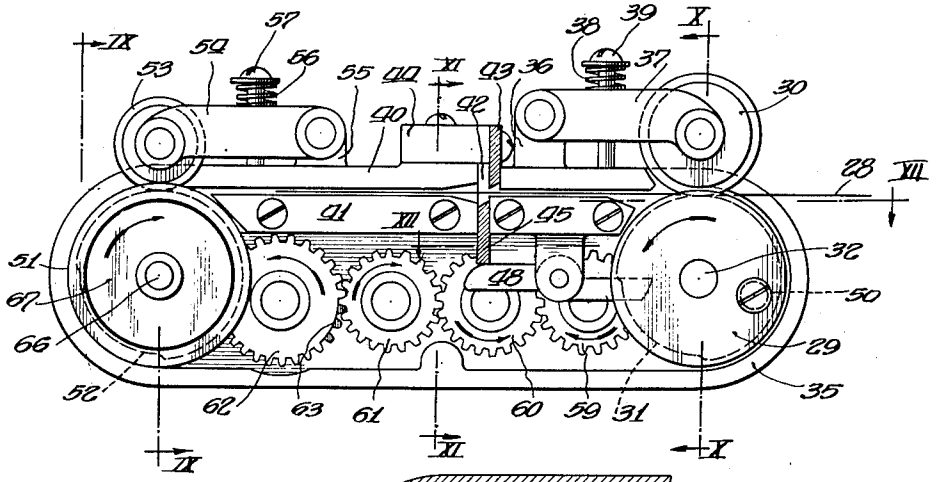


Fig. 7

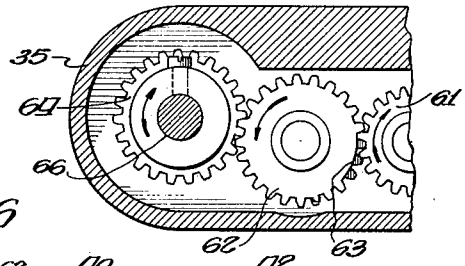
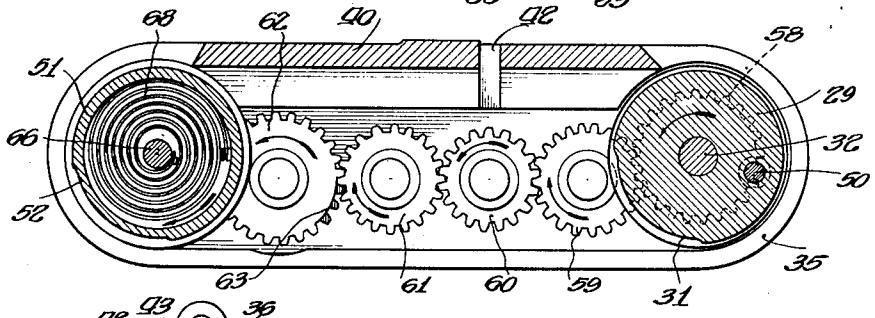


Fig. 6



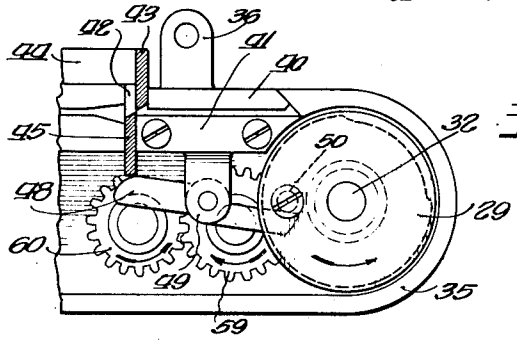


Fig. 8

Inventors
Rudolph Bares.
Andrew C. Wood.
By: Charles Bell Hills.

