

July 14, 1936.

W. L. WRIGHT ET AL

2,047,846

HOOD CAPPING CONTAINER

Filed July 30, 1931

8 Sheets-Sheet 1

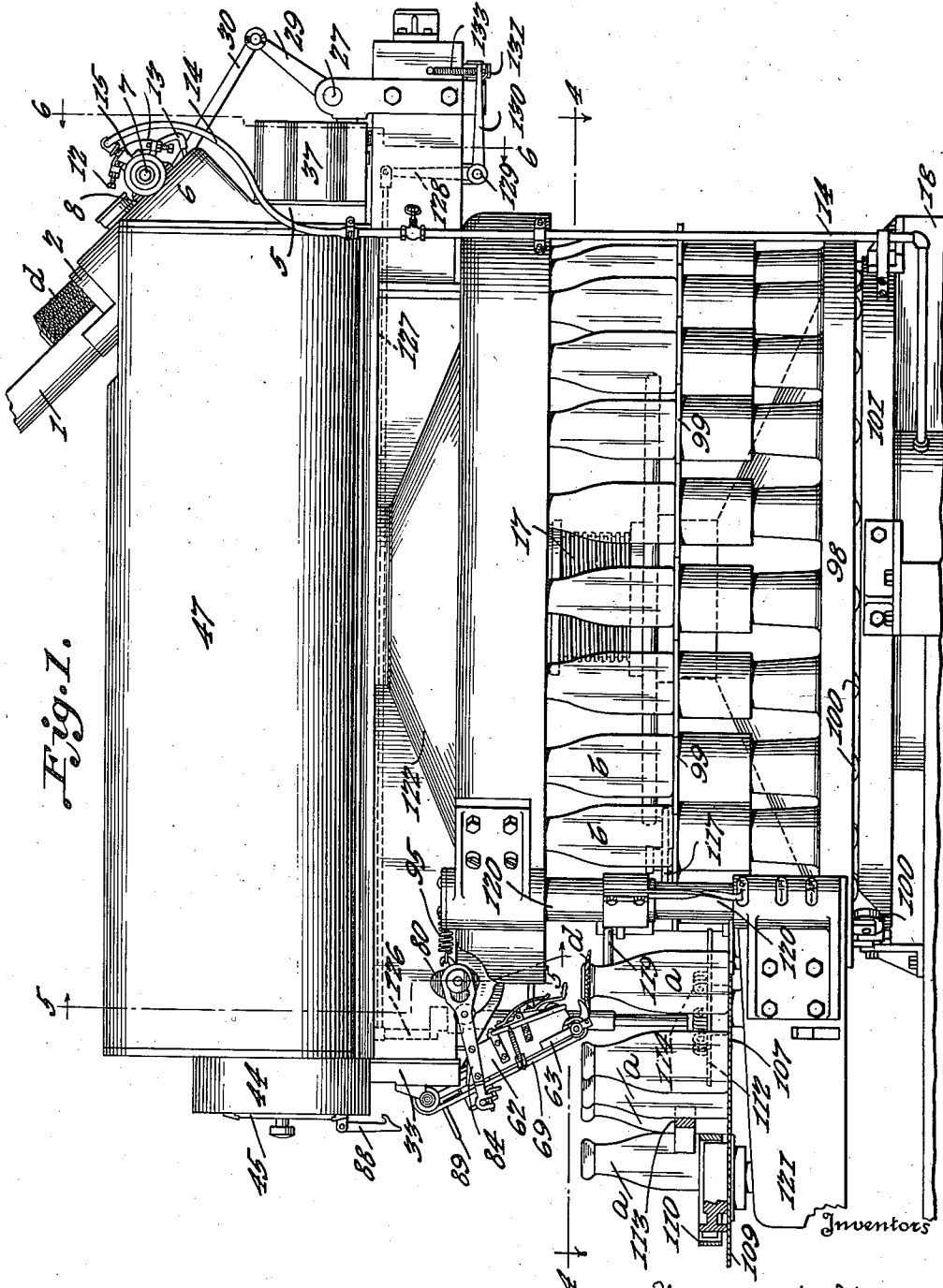


Fig. 1.

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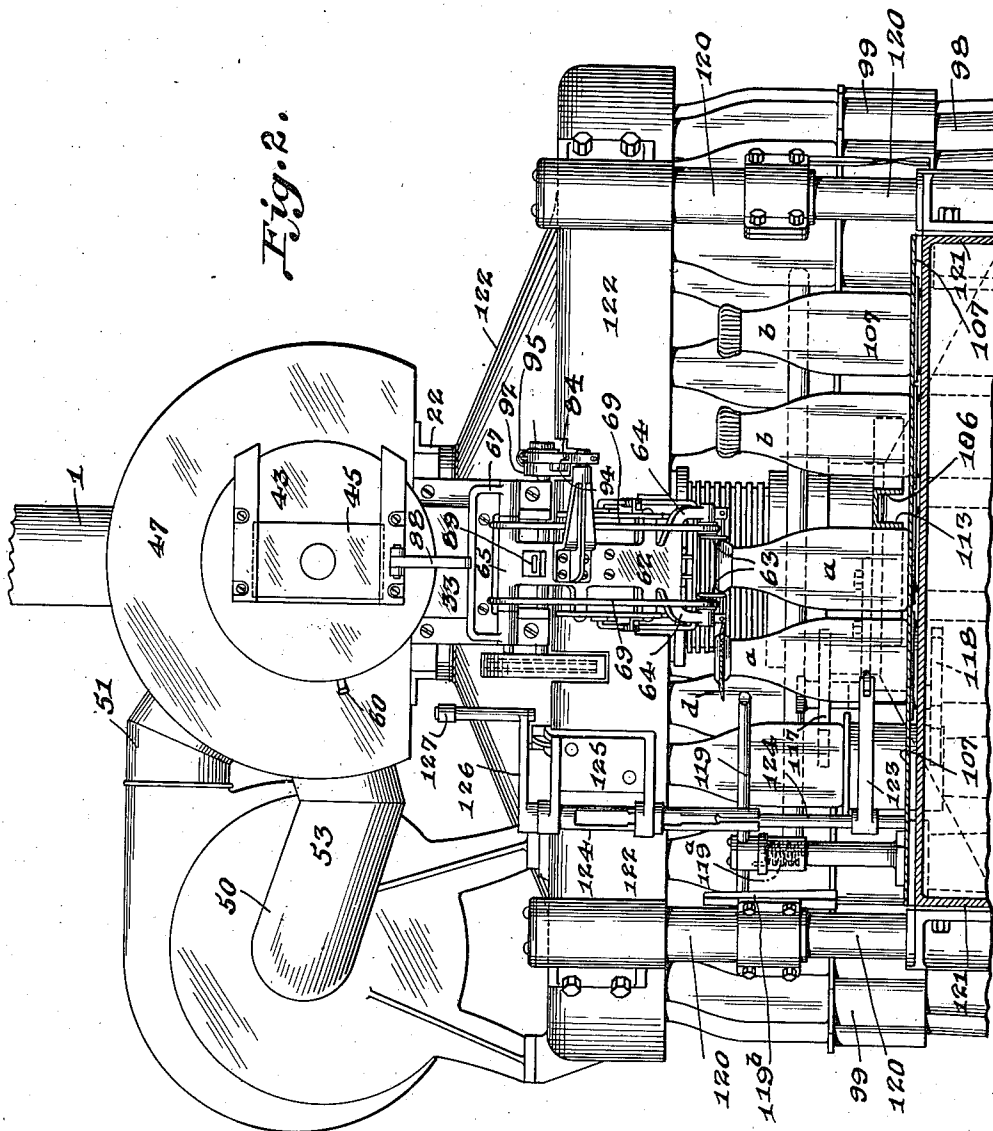
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HOOD CAPPING CONTAINER

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8 Sheets-Sheet 2

Fig. 2.



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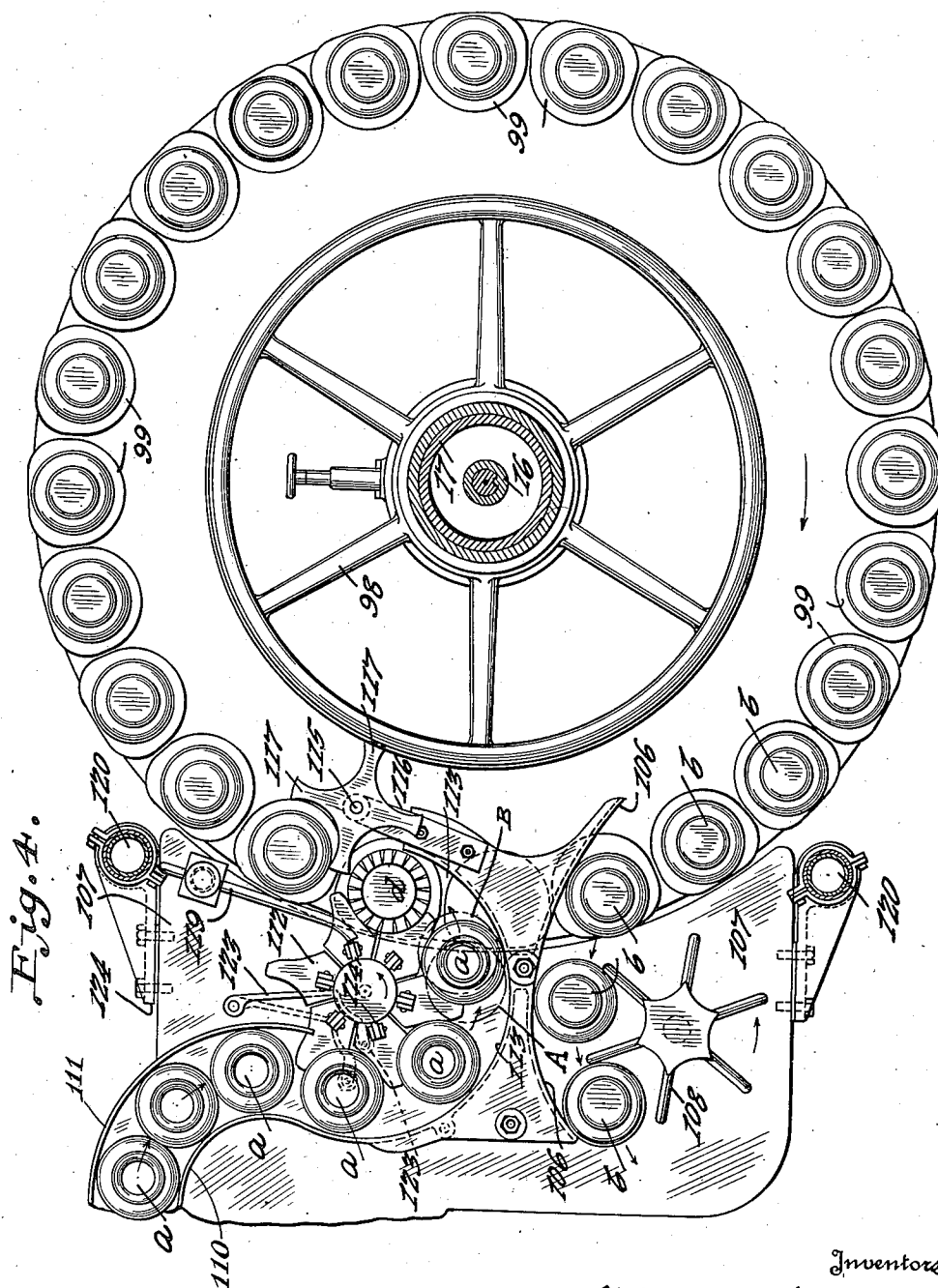
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8 Sheets-Sheet 4



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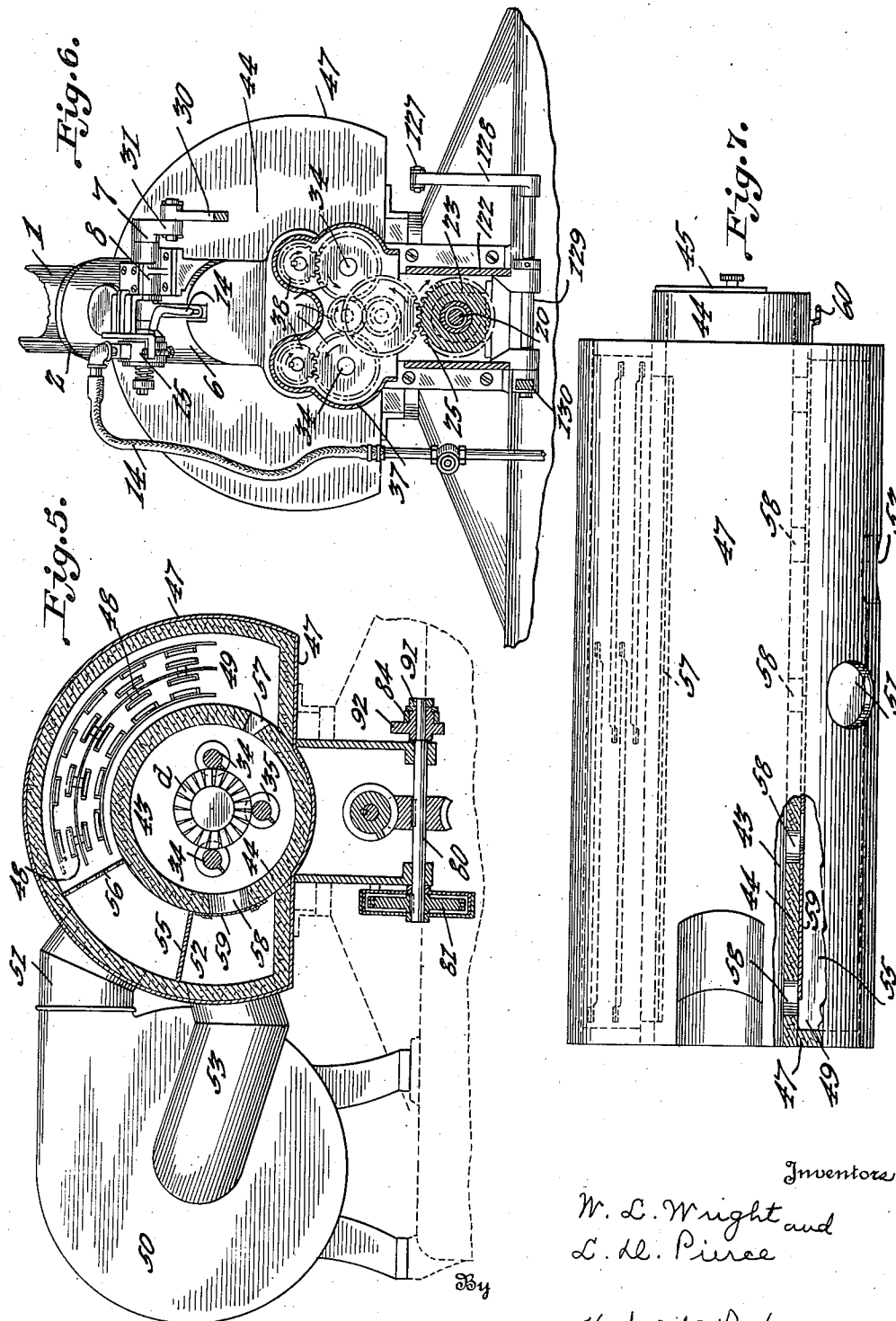
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HOOD CAPPING CONTAINER

Filed July 30, 1931

8 Sheets-Sheet 5



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HOOD CAPPING CONTAINER

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8 Sheets-Sheet 6

Fig. 9.