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COUNTER FOR CUP MACHINES

Filed Sept. 18, 1931 5 Sheets-Sheet 5

Fig. 9

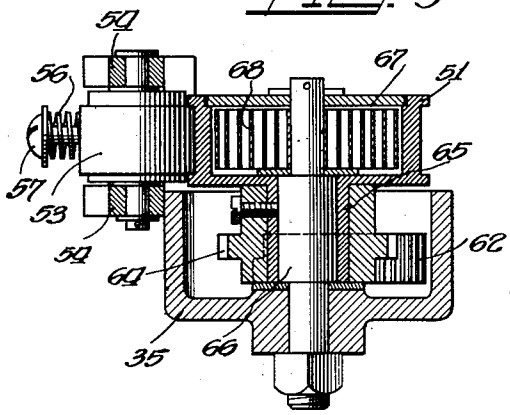


Fig. 10

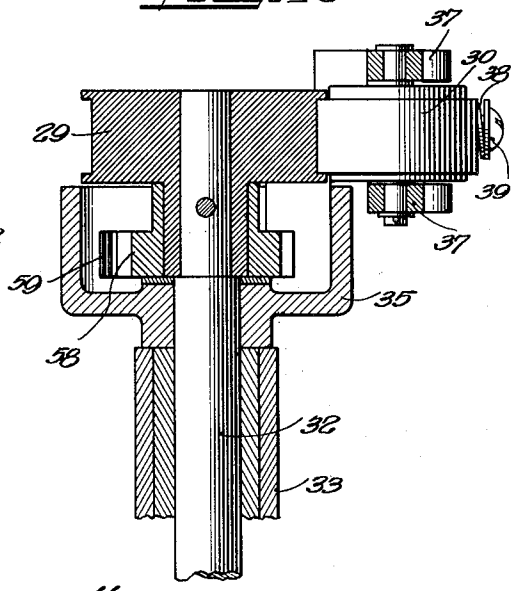


Fig. 11

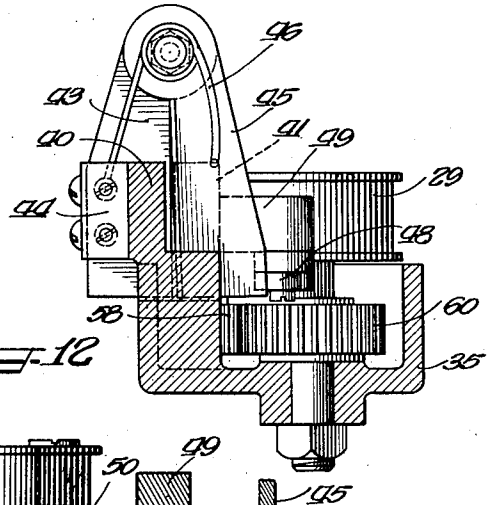


Fig. 12

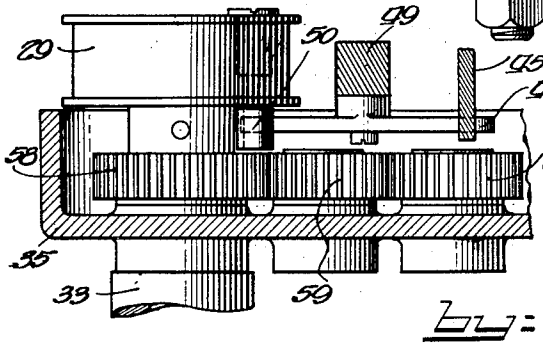
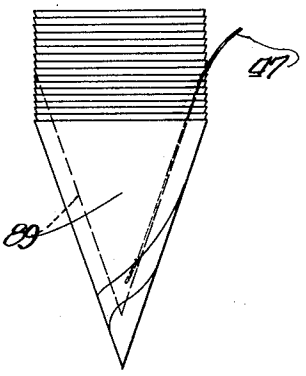


Fig. 13



Inventors
Rudolph Bares.
Andrew C. Wood.
By: Charles Fellows Atty.

Patented Aug. 22, 1933 1,923,061

UNITED STATES PATENT OFFICE

1,923,061

COUNTER FOR CUP MACHINES

Rudolph Bares and Andrew C. Wood, Chicago, Ill., assignors to Vortex Cup Company, Chicago, Ill., a Corporation of Delaware

Application September 18, 1931
Serial No. 563,502

28 Claims. (Cl. 93—36)

In container and cup making machines from which the finished cups are discharged to be deposited in stacks or in nested relation, considerable difficulty has been encountered in the counting of the discharged cups due to the lack of convenient automatic means whereby the stacked cups may be divided into counted groups by suitable separators or indicators to facilitate removal of predetermined or counted quantities of the cups from the stacking mechanism of the machine.

This invention relates to an improved cup counter and indicator depositing attachment for use in connection with cup forming and stacking machines of the type illustrated and described in the patent to Rudolph Holman, No. 1,594,617, dated August 3, 1926 for a "Cup forming machine and stacking attachment", which patent has been assigned to The Vortex Cup Company, of Chicago, Illinois, assignee of the present application for patent. The present invention relates to an attachment adapted to be conveniently connected with the machine and operable thereby to automatically count formed cups as they are discharged and stacked in nested relation. The counting of the cups is accomplished by the automatic insertion of projecting indicators or spacers at predetermined intervals in the stack of cups.

It is an object of this invention to provide a cup forming and stacking machine with an automatic counter and indicator spacer attachment adapted to be connected for operation from the machine to automatically cause indicators to be cut at predetermined times and delivered at spaced intervals in the stack of cups formed by the machine to automatically mark off the cups in counted quantities.

It is also an object of this invention to provide a container forming and stacking machine with an attachment operable by the machine for automatically cutting indicators from a strip of material and then automatically transferring the cut indicators into the stack of cups which are discharged from the machine to mark off the cups in counted numbers readily discernable by means of the projecting ends of the indicators.

It is a further object of this invention to provide a cup forming and stacking machine with an attachment operable from the machine and including a material device for advancing the material to the field of operation of a cutting mechanism adapted to be actuated at a predetermined time to cut off a strip of the material to form an indicator adapted at a predetermined time to be delivered into the uppermost cup in the stacking mechanism of the machine to mark off a counted quantity of cups determinable by a control unit forming part of the counter attachment.

Another object of the invention is to provide a cup forming and stacking machine with a counting attachment operable by the machine and adapted to first cut an indicating spacer from a strip of material and then deliver the indicating spacer into the last of a counted number of cups formed by the machine prior to the discharge of the next series of cups, thereby permitting the additional deposited cups to hold the indicating spacer in a gripped projecting position in the stack of cups.

It is furthermore an object of this invention to provide a cup forming and stacking machine with a counting attachment connected to be operated in synchronized relation with the blank feed mechanism of the machine to cause the counter to govern the operation of a cutter and a transfer mechanism to cut a spacer from a strip of material and then automatically deliver the spacer into a selected cup in the machine stacker attachment to mark off a counted number of the stacked cups.

It is an important object of this invention to provide an improved counter for an article forming machine, said counter adapted for use with an article producing machine to be operated from the machine in synchronized relation with the blank feeding mechanism of the machine to cause spacers to be cut from a strip of material fed to the counter and then cause the cut spacers at predetermined times to be delivered at spaced intervals between counted articles discharged from the machine to separate the articles in groups each of which contains a predetermined quantity of the articles, with the size of the groups of articles being determined by means of control means forming a part of the counter attachment.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a fragmentary elevational view of the discharge end of a container or cup forming and stacking machine having attached thereto and operable thereby an improved automatic

counter and indicator spacer attachment embodying the principles of the invention.

Figure 2 is a fragmentary top plan view of the machine illustrated in Figure 1 and the counter and indicator spacer attachment of this invention.

Figure 3 is a fragmentary enlarged vertical sectional view taken on line III—III of Figure 2 illustrating the pawl and ratchet control mechanism of the counter for governing the operation of the cutter and the indicating spacer delivering mechanism.

Figure 4 is a sectional detail view similar to that illustrated in Figure 3 with the counter parts positioned to illustrate the operation of the counter.

Figure 5 is an enlarged fragmentary top plan view taken on line V—V of Figure 1 illustrating the material cutting mechanism and the indicating spacer delivering means.

Figure 6 is an enlarged horizontal sectional view taken on line VI—VI of Figure 1.

Figure 7 is an enlarged fragmentary sectional view illustrating the gear mechanism at one end of the indicating spacer cutter and delivery unit illustrated in Figures 5 and 6.

Figure 8 is a fragmentary horizontal detail view of the cutter mechanism.

Figure 9 is an enlarged fragmentary vertical detail section taken on line IX—IX of Figure 5 illustrating the details of the indicating spacer delivery mechanism.

Figure 10 is an enlarged fragmentary detail section taken on line X—X of Figure 5 with parts shown in elevation.

Figure 11 is an enlarged vertical sectional view taken on line XI—XI of Figure 5 illustrating the cutter and the operating mechanism therefor.

Figure 12 is an enlarged fragmentary vertical detail view taken on line XII—XII of Figure 5.

Figure 13 illustrates a stack of cups showing an indicating spacer seated in one of the cups with a portion of the spacer projecting to indicate a counted number of the stacked cups.

As shown on the drawings:

The improved automatic counter and indicating spacer attachment of this invention is adapted to be supported upon a cup forming and stacking machine. In the present showing the improved attachment is mounted on a machine framework 1 having supported thereon a main driving shaft 2 connected to be driven by any suitable source of power. Mounted on the framework 1 and connected to be driven from the driving shaft 2 is a container or cup forming mandrel 3 with which a presser roller 4 is positioned to coact. To permit the forming mandrel to produce containers or cups, blanks are adapted to be fed to the mandrel by means of a blank feeding mechanism forming part of the machine and briefly comprising a reciprocating blank feed table 5 on which cup blanks are delivered from a blank holding magazine which, in the present showing of the machine, has been omitted. Rotatably journalled in suitable bearings 6 supported on the machine frame is a main operating gear 7 which receives a drive from a driving gear or pinion secured on the driving shaft 2. Pivotally connected eccentrically to the gear 7 is one end of a connecting rod 8 (Figure 2) the other end of which is pivoted to an arm 9 fixed at one end of a rod or shaft 10 supported in bearings provided on the machine frame.

An arm or lever 11 is pivoted on the shaft 10 and has the upper end thereof pivotally connected to operate the blank feed table 5. The table actuating lever 11 has connected thereto one end of a coil spring 12, the other end of which is connected to an adjusting screw 13. The adjusting screw 13 is mounted on an arm or plate 14 having a hub secured on the shaft 10. Integrally formed on the plate 14 is an extension or finger 15 which is held in contact with a screw 16 which projects through a boss 17 formed on the lever 11.

The machine is provided with a cup blank transfer mechanism adapted to transfer a blank from the supply magazine to the reciprocating blank feed table 5. The cup blank transfer mechanism comprises a crank arm 18 fixed on the shaft 10 to the outside of the plate 14. The upper end of the crank arm 18 is pivotally connected to one end of a connecting rod 19. The other end of the connecting rod 19 is pivotally connected to the end of a short arm 20 of a bell crank having a long arm 21 integral with said short arm. The upper end of the long bell crank arm 21 is connected to operate a blank gripping mechanism (not shown) whereby at predetermined times in the operation of the machine, a blank from the blank magazine is automatically delivered to the reciprocating table 5 for delivery to the forming mandrel 3 to be formed into a container or cup.

The cup forming machine is provided with a suitable discharge mechanism whereby cups when formed are adapted to be discharged from the forming mandrel and are deposited in a cup stacking mechanism embracing a curved guide chute 22 secured on the front of the machine framework 1. A stop member or rest 23 is pivotally mounted on the lower end of the chute 22 and when in closed position is adapted to afford a rest for the cups deposited in the chute. The cups formed by the machine are thus adapted to be discharged one at a time from the machine and are deposited in the chute in stacked or nested relation with respect to one another.

Having briefly described the container or cup making machine and the mechanisms forming a part thereof whereby blanks are adapted to be transferred from a blank magazine onto a reciprocating blank feed table to be delivered to the forming mandrel to be formed into cups which are discharged into the guide chute forming a part of the stacking attachment, the improved automatic cup counter and indicating spacer attachment will now be described.

The improved cup counter comprises a mounting plate or bracket 24 which is rigidly secured to the machine framework 1. Rigidly secured on an extension of the framework 1 is bracket arm 25 in which a stub shaft 26 is supported. Rotatably mounted on the stub shaft 26 is a material feed reel 27 which carries a roll of paper or other suitable material out of which the indicating spacers are adapted to be formed. The strip of material 28 is adapted to be conducted through a material feed and cutting unit between a primary feed reel 29 and a primary presser roll 30. The primary feed roller 29 is provided with a peripheral recess 31 (Figure 6). The primary feed roller 29 is secured on the upper end of a vertical driving shaft 32 which is rotatably supported in a bearing sleeve 33 forming part of a supporting bracket 34 which is rigidly secured to the machine framework 1 as illustrated in Figure 1. The shaft 32 projects upwardly through one end of a horizontally positioned gear casing or box 35 which is of elongated shape and

is open at the top as clearly illustrated in Figure 5. Secured to the rear side of the gear casing 35 is an arm 36 having pivotally supported thereon a pair of spaced arms 37 between the outer ends of which the main presser roller 30 is rotatably supported. For the purpose of resiliently holding the main presser roll 30 in rolling contact with the periphery of the main feed roll 29, a coiled controlled spring 38 is positioned on a supporting post 39 secured to the rear side of the gear box or casing 35. The strip of material 28 after passing between the primary feed reel 29 and the presser roller 30 is advanced between a guide wall 40 and an inner guide strip or wall 41 secured within the gear box 35 as clearly illustrated in Figure 5. The guide wall 40 is provided with a transverse opening 42 into which a stationary cutter blade 43 projects. The stationary cutter blade 43 is secured on a mounting block 44 secured to substantially the middle portion of the outer surface of the rear wall of the gear box 35, as clearly illustrated in Fig. 5. Pivotally supported on the upper end of the stationary cutter blade 43 is a movable cutter blade 45 which is resiliently held in open position by means of a control spring 46 (Figure 11). The control spring 46 acts to hold the movable cutter blade 45 in open position to afford a space between the cutting edges of the stationary blade 43 and the movable blade 45 to permit the material 28 to be advanced between the guide walls 40 and 41 to permit a predetermined length of the material to be cut off at a predetermined time to provide an indicating spacer 47.