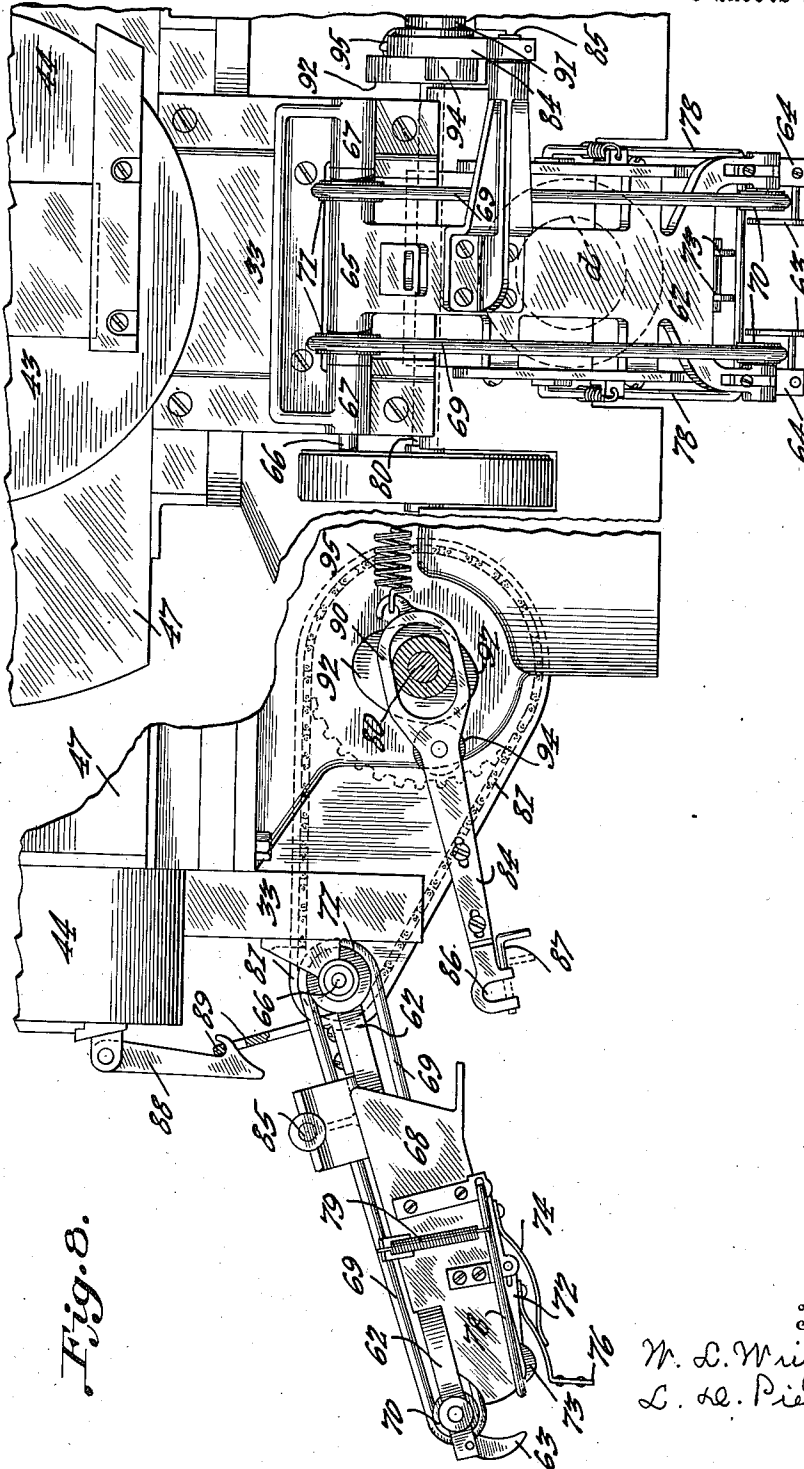


Fig. 8.

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2,047,846

HOOD CAPPING CONTAINER

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Fig. 12.

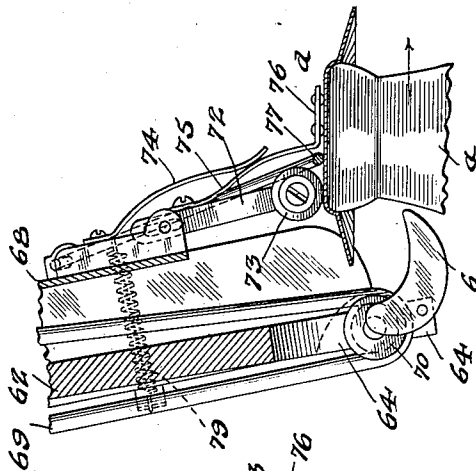


Fig. 11.

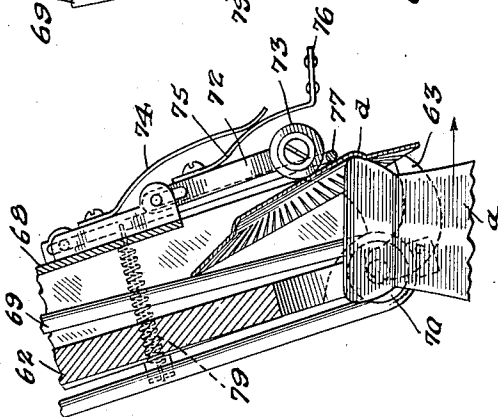
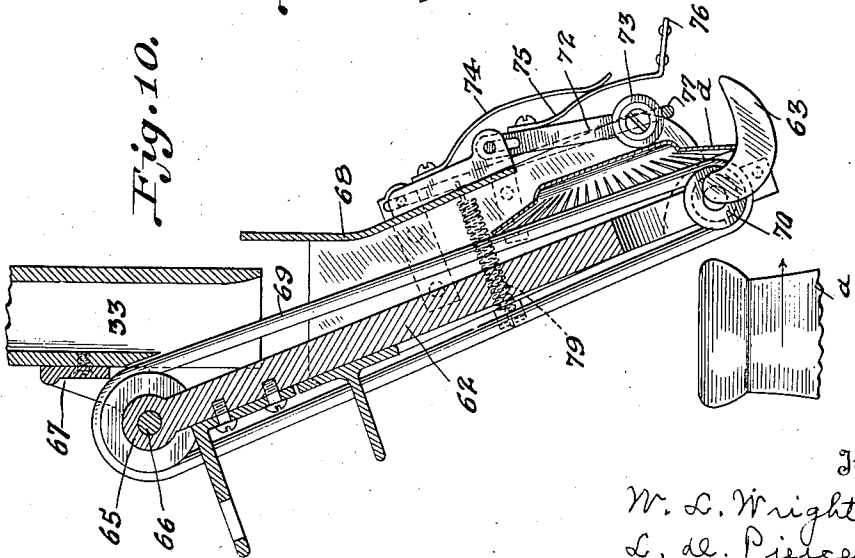


Fig. 10.



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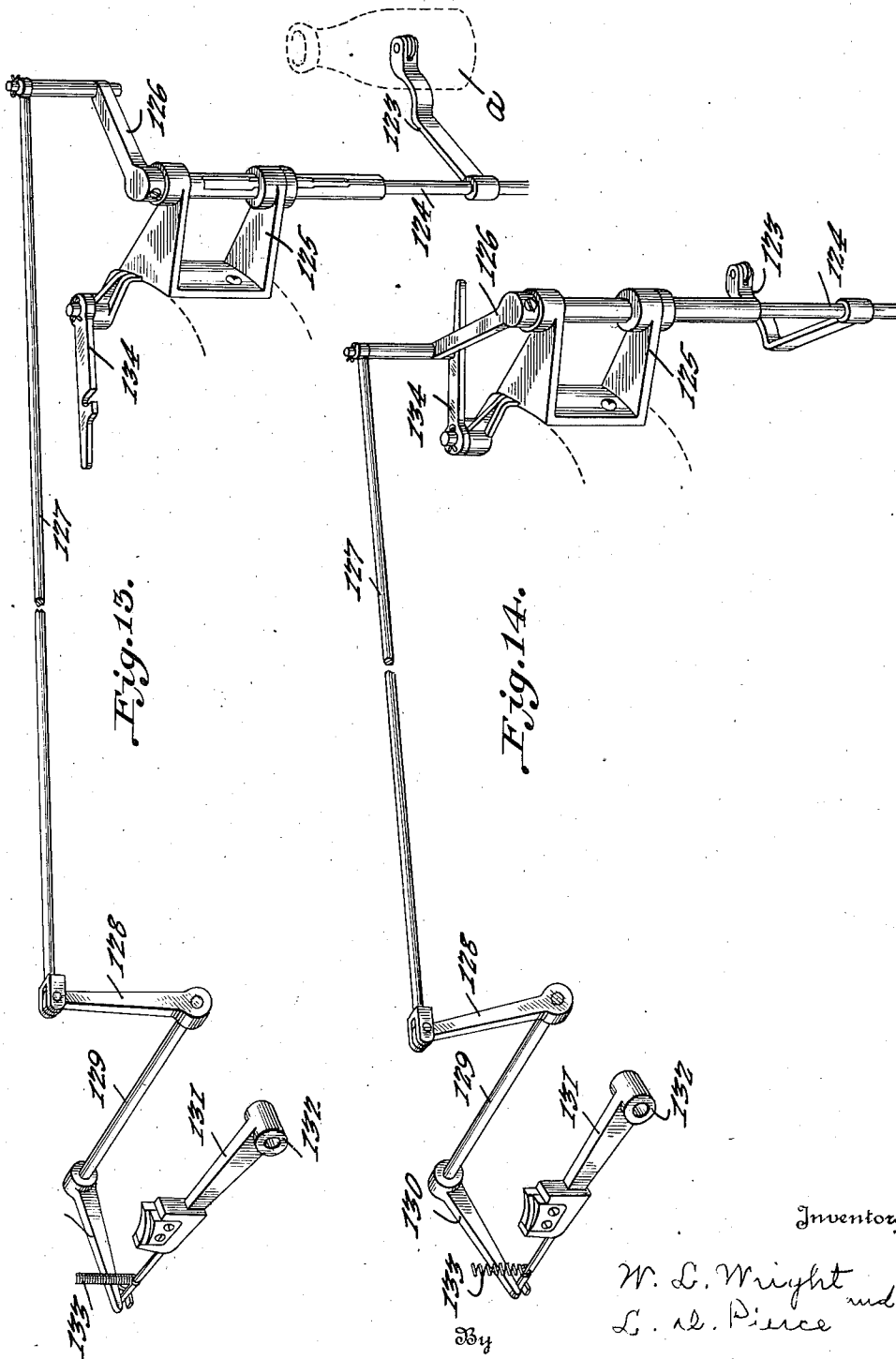
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HOOD CAPPING CONTAINER

Filed July 30, 1931

8 Sheets-Sheet 8



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2,047,846

HOOD CAPPING CONTAINER

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Application July 30, 1931, Serial No. 554,112

50 Claims. (Cl. 226—80)

This invention relates to hood capping contain-
ers, and particularly to apparatus for removing
hood cap disks, such as more or less flexible disks
of paper or other material, from a stack or other
supply, and bringing together the disks and the
containers to cause the location of disks on the
respective container heads, and finally to con-
tract the disks to hood cap secured form on the
container heads; and the objects and nature of
the invention will be understood by those skilled
in the art in light of the following explanations
of the accompanying drawings that illustrate the
preferred mechanical expression or embodiment
of the instant invention from among other con-
structions, arrangements and/or combinations
within the spirit and scope thereof.

An object of the invention is to improve and
increase the efficiency of hood capping machin-
ery as well as the speed of operation.

A further object of the invention is to improve
hood capping machinery designed for handling
and applying hood cap disks that carry or em-
body means whereby the disks under certain
treatment and/or conditions are rendered tem-
porarily moldable or otherwise capable of quickly
setting to secured condition on the container
heads.

A further object of the invention is to provide
various improvements with the end in view of
producing an exceedingly advantageous and
rapid hood capping machine.

Having the foregoing and other objects not
hereinbefore explained, in view, the invention
consists in certain novel features and arrange-
ments, and in combinations and constructions,
hereinafter more fully explained and specified.

Referring to the accompanying drawings,
forming a part hereof:

Fig. 1 is a side elevation of hood capping ap-
paratus, partially broken away, as an example
of an embodiment of our invention.

Fig. 2 is an end elevation, partially broken
away, of the apparatus of Fig. 1.

Fig. 3 is a vertical longitudinal section, of said
apparatus, partially broken away.

Fig. 4 is a horizontal section taken in the
plane of the line 4—4, Fig. 1.

Fig. 5 shows the heating chamber or oven in
vertical section approximately on the line 5—5,
Fig. 1.

Fig. 6 is a detail vertical section taken ap-
proximately on the line 6—6, Fig. 1.

Fig. 7 is a detached top plan view of the oven
and heating chamber, partially broken away.

Fig. 8 is a detail side elevation of mechanism

for applying a hood cap disk to a container
head or of a mechanical hand for this purpose,
the mechanical hand being shown detached from
an operating means and temporarily held ele-
vated in abnormal or inoperative position.

Fig. 9 is a detail enlarged front elevation of
said mechanical hand and adjacent machine
parts, the mechanical hand being shown in an
operative position.

Fig. 10 is a detail view showing the mechanical
hand in vertical section with a hood cap disk
held therein with its open side in position to be
engaged by the head of the advancing bottle also
shown.

Fig. 11 is also a detail vertical section showing
the mechanical hand in part, with the hood cap
disk in the act of being tilted down onto the
bottle head by the advancing movement of the
bottle.

Fig. 12 shows the structure of Fig. 11, with the
bottle advanced to a position with respect to the
mechanical hand, wherein the hood cap disk is
seated on the bottle head.

Figs. 13 and 14, are detached detail views of
the bottle detector mechanism for controlling
the clutch through which the initial disk feeder
and disk conveyers in the oven are driven.

In the particular example illustrated, without
desiring to so limit our invention, means are
provided to maintain and feed forward a supply
of relatively cold or set disks, for successive dis-
pensing by feed means, to disk conveyer mecha-
nism that carries a procession of separated disks
through a treating or conditioning chamber
wherein a procession of the disks is advanced
while the disks are subjected to treatment to
render them temporarily in condition for appli-
cation to and contraction and securing on bottle
heads, and wherein is maintained a supply of
such disks in temporary condition for hood cap-
ping and self-securing on bottle heads, and for
rapid successive delivery to mechanism whereby
each bottle is provided with a disk located on
its head for subsequent contraction and securing
thereon, by one of a succession of travelling hood
capping heads, while each bottle is carried by a
vertically movable support of a correspondingly
travelling succession of bottle supports or stools.

Means are also provided for successively deliv-
ering bottles to and from a station where the
bottle heads successively receive said disks in a
temporary hood capping condition and to suc-
cessively deliver bottles bearing such disks on
their heads to said successive bottle supports and
to cause such bottles to enter into operative rela-

tion with said hood capping heads of such procession or succession of travelling heads.

The example also discloses bottle detector means for preventing delivery of disks temporarily in condition for hood capping, except when a bottle is to be presented to receive such disk.

The term "bottle" is employed herein in a broad generic sense to include any containers or other articles to which the machine is or can be adapted, within our invention, to apply the closure or other disks.

The hood cap disks *d*, shown are more or less flexible, and each is formed with an imperforate or closed usually upwardly dished or bulged central portion and a flaring annular skirt or flange, the disk center being designed to cover a bottle mouth and its surrounding lip, and the disk skirt being designed to contract or mold downwardly and inwardly to depend around to cover the bottle head and its exterior rim and to be annularly and radially pressed thereagainst and under the rim and to be thus held in securing form and condition. These hood cap disks are usually composed of sheet fibrous material such as paper, although they can be formed of other sheet materials, such as in whole or in part of cellulose and the like materials.

From a certain specific standpoint, without desiring to so limit all features of the invention, these hood cap disks can carry any suitable binder, particularly at their annular skirt portions, capable when heated or when subjected to solvents or other conditions, of rendering the skirts temporarily moldable or otherwise temporarily in hood capping condition, and capable of quickly setting when said skirts are shaped to hood capping and securing form on the bottle heads, to maintain the caps in such form and securing shape and against removal from the bottle heads except by the application of the necessary expanding, cutting or tearing forces.

Those skilled in the art are familiar with various fibrous material hood cap skirt binders, such as sulphur and sulphur mixtures, and various adhesive binders that might be employed, and solvents for disks composed of materials that will weld or adhere when softened by a solvent to secure together overlapping folds or pleats of the contracted cap skirts to hold the hood caps in secured form on the bottle heads.