The cutter actuating mechanism comprises a beam or arm 48 which is pivotally mounted intermediate its ends on a bracket 49 formed on one side of the guide wall 41 as clearly illustrated in Figure 8. One end of the pivoted cutter control arm 48 is positioned to coact with the movable cutter blade 45 while the opposite end of said control arm is positioned in the path of travel of a cutter control roller 50 rotatably supported on the underside of the main feed reel 29. The inner guide wall 41 is provided with a transverse opening in which the movable cutter blade 45 is positioned to permit the same when actuated to coact with the stationary cutter blade 43 to cut across the advanced strip of material 28 when the cutter control arm 48 is actuated by means of the roller 50. The material 28 before being cut passes through the guide space provided between the guide walls 40 and 41 and passes between a secondary feed reel 51 having a recess 52 provided in the outer peripheral surface thereof. The reel 51 has a presser roller 53 coacting with the peripheral surface thereof to assist in effecting a discharge of an indicating spacer when cut into a finished cup as hereinafter more fully described. The presser roller 53 is rotatably supported on a pair of arms 54 which are pivotally supported on a bracket arm 55 secured on the exterior of the rear wall of the gear box 35. The auxiliary presser roller 53 is resiliently held in contact with the outer peripheral surface of the spacer discharge reel 51 by means of a control spring 56 engaged around a mounting post 57 secured to the rear side of the gear box 35. The auxiliary presser roller 53 having resilient rolling contact with the outer periphery of the discharge reel 51 is prevented from moving into the recess 52 by the reduced ends of the roller 53 which have rolling contact with the flanges of the indicating spacer discharge reel 51 as clearly illustrated in Figure 9 so that a space is provided between the reel 51 and the roller 53 during an interval of time sufficient to permit a portion of the strip of material 28 to be fed forwardly a sufficient distance beyond the cutters to permit an indicating spacer of sufficient length to be cut. In a similar manner, the material feed roller 30 is prevented from moving into the recess 31 of the feed reel 29 due to the fact that the reduced ends of the roller 30 have rolling contact with the flanges of the reel 29 thereby preventing the entrance of the roller 30 into the recess 31 leaving a space sufficient to prevent the material 28 from being fed forwardly during the operation of the cutters to cut an indicating spacer from the strip of material.

Positioned within one end of the gear box 35 and secured on the shank of the material feed reel 29, as clearly illustrated in Figure 10, is a gear 58 which meshes with a smaller gear 59 which is rotatably supported on a stub shaft within the gear box 35. The gear 59 in turn drives an intermediate gear 60 which is in mesh with a gear 61. The gear 61 meshes with a mutilated control gear 62 having a number of teeth thereof cut off to provide a mutilated section 63 (Figure 7). Meshing with the upper mutilated section of the gear 52 is a gear 64 which is secured on the hub 65 of the discharge reel 51 as clearly illustrated in Figure 9.

The hub 65 of the discharge reel 51 is rotatably mounted on a stationary shaft 66 which projects upwardly through one end of the gear box 35 with the upper end of said shaft projecting through a closure plate 67 which closes the upper open end of the discharge reel 51.

Mounted within the discharge reel 51 is a coiled control spring 68 one end of which is secured to the shaft 66 while the outer end thereof is secured to the inner periphery of the discharge reel 51, as clearly illustrated in Figure 6.

The indicating spacer cutter mechanism and discharge mechanism are adapted to be operated from the vertical driving shaft 32 which in turn is adapted to be operated by a counter mechanism operable from the cup forming machine. Secured on the lower projecting end of the driving shaft 32 is a beveled gear 69 which is in mesh with a driving beveled gear 70 which is supported on a stub shaft 71 rotatably supported in the bracket plate 24. Secured or formed on the back of the beveled gear 70 is a secondary or auxiliary ratchet wheel 72 having a stop pawl 73 coacting therewith to prevent reverse rotation of the auxiliary ratchet wheel. The stop pawl 73 is pivotally supported on the bracket plate 24. Also pivotally mounted on the bracket plate 24 is the lower end of a cam bar 74 having a control cam 75 integrally formed on one side thereof. Supported on the mounting plate 24 is a control spring 76 one end of which is engaged with the pawl 73 to resiliently hold the same in coacting relation with the auxiliary ratchet wheel 72 while the other end of the control spring 76 engages the pawl bar 74. As clearly illustrated in Figures 3 and 4, an operating pawl 77 is pivotally supported on the upper end of the cam bar 74 and is engaged by a control spring 78 which acts to resiliently hold the pawl 77 in coacting engagement with the teeth of the auxiliary ratchet wheel 72.

The auxiliary counter ratchet wheel 72 is provided with ten teeth and is adapted to be rotated one-tenth of a revolution each time the cam bar 74 is actuated. The control cam 75 forming a part of the cam bar 74 is positioned in the path of travel of a control roller 79 which is rotatably

supported on one side of a main counter ratchet wheel 80. The ratchet wheel 80 is rotatably supported on a stub shaft 81 mounted on the supporting plate 24. The main ratchet wheel 80 is provided in the present instance with twenty-five teeth and coacting with the auxiliary counter ratchet wheel 72 affords an arrangement whereby after 250 cups have been formed by the machine and deposited in stacked relation in the stacking chute 22 an indicating spacer 47 is automatically cut from the strip of material and deposited in the 250th cup.

A drive from the container or cup making and stacking machine is adapted to be transmitted to the counter mechanism by means of a driving or connecting rod or bar 82 one end of which is pivotally connected to the upper end of the crank arm 18 (Figure 1) forming part of the blank transfer operating mechanism of the cup forming machine. It will be noted that each time the blank transfer mechanism of the machine is actuated to cause a blank to be delivered onto the reciprocating blank feed table of the machine, the operating bar 82 is actuated to cause operation of the counter mechanism. The operating bar 82 has the outer end thereof pivotally connected by means of a bolt 83 or other suitable means which is removably engaged in any one of a series of openings or apertures 84 provided in the lower end of an operating lever 85. The operating lever 85 is pivotally supported intermediate its ends on the stub shaft 81. Pivotally supported on the upper projecting end of the operating lever 85 is a spring controlled main operating pawl 86 which is positioned to coact with the teeth of the main counter ratchet wheel 80.