The primary disk supply

The particular example disclosed by the drawings of an embodiment of the instant invention, provides an upwardly disposed magazine 1, to maintain and feed forward a supply of hood cap disks *d*. The supply of disks is replenished, as required, by stacks of nested disks inserted into the magazine through the open upper side thereof. The magazine is preferably of a capacity to receive a large number of such disks in the form of a stack with the disks preferably not cemented or otherwise attached to each other and preferably loosely nested together and all facing in the same direction, preferably in reversed or upside down position with their flaring annular skirts extending backwardly (upwardly) and their closed centers to the front or facing forwardly and downwardly although we do not wish to so restrict our instant invention. The stack of disks in the magazine, is preferably, under constant tendency to feed forwardly, i. e., downwardly in the magazine toward the magazine bottom outlet or discharge for dispensing therefrom successively, and, if so desired, gravity can

be depended on to cause the forward movement of the supply of disks, aided if so desired by a weight or follower.

If so desired, the magazine can be in the form of a fixed upwardly inclined trough 1, open at its upper side to permit inspection and handling of the disk supply and for the easy replenishing thereof. The inner surface of the trough should be smooth to permit the disks to freely slide downward while maintaining their transverse parallel positions, and the angular position of the trough should also be such as to facilitate the downward feeding of the disks by gravity unless a force feed is employed. The lower end of the trough is arranged within a tubular housing 2, through which the disks advance to the lower open end or dispensing discharge from which the bottom or end disks are successively removed or dispensed.

Any suitable means is provided to normally hold back the supply of disks in the magazine to prevent unauthorized dropping of the bottom disk therefrom. For instance, as an example of various means that can be employed for this purpose, we show a fixed short stop finger 4, depending radially from the top of housing 2, a short distance into the upper portion of the otherwise, preferably, unobstructed open bottom discharge opening of the magazine, so as to catch each bottom or end disk by its top edge portion (Fig. 3) and thus hold the same back, in such manner that the disk under forward pull will strip or slip forwardly past said stop, particularly as the disks are preferably more or less flexible.

In the example shown, the magazine as a unit, is preferably exposed and accessible at the exterior of the machine, usually being normally fixedly secured on the top of the machine at one end thereof.

The initial feed

Any suitable means can be employed to dispense the disks from the primary supply of disks and start such dispensed disks on their travel toward the station where the bottles receive such disks.

In the machine example illustrated, the bottom or discharge end of the primary supply magazine 1, 2, opens into the upper part of a chamber having a depending bottom passage or chute 5, leading down to the disk receiving end of disk conveying mechanism hereinafter described. This chamber is formed by a box or housing 6, normally constituting a fixed or rigid part of the machine structure.

A horizontal transversely arranged rock shaft 7, is mounted in a bearing bracket 8, fixed on the top of the box 6, Figs. 1, 3 and 6. A lateral or crank arm 9, normally fixed to said shaft depends therefrom into the chamber through a slot in the box, and the lower end of this arm carries a suction head or cup 10. The arrangement is such that when the shaft 7, is rocked in one direction, the arm will carry the suction cup upwardly toward the bottom disk *d*, in the magazine, and before reaching its limit of upward rearward movement and coming to rest, the working face of said cup will come into approximately-parallel upwardly pressing operative engagement with the imperforate central portion of said bottom disk and by suction or exhaust of air from the interior of the cup, said disk will be pressed to and held by said cup. Hence, when said shaft rocks in the opposite direction, the suction cup will move downwardly and forwardly, carrying the disk and stripping the

same from the magazine and stop 4, until the disk assumes an approximately vertical position over the entrance to the chute 5, when the arm reaches its limit of downward and forward movement whereupon the suction in the cup will be broken by restoration of atmospheric pressure therein, or otherwise, and the disk will be released to drop by gravity, in its vertical edgewise position, into the chute 5.

The arm 9, and its suction cup are arranged within the box 6, in advance of the open dispensing end of the magazine, so that the cup will move back and forth between its upper operative disk engaging position and its lower disk releasing position, through a curved path of approximately 45°, more or less. The length of travel of the suction cup is determined by the cam groove 26, and the relative lengths of the levers by which the suction cup arm is oscillated from cam groove 26, hereinafter more fully explained.

The presence and absence of minus pressure in the suction cup can be controlled by any suitable means, or in any desirable manner, as will be readily understood by those skilled in the suction or vacuum cup art, to cause the suction cup to function as hereinbefore described in taking hold of successive end disks in the magazine and extracting them therefrom and carrying them, one at a time, to the discharge position and there releasing the same to drop into chute 5.

If so desired, where the suction cup is connected with a so-called vacuum pump or other air exhausting means, as through suction pipe lines 14, and air passages, a suitable valve mechanism 15, can be employed to connect the interior of the vacuum cup 10, with and to disconnect the same from the pipe lines 14, and to atmosphere, in proper sequence as required to attain the action hereinbefore described.

Any suitable actuating means can be provided to swing the suction feeder back and forth on its disk removing, transporting and discharging, and return strokes to successively remove the end disks from the supply and deliver the same to the hereinafter described conveyer mechanism. For instance, for this purpose, as an example, we show, center upstanding rotary drive shaft 16, arranged within and projecting above the center rigid pedestal 17, rising from gear box or bottom housing 18, wherein is located any suitable power transmission and means for continuously driving said shaft 16.

On the fixed horizontally disposed deck 19, of the machine frame, a radial rotary shaft 20, is mounted, and this radial shaft 20, is geared to and driven by vertical shaft 16, through the medium of large gear 21, on the projecting upper end of shaft 16, and pinion 22, on shaft 20.

A sleeve 23, is concentrically and loosely arranged on the outer end portion of shaft 20, and is normally constantly driven thereby through the medium of any suitable clutch mechanism 24. In other words, the sleeve is not driven by said shaft except through the medium of the clutch, although our invention is not so limited. This sleeve is equipped with concentric exterior spur gear wheel 25, for a purpose hereinafter explained, and also with an exterior annular or continuous cam groove 26, for driving the suction feeder 10, through the medium of a suitable power transmission, such as rock shaft 27, arranged transversely with respect to the axis of and spaced laterally from the sleeve 23, and independently mounted in a support rigid with the

machine frame deck 19, and having a depending crank arm 28, carrying a roller fitting in groove 26, and another crank arm 29, pivotally connected by push and pull pitman 30, with crank arm 31, rigid with the suction feeder rock shaft 7.

Accordingly, in the example illustrated, each revolution of shaft 20, and sleeve 23, will, through the lever transmission 28, 29, 30, 31, described, actuate the suction cup 10, on a complete cycle from the discharge position (Fig. 3) on the return stroke to the disk supply, and on the disk extracting and transporting stroke back to the disk discharging position, although we do not wish to so limit our invention.

The disk conveying and spacing mechanism

In the particular example disclosed hereby, without intending to so limit this feature of our invention, the disk conveying mechanism embodies several usually similar parallel rotary elongated screw conveyers or elongated shafts each formed with an exterior spiral flange or an exterior spiral groove capable of functioning as hereinafter described, with these screw shafts arranged and cooperating to support and advance a multiplicity or succession of the disks *d*, or the like, longitudinally of said shafts while maintaining said disks approximately parallel in vertical positions on edge and spaced apart and preferably while rotating said disks as they are advancing. For instance, we show three parallel spaced rotary screw conveyer shafts arranged to form a trough open at the top, into the receiving end of which the successive disks *d*, will drop from vertical chute 5, and from which the disks *d*, will be discharged at the outlet end of the trough into depending discharge chute 33.

The two upper similar screw conveyer shafts 34, are located in a common horizontal plane and are spaced a distance apart determined by the maximum and minimum diameters of the disks to be handled thereby. The center depressed screw conveyer shaft 35 is usually similar to and parallel with shafts 34, and located in a vertical plane approximately midway between the vertical planes of the two shafts 34, and in a horizontal plane a distance below the common horizontal plane of shafts 34, determined by the maximum and minimum diameters of the disks to be handled, Figs. 5 and 6.

The several screw shafts 34, 35, are preferably similarly formed or otherwise provided with spiral flights, grooves or flanges of like pitch and of such radial width of depth, that the disks are received and held in vertical positions arranged transverse'y of the shafts with their edges engaging the surfaces of the shafts between the convolutions of the screw or spiral flanges which engage the side faces of the disks to hold the disks upright and spaced apart and against falling forwardly or rearwardly. The center depressed shaft directly supports the transversely arranged upright parallel disks and the upper side shafts hold the disks in vertical positions on the center disk.

The several shafts 34, 35, while performing their disk advancing function, preferably all rotate in the same direction to rotate all the disks supported thereby in the same direction while said disks are being advanced longitudinally of said shafts by the spiral flanges or conveyer flights of said shafts. The circular disks are thus rotated by their more or less loose frictional contact with the rotating surfaces of the shafts and their spiral flanges, while the disks are maintained by

the screws and their spiral flanges, in their upright positions transversely with respect to the shaft axes and spaced apart and in approximate parallelism.

At their receiving ends, the screws 34, 35, extend across the chute 5, into which the vertically arranged disks *d*, are discharged by feeder 10, and extend into a fixed gear box or housing 37, and are mounted in a rigid wall thereof. The rotary conveyer shafts 34, 35, are driven from gear 25, rigid with rotary sleeve 23 (Fig. 3) through the medium of a train of gearing 30, in said box 37, (Fig. 6) by which said conveyer shafts are all simultaneously rotated preferably at the same speed and in the same direction, to gain the results hereinbefore explained.

The opposite or discharge ends of the rotary screw conveyer shafts 34, 35, are supported by and mounted in a suitable fixed support 39, providing an outlet for the disks *d*, discharged from the said conveyer shafts, and a depending chute 33, into which the successive disks from said conveyer shafts drop vertically on their way to the station where the bottle heads receive such disks.

The receiving ends of the conveyer shafts 34, 35, located in the chute 5, are each preferably formed or provided with relatively quick acting or high speed screw threads or convolutions 40, designed to quickly remove and advance the disks *d*, from the chute 5, and deliver the same onto the relatively low pitch spiral threads of the body portions of the conveyer shafts, with the end in view of quickly moving each transverse upright disk received in the inlet end of the conveyer trough formed by the shafts, forwardly and out of the way of the following disk that will drop through the chute 5. This initial quick removal of the disks prevents clogging and preserves the desired spacing of the disks as they advance along the main lengths of the shafts.

At the discharge end of the conveyer trough formed by the rotating shafts 34, 35, said shafts can also, if so desired, be formed with quick acting or high pitch final convolutions 41, to more quickly propel and discharge the disks outwardly from the trough in vertical positions to drop in such positions in chute 33, and to maintain the desired spacing and timing between the successive disks.

The oven or other disk treating or conditioning chamber

The mechanism 34, 35, designed to assemble and advance or convey a multiplicity or procession of disks *d*, to form and maintain a supply of disks, extends longitudinally through and is arranged within a longitudinally elongated disk conditioning chamber 43, wherein the disks of said procession or supply of such disks carried and being advanced by said mechanism, are subjected to the treatment or conditions required by the characteristics of the particular kind of hood cap disks being handled, to bring such disks to the state or condition necessary to render them at least temporarily moldable or otherwise capable of being shaped to hood cap securing form and of retaining such form on the bottle heads. The particular example illustrated is, from a specific phase of our invention, peculiarly adapted for handling and applying hood cap disks that are by the application of more or less high temperatures brought to a temporary hood capping condition, but we do not wish to so limit all features of our invention. From a specific phase of our invention, to give a concrete example, the

hood cap disks where made, say, of paper or other fibrous material with their flaring longitudinally creased or pleated annular skirts carrying a binder, such as sulphur, sulphur mixtures, etc., from among others, are brought to the temporarily moldable hood capping condition by more or less high temperatures, and hence for treating hood cap and other more or less flexible non-metallic disks, of the just mentioned characteristics, the treating chamber 43, constitutes an oven, provided with heating and controlling means. The oven, in the particular example illustrated, embodies a horizontally elongated cylindrical or other tubular housing 44, having its surrounding wall insulated against heat exchange. This housing forms the treating chamber 43, which if so desired, can be internally unobstructed except for the rotary conveyer shafts 34, and 35, and the disks *d*, carried thereby. The housing is fixedly carried by the supporting framework of the machine, and at one end opens into the chute 5, where the disks successively drop onto the conveyer shafts, and at the other end opens to the chute 33, into which the conditioned disks are successively discharged by said conveyer shafts.

The chute 5, is, preferably, closed against substantial heat escape except at its upper end where it opens into the interior of box 6. The discharge end of the relatively cold disk magazine 1, 2, opens into the interior of the upper part of box 6, and hence the disks, particularly the lower disks in the magazine, are exposed to the relatively more or less high temperature in box 6, maintained by the open communication with chamber 43, through chute 5, resulting in more or less preheating of the disks before they enter chamber 43. At its opposite or rear end, in the direction of the disk feed through chamber 43, said chamber is closed by a vertical or transverse wall which can have an opening normally closed by a slide or other suitable movable door or other closure 45, whereby the interior of chamber 43, and the contents thereof are accessible and subject to inspection.

The chute 33, opens downwardly from said just mentioned end of chamber 43, and hence is heated thereby and the disks passing down therefrom are subjected to such temperature.

However, we do not wish to limit the broader features of our invention, to the just mentioned features whereby the disks on their travel to and on part of the way, at least, on their travel from the conditioning chamber 43, are subjected in a measure at least, to the high temperatures thereof.

The straight elongated conveyer shafts 34, 35, are arranged longitudinally of the chamber and are spaced apart and are spaced from the surrounding longitudinal wall 44, of said chamber, and, preferably, so that the procession of upright transversely arranged rotating spaced disks *d*, will travel approximately along the center longitudinal axial line of said chamber, with the heat having free access to the side faces and edges of all the disks, enabling the heated air to circulate between the disks in all radial directions, while the constant disk rotation aids in uniform treatment and conditioning of each disk throughout, at least, all portions of its annular rim or skirt. The heated air can circulate within the chamber 43, around each conveyer shaft as well as between said shafts, and around each individual disk.

These conveyer shafts are constantly rotating,

during machine operation, while an unbroken procession of bottles is advancing to successively receive conditioned disks, successive disks are constantly being received one at a time at the inlet end of chamber 43, and successive conditioned disks are being discharged one at a time at the discharge end of said chamber, while a long line or procession made up of many disks, constituting a conditioned disk supply, is constantly moving forward in said chamber and subjected therein to the conditioning treatment, so that each disk by the time it has passed through said chamber has for a substantial length of time been thoroughly and uniformly conditioned by the heat or other conditioning treatment.

The cap conditioning chamber air heating and circulating system

Any suitable means and arrangements are provided for heating and circulating the heated air in the conditioning chamber 43, with the end in view of uniformly conditioning all of the disks passing through said chamber, and each disk throughout, and of maintaining the temperature in said chamber between certain maximum and minimum predetermined points, and to avoid building up high temperatures within said chamber, to scorch, damage or ignite the disks even when the disks are kept motionless in the chamber for substantial lengths of time. It is within certain broad aspects of our invention to locate the heating means either without or within the chamber 43, and to locate driven means either within or without said chamber to force hot air circulation through the supply of disks and between the disks in said chamber. For instance, in the example illustrated, we show, an indirect forced air or draft heating system for the chamber 43, that embodies a housing 47, preferably having walls insulated to reduce heat exchange, preferably arranged externally and longitudinally of chamber 43, and preferably combined with the housing 44, (although not necessarily so) to cooperate therewith in forming certain chambers or air flues communicating with chamber 43, to supply the same with heated air under more or less pressure and for the withdrawal of air therefrom.

In this example, the electric resistance heating elements or units 48, are remote from the disk conditioning chamber 43; to protect the disks from the direct heat radiation of the red hot or incandescent units 48. These heating elements or units 48, are located exteriorly of the tubular housing 44, that encloses conditioning chamber 43, and within a separate air heating chamber 49, exteriorly enclosed by the insulated housing 47. To gain compactness and heat conservation, this separate air heating chamber 49, is enclosed between the approximately concentric rigid longitudinal inner and outer housings 44, 47, and is approximately of the same length as chamber 43, and extends around the major portion of the circumference of housing 44, although we do not wish to, so limit the broader aspects of our invention. An air pump or blower 50, is arranged and supported, by the machine frame, exteriorly of the housings 44, 47, and an endless air circuit is provided that includes the pump exhaust or pressure outlet 51; the chamber 49; the disk conditioning chamber 43; a suitable manifold 52; and the pump suction pipe or inlet 53. When the pump is in action, and the electric heating elements 48, are energized, the desired volume of air under the required pressure is

forced through chamber 49, and into contact and heating relation with said heating elements, and this more or less highly heated air passes from chamber 49, into and traverses the disk conditioning chamber 43, and passes through the procession of disks therein and maintains the desired temperature within and approximately uniformly throughout the chamber 43, and said air passes from chamber 43, into manifold 52, and therefrom through suction pipe 53, back into the pump. This endless circulation of air is maintained by the pump to keep the temperature in the conditioning chamber between the desired maximum and minimum points, necessary to properly condition the disks without damage or injury.