For the purpose of manually stopping the counter mechanism, a manually operable control arm or lever 87 is pivotally supported at one end on the mounting plate 24. The hand lever 87 is positioned between the main ratchet wheel 80 and the operating lever 85 and normally is in a released position as clearly illustrated in Figure 4 resting on a pin or stud 88 secured to the operating lever 85. The counter operating pawl 86 has the outer end thereof notched as indicated by the reference numeral 89 leaving a shoulder which projects to one side of the ratchet wheel 80 to permit the manually operable lever 87 when raised to engage the shoulder of the pawl 86 to swing the pawl upwardly out of coacting engagement with the main counter control ratchet wheel 80. As clearly illustrated in Figure 3, the pivoted end of the manually controlled release lever 87 is in a position to be contacted by the upper end of the cam arm 74 to serve as a stop for limiting the swing of said cam arm due to the action of the control spring 76.

In the present form of cup forming machine, the blanks which are fed to the forming mandrel 3 are formed into conical cups or containers 89 (Figure 13) which are deposited in nested or stacked relation in the stacking chute 22 and are adapted to be separated at spaced intervals by means of the indicating spacers 47 which are automatically cut from a strip of material to form indicating spacers which in turn at predetermined times are delivered into the last one of a counted number of cups so that the stack of nested cups is divided into counted groups by means of the indicating spacers 47.

The operation is as follows:

The automatic counter and indicating spacer attachment of this invention is adapted for attachment to and operation by a cup forming machine or to any other type of machine wherein articles are discharged and positioned adjacent one another in a receiver from which the articles are preferably removed in counted groups or quantities.

The receptacle or cup forming machine, with which the attachment is used in the present showing, is adapted to be operated from any suitable source of driving power. When the machine in is operation, blanks from a supply magazine are adapted to be automatically fed from the magazine into a position to permit a transfer mechanism forming part of the machine to act automatically to transfer the advanced blanks upon a reciprocating feed table 5 which in turn serves to deliver the blanks to the forming mandrel 3 of the machine to cause the blanks to be formed into containers or cups. At predetermined times in the operation of the cup forming machine, the completed cups are automatically discharged from the forming mandrel and are delivered to a receiving chute 22 forming a part of the stacking mechanism of the machine. As the cups are delivered into the receiving chute 22 the cups are nested one within the other in stacked relation. In order that the stacked cups may be removed from the receiving chute in counted quantities or groups readily discernible by convenient indicating means the improved attachment embodying the principles of this invention is adapted to be secured to the machine and operated thereby for the purpose of automatically delivering indicating spacers 47 at predetermined intervals in the stack of formed cups to separate predetermined counted quantities of the cups.

The counter and indicating spacer attachment is connected for operation from the machine by means of the connecting bar or rod 82 one end of which is pivotally connected with the crank arm 18 forming a part of the blank transfer mechanism of the machine. The connecting bar 82 has the second end thereof connected with the apertured lower end of the attachment actuating lever 85. The pivotal swinging movement of the actuating lever 85 may be varied by connecting the actuating bar 82 with different ones of the openings 84 provided in the lower end of the lever. The pivotal swinging of the upper end of the operating lever 85 determines the advance of the main operating pawl 86 so that each time a blank is transferred from the machine magazine onto the machine blank feed table 5 by the operation of the machine blank transfer mechanism, the attachment operating lever 85 is advanced from the full line position illustrated in Figure 3 into the full line position of Figure 4 to cause the main operating pawl 86 to operate the main counter ratchet wheel 80 to cause the same to be rotated a predetermined distance or one-twenty-fifth (1/25th) of a revolution in the present instance since the ratchet wheel 80 is provided with twenty-five teeth.

If, at any time, during the operation of the counter attachment it is desired to stop the operation thereof without stopping the operation of the cup forming machine, the manual control lever 87 is swung upwardly from its normal position resting on the stop pin 88 to engage the shoulder 89 of the main control pawl 86 to swing said pawl upwardly out of coacting engagement with the teeth of the ratchet wheel 80. The drive to the counter attachment is thereby disconnected until such time as the control lever 87 is again

lowered to permit the pawl 86 to coact with the teeth of the ratchet wheel 80.

Each time the operating lever 85 is actuated, the feed table 5 delivers a blank to the forming mandrel 3 and a completed cup is discharged from the forming mandrel and is deposited in the cup receiving chute 22 while the main pawl 86 is advanced from the full line position illustrated in Figure 3 to the full line position illustrated in Figure 4 to cause the ratchet wheel 80 to be rotated one-twenty-fifth (1/25th) of a revolution thereby advancing the cam control roller 79 a step nearer the control cam 75.

When twenty-five cups have been deposited in the chute 22, the control roller 79 on the ratchet wheel 80 is brought into engagement with the cam 75 thereby causing the cam arm 74 to be swung from the full line position illustrated in Figure 3 into the full line position illustrated in Figure 4 causing the auxiliary control pawl 77 to rotate the auxiliary ratchet wheel 72 one-tenth of a revolution, there being ten teeth on said ratchet wheel 72.

Rotation of the auxiliary ratchet wheel 72 causes rotation of the beveled gear 70 which being in mesh with the beveled gear 69 causes rotation of the driving shaft 32 and the material feed reel 29 to cause the strip of material to be unwound from the reel 28 and advanced or fed forwardly with the assistance of the spring-controlled presser roll 30 a predetermined distance between the guide members 40 and 41 and between the cutter blades 43 and 45. With the depositing of each 25 cups into the receiving chute 22, the main ratchet wheel 80 is rotated one revolution thereby causing the auxiliary ratchet wheel 72 to be rotated one-tenth of a revolution thereby causing the material strip to be intermittently advanced between the guide members 40 and 41 and between the cutter blades until the auxiliary ratchet wheel 72 has been rotated a full revolution after 250 cups have been deposited in the receiving chute. With the gradual rotation of the material feed reel 29 the cutter control roller 50 is gradually advanced toward the fulcrumed cutter control arm 48 and the recess 31 provided in the outer periphery of the feed reel 29 is advanced into a position adjacent the presser roller 30 so that the feeding action of the material 28 is temporarily discontinued during the cutting of an indicating spacer from the strip of material. When the control roller 50 engages one end of the fulcrumed arm 48, said arm is pivotally actuated to cause the pivoted cutter blade 45 to be moved toward the stationary blade 43 thereby cutting through the strip of material to cut off a portion of the advanced end of the material to form an indicating spacer 47.

With each partial rotation of the driving shaft 32, the gear 58 causes a drive to be transmitted to the meshing gears 59, 60 and 61 causing the mutilated gear 62 to be partially rotated to cause rotation of the gear 64 thereby causing the discharge roll or reel 51 to be gradually rotated in a clockwise direction, looking at Figure 6, to gradually wind up the control spring 68 which governs the operation of the discharge roller or reel 51.