Various controlling, and heat indicating instruments, not shown, can be provided, to show the temperatures within various portions of the conditioning chamber, and to vary the pump speed 20 and the air distribution.

Also the various electrical connections and controls for the electric heating units 48, are not shown, as being within the skill of the engineer and forming no part of our present invention. 25

The air pump, compressor, or blower 50, can be of any type or construction suitable for the purposes of our invention and can be driven by any suitable means or power, although we happen to show a rotary air pump or blower of the centrifugal type driven by rotary electric motor 54.

The pump outlet 51, discharges into the longitudinally elongated relatively-narrow end of the air heating chamber 49, preferably between a radial imperforate partition or end closing wall 55, and a radial air distributing perforated plate or partition 56, (Fig. 5). The air forced by the pump passes through the perforated partition 56, into the area of heating chamber 49, that is traversed by the preferably numerous electric heating units 48, and the perforated partition is designed to cause approximately uniform distribution of the air throughout the length and width of the chamber for uniform heating by said heating units, although we do not wish to limit our invention to such specific arrangements nor to the provision of the distributing partition 56. 40 45

The imperforate partition 55, is employed in this specific arrangement, to which we do not wish to limit ourselves, to close the inlet end of chamber 49, from the air outlet from the disk conditioning chamber 43. 50

The outlet from chamber 49, preferably beyond the portion thereof occupied by the heating units, into the disk conditioning chamber 43, is preferably in the form of a narrow slot 57, opening approximately radially through the wall of housing 44, and preferably contracting from its inlet 60 from chamber 49, to its outlet into chamber 43. This slot is longitudinally elongated to approximately equal the length of chamber 43, and approximately the width of chamber 49, longitudinally of housings 44, 47, although we do not wish to so limit our invention. This air inlet 57, is designed to cause the air to radially enter the chamber 43, under more or less pressure and to flow diametrically across and through the procession of edgewise arranged disks thereinto and to penetrate to all portions of said procession and the surfaces of the disks thereof, and to cause uniform distribution of the pressure and heat throughout said chamber. 65 70

The air exhaust or outlet from chamber 43, is 75

usually arranged on the opposite side of said chamber from the inlet 57, or on the opposite side of the procession of disks *d*, from the inlet 57. In the particular example illustrated, the outlet is through a series of radial ports or openings 58, through the housing wall 44, and arranged in a line longitudinally thereof, although we do not wish to so limit our invention. The capacities of these outlets can be varied by a slide damper 59, if so desired having an accessible operating handle 60, exposed at the exterior of an end of the oven assembly.

The exhaust ports or outlets 58, from chamber 43, open and discharge into the manifold 52, arranged longitudinally of and between the housings 44, 47, which is indirect suction communication with the pump through the pump suction pipe 53.

By means of damper 59, the capacity of the exhaust 58, can be varied to control and vary the air pressure within, and to a certain extent, also the temperature within the chamber 43.

If so desired, any suitable damper controlled offtake (not shown) can be provided for carrying off fumes from the exhaust manifold 52.

Mechanism for depositing conditioned disks on bottle heads

The conditioned disks *d*, from the conditioning chamber 43, are successively discharged one at a time, at spaced intervals, from the conveyer trough 34, 35, into depending chute 33, preferably with their concaved sides or flaring skirts facing forwardly and the disks fall preferably by gravity and are guided downwardly in the chute, preferably to maintain their vertical or edgewise positions with their concave sides facing outwardly (Fig. 3) by the fixed side and edge walls of the narrow chute. If so desired, vertical guides 60, can be arranged in the enlarged top or mouth of the chute 33, in advance of the quick discharge ends 41, of the screw conveyers, to maintain the disks *d*, in vertical edgewise positions as they drop into the narrow lower portion of said chute, to assure delivery of the disks from said chute, in the desired position (Fig. 3).

The disks from the chute are successively delivered right side up (concave side down) on the heads of successive bottles for contracting to securing hood cap form thereon. If so desired, the disks from the conditioning chamber 43, can through chute 33, or otherwise, be successively delivered right side up direct to a platform or support, to be picked up by successive bottle heads and carried thereby upwardly into successive hood capping or clamping heads, approximately as in the disclosure of our application filed May 9, 1929, Serial No. 361,780.

However, in the present disclosure we prefer to employ a so-called mechanical hand of our invention, to receive the successive disks from chute 33, and deposit the same on successive bottle heads while said bottles are travelling on their way to successive bottle stools or supports of a constantly rotating annular series or circle of such supports and a correspondingly rotating annular series or circle of complementary hood capping or clamping heads.

We provide means to receive the disks one at a time from the discharge end of chute 33, or otherwise from the conditioning chamber, and carry such disk to a point within the path of travel of a bottle head, and there hold the disk in an inclined position with concaved side down so that the advancing bottle head will engage the con-

cave side of the disk and sweep and strip the same from such means, which means is provided with devices to deposit, center, and press the disk down on the bottle head and thus leave the same thereon in position for subsequent hood capping, whereby the advancing bottle head will advance from such means, carrying its hood cap disk to the hood capping head for completion of the hood capping operation. For instance, in the particular example illustrated, we show an arm or so-called "hand", depending from the supporting frame of the machine or some part carried by said frame, and swingable in the direction of movement of the bottles advancing toward the rotating circle of bottle stools, with the lower or free end of this arm arranged to intersect the horizontal plane in which the bottle heads travel, with this arm inclining downwardly and rearwardly in the direction of bottle travel and under the outlet of chute 33, and across the vertical plane of said chute, and arranged to catch and receive the successive disks *d*, dropping from chute 33, and guide and carry each disk downwardly to the free end of the arm and there loosely retain such disk in the path of a bottle head and in proper position to be picked up and carried off by said head.

In the specific example shown, without intending to so limit all features of our invention, this arm embodies a longitudinally elongated preferably stiff or rigid frame 62, depending from and at its upper end turning on a suitable transverse axis carried by the machine frame, while the lower end of said frame is transversely forked or bifurcated to provide a central transverse opening for the passage of the bottle heads, between the rigid spaced downwardly projecting arms 64, that at their lower ends are provided with a pair of spaced rigid lateral or rearwardly projecting (in the direction of bottle travel) bottle head centering and disk supporting stiff horns 63. The upper end of frame 62, provides a transverse eye or bearing 65, receiving and axially oscillatory on the hereinbefore mentioned transverse supporting axis, such as rotary shaft 66, mounted in suitable bearing brackets 67, carried by the fixed vertical outer wall of the chute 33, and arranged at an elevation above the horizontal outlet of chute 33. The swingable hanging arm or "hand", provides a guiding way or passage along its upper longitudinal side, when the arm is in normal downwardly and forwardly inclined position, into the upper end of which the disks from chute 33, are received and down which each disk is conducted and deposited on the horns 63, with the lower edge of the disk resting on the top edges of the horns. For instance, this passage longitudinally of the arm can be provided by open-end housing 68, fixed to frame 62, and, if so desired, the disk carrying floor of such passage can be formed by the downwardly travelling top lengths of a pair of parallel widely spaced preferably smooth surface endless cords or belts 69, arranged longitudinally of the arm, at their lower rights supported by aligned idler pulleys 70, mounted on the lower ends of the fork arms 64, at the outer faces of horns 63, and at their upper ends supported and driven by pulleys 71, fixed on and constantly driven by the shaft 66. The arrangement is preferably such that each disk *d*, will drop from chute 33, in such position that the concaved side of the disk will engage the downwardly travelling belt lengths; the belts being preferably spaced a distance greater than the diameter of the disk cen-

tral portion so that the under surfaces of the disk flange will rest on the belts, and the disk will thus travel down within and be guided by the housing 68, until deposited on the horns concave side down and facing the advancing bottle head on which the disk is to be deposited. It is within the scope of this feature of our invention, to omit the travelling belts and permit the disks to slide down the arm guideway on a stationary floor solely by gravity, and, in fact, the disks may so slide on the belts faster than the belts travel, but we prefer to employ the belts as tending to more accurately assure the delivery of the disks on horns 63, and their retention in proper position on such horns, particularly to assure the delivery of the disks onto the horns against the resistance of any means that may be employed to temporarily or releasably hold the disks in the desired position on the horn preparatory to disk deposit on the approaching bottle head.