The material feed mechanism is so timed that before the end of the material reaches the discharge roller 51 the presser roller 53 is in rolling contact with a portion of the periphery of the roller 51 and when the end of the material is ready to pass between the discharge roller 51 and the presser roller 53 the advanced end of the recess or pocket 52 in the outer periphery of the roller 51 reaches a position opposite the presser roller 53 thereby permitting the advancing material to be advanced between the discharge roller 51 and the roller 53 with said roller 51 being rotated in a direction opposite to the direction of travel of the material.

At the time that the movable cutter blade 45 is actuated to cut across the strip of material to cut an indicating spacer therefrom, the end of the recess 52 passes the presser roller 53 permitting the peripheral surface of the discharge roller 51 to engage the underside of the indicating spacer just as the toothless or mutilated segment 63 of the gear 62 is brought into register with the discharge roller gear 64 thereby temporarily releasing the meshing engagement of the teeth of the gear 62 with the teeth of the gear 64 to not only discontinue rotation of the gear 64 but also to cause release of the discharge roller 51 permitting the wound up control spring 68 to rapidly rotate the discharge roller 51 in a counterclockwise direction so that the cut off indicating spacer which is frictionally gripped between the outer periphery of the discharge roller 51 and the presser roller 53 is advanced toward the open end of the cup receiving chute 22 and is discharged from the indicating spacer transfer mechanism and is deposited in the 250th cup or in the last of a predetermined or counted number of cups delivered from the cup forming mandrel into the receiving chute. With the projection of an indicating spacer 47 into a predetermined one of the cups, the cup forming machine continues to deposit cups into the chute so that a plurality of additional cups are nested or stacked in the cup containing the indicating spacer to hold the inner end of the spacer frictionally gripped in position while the outer end of the indicating spacer projects from the stack of nested cups to clearly indicate a counted group or quantity of the nested cups.

With the depositing of an indicating spacer in a predetermined cup in the stack of cups within the chute 22, the mutilated section of the gear 62 passes the gear 64 permitting the teeth of said gear 62 to again mesh with the teeth of the gear 64 to cause the discharge roller 51 to again be rotated in a clockwise direction to cause rewinding of the control spring 68 preparatory to the discharge of the next indicating spacer after another counted group of 250 cups is deposited in the stacking chute 22.

In the present showing of the invention, the counter mechanism is provided with ratchet wheels 80 and 72 the tooth ratio of which is such that 250 cups are adapted to be counted before an indicating spacer is cut off from a strip of material and deposited in the 250th cup stacked in the machine cup receiving chute 22. It will of course be understood that ratchet wheels having different tooth ratios may be used in the counter mechanism to permit the attachment to be used for the purpose of counting off different quantities of stacked cups.

The improved counter attachment in the present instance is associated with a cup forming machine, but it will of course be understood that the improved attachment may be readily adapted for use in connection with machines making various articles which are required to be counted off in predetermined numbers or groups. In the present case, the improved counter attachment is mounted to be operated in synchronized relation with the blank feed and cup forming mech-

anism of a cup forming machine and is adapted to automatically advance a material, cut indicating spacers therefrom, and at predetermined times in the discharge of cups from the machine, deliver the indicating spacers at spaced intervals in the stack of discharged cups to designate predetermined counted groups or quantities of the cups.

It will, of course, be understood that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and it is therefore not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

We claim as our invention:

1. The combination with a container receiving chute, of a machine for delivering containers thereto, a counter mechanism, means connected for operation from the machine adapted to actuate the counter mechanism each time a container is delivered by the machine into said chute, an indicating spacer forming means connected to be operated from the counter mechanism, an indicating spacer delivering means connected to be wound up by the counter mechanism, and control means operable by the counter mechanism for releasing the delivery means at a predetermined time allowing the same to unwind and engage an indicating spacer and deliver the same into one of a counted number of containers in said chute to indicate a counted quantity of the containers.

2. The combination with a container receiving chute, of a machine for delivering containers thereto, a counter mechanism, adjustable driving means connected to be operated from the machine for actuating the counter mechanism, a manually operable control connected with the counter mechanism for stopping the operation thereof when desired, a material feed device actuated by the counter mechanism for advancing a strip of material, a cutter device, means operable by the material feed device for operating the cutter device at a predetermined time to cut an indicating spacer from the advanced material, an indicating spacer transfer device, a control spring therein adapted to be wound by the rotation of the transfer device from the counter mechanism, and a control device operable from the counter mechanism for releasing the transfer device at a predetermined time to permit unwinding of the spring and operation of the transfer device to cause the same to engage an indicating spacer and deliver the same into the last one of a counted number of containers in the receiving chute to mark off a counted quantity of the containers.

3. The combination with a container receiving chute, of a machine for delivering containers thereto, a main pawl and ratchet counter unit, means for operating the same from the machine each time a container is delivered into the receiving chute, an auxiliary pawl and ratchet counter unit, control means operable at predetermined times by the main pawl and ratchet counter unit to cause operation of the auxiliary pawl and ratchet counter unit, a material feed device operated by the auxiliary counter unit, a cutter device operable by the feed device at a predetermined time to cut an indicating spacer from the advanced material, a spring controlled transfer device, a gear unit connected to be driven from the auxiliary counter unit to cause the transfer device to be operated to wind up the control spring thereof, and a release member forming a part of the gear unit for releasing the transfer device at a predetermined time to cause the same to engage an indicating spaced and deliver the same into one of the containers in said chute to mark off a counted number of containers.

4. The combination with a container receiving chute, of a machine for delivering containers thereto, a main pawl and ratchet counter unit, a lever for operating the same, a connecting rod adjustably attached to said operating lever and operable from the machine, an auxilary pawl and ratchet counter unit, control means operable at predetermined times by the main counter unit to cause operation of the auxiliary counter unit, a material feed mechanism operated by the auxiliary counter unit for advancing a strip of material, a cutter mechanism, means operable by the material feed mechanism to actuate the cutting mechanism at a predetermined time to cause an indicating spacer to be cut from the advanced strip of material, a spring controlled transfer device, means operated from the auxiliary counter unit for winding the transfer device and means coacting with the transfer device for releasing the same at a predetermined time to cause the transfer device to engage an indicating spacer and then deliver the same into the last one of a counted number of containers in said receiving chute.

5. The combination with a container receiving chute, of a machine for delivering containers thereto, a main pawl and ratchet counter mechanism, a lever for actuating the same, a connecting member operable from the machine and connected to operate the operating lever, a cam member, means on said main counter mechanism for actuating the cam member at predetermined times, an auxiliary pawl and ratchet counter mechanism operable by the cam member, a feed mechanism connected to be driven by the auxiliary counter mechanism to cause a strip of material to be advanced, a cutting mechanism, means operable by the feed mechanism to cause operation of the cutting mechanism at a predetermined time to cut an indicating spacer from the advanced strip of material, a spring controlled transfer mechanism, means operable from the auxiliary counter mechanism for rotating the transfer mechanism to cause tensioning of the control spring and a release device for releasing the transfer mechanism at a predetermined time to cause the spring to rotate the transfer mechanism in an opposite direction to engage the indicating spacer and deliver the same into a container in said chute to mark off a counted number of containers.

6. The combination with a container receiving chute, of a machine for delivering containers thereto, a connecting member operated from the machine, an actuating lever operable by said connecting member, a main counter ratchet wheel, a spring controlled main pawl on said actuated lever coacting with the main counter ratchet wheel to rotate the same a predetermined distance each time a container is delivered to the receiving chute, a pivoted cam member, a roller on said main counter ratchet wheel for actuating the cam member at predetermined times, an auxiliary counter ratchet wheel, an auxiliary pawl supported on said cam member for rotating the auxiliary counter ratchet wheel a predetermined distance for each complete revolution of the main counter ratchet wheel, a material feed

mechanism operable from the auxiliary counter ratchet wheel to advance a strip of material, a cutter mechanism, control means operable by the feed mechanism for causing the cutter mechanism to cut an indicating spacer from the advanced strip of material at a predetermined time, a rotatable transfer mechanism, a gear train operable from the auxiliary counter ratchet wheel for rotating the transfer mechanism when the feed mechanism is operated, a control spring in the transfer mechanism adapted to be tensioned when the transfer mechanism is rotated by the gear train, and a mutilated gear member forming a part of the gear train for releasing the transfer mechanism at a predetermined time to cause the tensioned spring to rotate the transfer mechanism in an opposite direction to cause the same to engage the cut indicating spacer and then deliver the same into a selected one of a counted number of containers in the receiving chute to mark off a group of counted containers.

7. The combination with a container receiving chute, of a machine for delivering containers thereto, a transfer mechanism, a control spring therein, means for delivering an indicating spacer to the transfer mechanism, and mechanisms operable from the machine for first winding up the spring and then automatically releasing the spring at a predetermined time to cause the transfer mechanism to engage the indicating spacer and deliver the same into a selected one of the containers in the receiving chute to mark off a counted group of containers.

8. The combination with a container receiver, of a machine for delivering containers thereto, a rotatable transfer mechanism, means for feeding an indicating spacer thereto, a control spring in said transfer mechanism, a counter mechanism operable from the machine connected to rotate the transfer mechanism to cause winding of the spring therein, and a release device operable from the counter mechanism to release the spring at a predetermined time to cause the transfer mechanism to be operated by the spring to engage the indicating spacer and deliver the same into a selected container in the receiver to mark off a counted number of containers.

9. The combination with a container forming machine and the stacking mechanism thereof, of mechanism for forming and delivering indicating spacers at spaced intervals between the containers deposited in the stacking mechanism, mutilated gear means for controlling the operation of said forming and delivering mechanism, a gear mechanism for operating said means, a counter unit for actuating the gear mechanism, and means connecting said counter unit for operation from the machine in timed relation with the discharge of containers from the machine into the stacking mechanism.

10. The combination with an article holder, of an indicating spacer delivery mechanism, means for automatically setting the delivery mechanism, and a mutilated member forming a part of said means for automatically releasing the delivery mechanism at a predetermined time to permit the same to engage and then deliver indicating spacers at spaced intervals between the articles in the holder to mark off predetermined quantities of the articles.

11. The combination with an article receiver, of a spring controlled transfer mechanism, means for delivering an indicating spacer to the transfer mechanism, a gear mechanism for setting the transfer mechanism, and a mutilated gear forming a part of said gear mechanism adapted to cause release of the transfer mechanism at a predetermined time to cause the transfer mechanism to engage the indicating spacer and deliver the same between the articles in said receiver to mark off predetermined quantities of the articles.

12. The combination with an article receiver, of a rotatably mounted transfer device, a spring for controlling the operation thereof, mechanism for rotating the transfer device in one direction to cause winding of said spring, said mechanism including a mutilated release means, a feed means for delivering an indicating spacer to the transfer device, and a counter mechanism connected to operate the feed means and the mechanism for operating the transfer device to cause the mutilated release means to release the transfer device at a predetermined time to allow the wound spring to rotate the transfer device in an opposite direction to cause the same to grip an indicating spacer and deliver the same into one of the articles in the receiver to mark off a predetermined quantity of the articles.

13. A counter and indicating spacer attachment comprising a material feed mechanism, driving means for operating the same to cause a material to be advanced, a cutter device, a control on said feed mechanism for causing operation of the cutter device at a predetermined time to cut an indicating spacer from the advanced material, a spring controlled transfer mechanism for receiving the indicating spacer, and a gear train operated by the driving means for setting the spring controlled transfer mechanism, said gear train including a mutilated gear adapted at a predetermined time to cause release of the transfer mechanism and discharge of the indicating spacer thereby.

14. A counter and indicating spacer attachment comprising a material feed mechanism, driving means for actuating the same to cause a material to be advanced, a cutter device, a control carried by the feed mechanism for causing operation of the cutting device at a predetermined time to cause an indicating spacer to be cut from the advanced material, a spring controlled rotatably mounted transfer mechanism for receiving the indicating spacer, a spring controlled roller means coacting with the transfer mechanism for holding the indicating spacer engaged with the transfer mechanism, and a gear train operated by the driving means for winding the transfer mechanism, said gear train including a mutilated control gear adapted at a predetermined time to cause release of the indicating mechanism and operation thereof to cause the indicating spacer to be discharged.

15. In a counter and indicating spacer attachment of the class described, the combination with a cutting mechanism, of an indicating spacer transfer mechanism, a rotatable feed member, a pin carried thereby for governing the operation of the counter mechanism to cause an indicating spacer to be cut from a piece of material, means for setting the transfer mechanism and including a release device adapted at a predetermined time to cause the transfer mechanism to engage the indicating spacer and discharge the same, an auxiliary pawl and ratchet mechanism for driving the rotatable feed member and said means, a cam mechanism for actuating the auxiliary pawl and ratchet mechanism, a main pawl and ratchet mechanism, a roller thereon adapted at predetermined times to cause operation of the

cam member, and a driving device for operating the main pawl and ratchet mechanism.

16. In a counter and indicating spacer attachment of the class described, the combination with a transfer mechanism, of means for forming and delivering an indicating spacer to the transfer mechanism to be engaged and discharged thereby, and a counter unit for operating the transfer mechanism and said means, said counter unit comprising an auxiliary ratchet wheel, a pivoted cam member, a pawl carried thereby for actuating the auxiliary ratchet wheel, a main ratchet wheel, a roller carried thereby for actuating the cam member at predetermined times, a lever member, means for actuating the same, and a main pawl carried by the lever member for causing rotation of the main ratchet wheel.

17. The combination with an article making and stacking mechanism, of a discharge device, means for feeding indicating spacers thereto, gear means for winding the discharge device, and a mutilated control gear forming a part of said gear means adapted to release the discharge device at predetermined times to cause the same to engage the indicating spacers and discharge the same into the stacking mechanism to count off predetermined quantities of the articles.

18. In a counter attachment of the class described, the combination with an indicating spacer transfer device, of a control spring therein, means for forming and delivering indicating spacers to the transfer device, a gear on said transfer device, a mutilated gear coacting therewith, and means for operating the mutilated gear to cause the transfer device to be wound up and at a predetermined time released to cause the transfer device to engage an indicating spacer and then discharge the same.

19. In a counter mechanism of the class described, the combination with a transfer device, of a control member therein, means for forming and delivering indicating spacers to the transfer device, a gear on said transfer device, a mutilated gear coacting therewith for controlling the operation of the transfer device, and a counter unit connected to govern the operation of the feed means and said mutilated gear.

20. A counter attachment comprising in combination an indicating spacer transfer device, a cutter mechanism, a material feed mechanism for delivering material to the cutter mechanism and causing operation of the cutter mechanism at predetermined times to cut indicating spacers from the advanced material, a gear train for operating the transfer device, said gear train including a mutilated control gear for controlling the release of the indicating spacer transfer device at predetermined times to cause the same to engage indicating spacers and discharge the same, a counter unit for controlling the operation of the feed mechanism and said gear train, driving means for actuating the counter unit, and manually operable means for disconnecting the counter unit from operation by the driving means.

21. A counter attachment comprising a transfer device, a presser roller coacting therewith, a material feed reel, a presser roller coacting therewith, a cutter mechanism for receiving a material advanced by the feed reel, a cutter operating device, a control member carried by the feed reel for actuating the cutter operating device at predetermined times to cause the cutter mechanism to cut indicating spacers from the advanced material, a gear train for setting the transfer device, said gear train including a mutilated gear for causing release of the transfer device at predetermined times to cause the same to engage the indicating spacers to discharge the same, and a counter unit connected to drive the feed reel and said gear train.

22. In a counter attachment of the class described, the combination with an indicating spacer discharge device, of means for forming and feeding indicating spacers to the discharge device, and a mutilated gear counter mechanism connected to intermittently cause operation of the discharge device.

23. A counter attachment comprising an indicating spacer discharge device, means for forming and feeding indicating spacers to the discharge device, a gear train for operating the discharge device, said gear train including a mutilated control gear for causing release of the discharge device at predetermined times to cause the same to engage indicating spacers and discharge the same, a counter unit for simultaneously driving the feed means and the gear train, and means for governing the operation of the counter unit.

24. In a counter and indicating spacer attachment, a discharge device, a gear train for operating the same, a multilated gear forming a part of said gear train for releasing the discharge device at predetermined times to cause the same to engage and discharge indicating spacers, means for forming and delivering indicating spacers to the discharge device, a plurality of mechanisms connected to drive the feed means and said gear train, a control device operable by one of the mechanisms to cause actuation of the other of said mechanisms, driving means connected to cause actuation of one of said mechanisms, and a manual control for discontinuing the drive from said driving means to said last mentioned mechanism.

25. In a counter and indicating spacer attachment, the combination with an indicating spacer discharge device, means for forming and delivering indicating spacers to the discharge device, to be discharged thereby, and a counter unit for operating the discharge device and said means, said counter unit comprising a pair of pawl and ratchet wheel mechanisms, and a pivoted cam control means operable by one of said pawl and ratchet wheel mechanisms at predetermined times to cause intermittent operation of the other of said pawl and ratchet wheel mechanisms.

26. In a counter and indicating spacer attachment, the combination with an indicating spacer discharge device, of means for delivering indicating spacers into the field of operation of said discharge device, a control mechanism for causing the discharge device to be operated in a direction opposite to the direction of feed of said indicating spacer to cause setting of the discharge device, said control mechanism including a release means for releasing the discharge device at predetermined times to cause the same to move in the direction of feed of said indicating spacers to engage the indicating spacers and then discharge the same, and a counter connected to drive and govern the operation of said feed means and said discharge device.

27. In a counter and indicating spacer attachment, the combination with means for forming and discharging indicating spacers one at a time from the attachment, and a counter for governing the operation of said means, said counter comprising a ratchet member, a spring controlled pivoted cam, a pawl thereon for operating the

ratchet member, a second ratchet member, a roller thereon for operating the cam at predetermined times and means for actuating said second ratchet member.

28. In a counter and indicating spacer attachment, the combination with a rotatable indicating spacer discharge means, of mechanisms for forming and delivering indicating spacers to the discharge means, and a counter control connected to cause operation of said mechanisms, and alternate rotation of said discharge means at predetermined times to cause the same to engage and then discharge indicating spacers from the attachment.

RUDOLPH BARES.
ANDREW C. WOOD.