The lower portion of the rear (in the direction of bottle travel) wall of housing 68, behind the disk when resting on horns 63, is open, and a longitudinally-movable and rearwardly swingable hanger 72, is arranged longitudinally and centrally of the depending arm and of said opening and at its lower free end carries one or more aligned idler pressure rolls 73, freely rotatable on an axis arranged transversely of said hanger. This hanger is at its upper end pivotally mounted on a transverse pivot or axis provided by a suitable fixture secured on the rear side of the longitudinal rear wall of housing 68, in such manner that the hanger constantly tends to swing down or forwardly with respect to the arm and into the path of each disk *d*, descending toward horns 63, being centrally arranged a short distance above horns 63, to engage the rear face of the descending disk, centrally thereof between belts 69, and ride up on the rear face of the central portion of the disk and remain in contact with the lower portion of said rear face of the disk when the disk comes to rest on the horns (Fig. 10) exerting more or less light forward pressure against said disk to cooperate with the horns and downwardly travelling belt lengths to hold the disk detachably in the desired position. The transverse bearing in the upper end of hanger 72 is preferably elongated longitudinally of the hanger to afford the hanger a limited free longitudinal movement.

Any suitable means can be provided to yieldingly hold said hanger 72, forwardly under more or less light pressure against rearward swing. For instance, for this purpose, as an example, I show depending free end plate spring 74, at its upper end fixed to the rear wall of housing 68, and at its lower end pressing forwardly against and yieldingly resisting rearward movement of depending rear spring arm 75, fixed to the rear of hanger 72, and at its rearwardly deflected rear end carrying the rearwardly projecting heel or thumb 76.

In addition to the members 73, 76, a rearwardly yielding presser cross bar 77, can be provided normally located below the roll 73, and in advance of the heel 76, to yieldingly engage the rear face of the disk after the roll has been thereby forced rearwardly. This bar 77, can be carried by upwardly extending arms 78, at their upper ends pivotally connected to the rear side of the rear wall of housing 68, to rock on a transverse axis located a distance above the supporting axis of hanger 72. These arms 78, are yieldingly pressed forward to their limit of forward swing against

said rear wall of the housing by any suitable means, such as one or more coiled expansion springs 79.

The cross shaft 66, is continuously driven to continuously drive the belts 69, in one direction, during machine operation, by cross shaft 80, mounted in the machine frame, such as deck 19, to the rear of the disk delivering swing arm or hand, through the medium of suitable gearing, such as chain and sprocket transmission 81.

The cross shaft 80, is constantly driven from the gear 21, of main upright shaft 16, through the medium of radial shaft 82, appropriately geared at one end to gear 21, and at the other end to cross shaft 80.

The disk delivering swing arm or hand 62, etc. is maintained at the desired downward and rearward inclination intersecting the path of the disks discharged by chute 33, and to properly cooperate with the advancing bottle heads for disk delivery onto and seating on said heads, by any suitable means, and by any suitable means, said arm is also preferably swung a short distance forwardly and rearwardly in timed relation to the advancing bottles, i. e. a forward and rearward stroke for each bottle, in that the arm preferably moves rearwardly while the bottle head receiving the disk is moving forwardly, and then as the bottle having received such disk advances beyond said arm, the arm makes its forward return stroke to initially receive the following bottle head when the arm has completed its forward stroke (Fig. 10) and begins or is about to begin its rearward stroke.

For instance, in the example illustrated, we show a pitman 84, at one end having push and pull pivotal connection with the disk delivering swing arm 62, etc. and at the other end having eccentric operative connection with the continuously rotating cross shaft 80.

The swing arm 62, etc. is in this example equipped with a pivot stud or axis 85, rigid with the arm and projecting laterally therefrom at a point below the transverse axis 66, on which said arm swings. The forward end of pitman 84, is formed with a transverse bearing or eye more or less loosely receiving and confined on stud 85, preferably in such manner as to render the pitman readily separable or removable therefrom, for the purposes hereinafter pointed out. For instance, I show this transverse bearing eye 86, in the form of a reversed V, open at the bottom so that the said bearing can be lifted clear of the stud to detach the pitman therefrom, and as easily dropped to operative position on the stud to again couple the piston to the arm. The open side of the bearing 86, can be closed as by a movable or detachable key or pin 87, to normally lock the pitman to the stud against accidental detachment.

One purpose of the readily attachable and detachable connection between the pitman and the swing arm 62, etc. is to permit forward and upward vertical swing of said arm 62, to an abnormal position (Fig. 8) entirely free and clear of the path of disks *d*, dropping from the chute 33, as it is sometimes desirable to permit the machine to run to clear or empty the oven and disk conveyer trough 34, 35, of disks through chute 33, without operating the initial feeder to feed disks to said conveyer trough and without delivering conditioned disks to said arm 62, etc. as when no bottles are being run through the machine for hood capping.

The arm 62, etc. can be detachably supported 75

in such inoperative elevated position by suitable means, such as pivoted hook 88, hanging from the front closure of oven housing 44, and adapted for operative detachable engagement
5 with eye 89, fixed to and projecting laterally from the swing arm frame 62. When the swing arm is thus held elevated in abnormal position, any suitable container (not shown) can be placed under chute 33, to catch the discharged disks.

10 When a run of bottles is to be hood capped, the eye 89, is detached from hook 88, and the swing arm 62, etc. is swung downward and back to normal position to operatively receive disks from chute 33, and thus held by attaching the bearing eye 86, of pitman 84, to the swing arm
15 stud 85, as in Fig. 1, for instance.

The pitman 84, can be operatively coupled to constantly rotating shaft 80, to attain the desired short back and forth swinging movements of
20 swing arm 62, etc. by any suitable means or by various operative connections. For instance, I show the pitman formed with an enlarged eye 90, through which the shaft 80, extends, with the pitman loosely confined between outer end head 91, and a cam 92, both normally fixed on the shaft.

The pitman is provided with a roll 94, rotatably mounted on a stud rigid with and projecting laterally from the pitman. This roll is held forward
30 in constant engagement with the operative circumferential edge of cam 92, by the action of retractable coiled spring 95, at one end secured to the machine frame or other part fixed thereto and at its front end secured to a hook rigid with and projecting forwardly from the forward end
35 of the pitman, to exert constant forward longitudinal pull on the pitman to hold the roll and cam in operative relation, and if so desired to limit the drop of the free end of the pitman when detached from swing arm stud 85, (Fig. 8). The
40 spring 95, thus holds the pitman longitudinally forward thereby requiring the roll 94, to follow the working edge or circumference of cam 92, and the annular working circumferential edge
45 of the cam is formed with a high portion to longitudinally project or move the pitman rearwardly, and with a low portion to permit said spring to longitudinally move the pitman forwardly, to impart to the swing arm 62, etc. the
50 short forwardly and return swing movements hereinbefore described.

In the particular example illustrated, the eccentric actuating connection (say, rotating cam 92 and roll 94) that control the back and forth
55 swing of the hood cap disk applying arm, carry the lower end of said arm through a short arc while the bottle with which said arm is then cooperating to provide the bottle top with a hood cap disk, moves forward a distance, say, of about
60 one inch and a half, more or less.

In this example, the upright bottles while continuously moving forward in a horizontal plane toward the bottle stool and hood capping head rotors, have the hood cap disks successively deposited
65 on their heads, by said swing arm, the lower end of which moves back and forth in a short path, say, about an inch and a half in length, in the vertical plane of the bottle path, without halting or interrupting the continuous
70 forward movement of the bottles during the disk applying operations.

In the particular example illustrated, the disk applying stroke or swing of the arm is opposed to the advancing movement of the bottle, i. e.
75 as the bottle moves forward, the arm swings

rearwardly and deposits and seats the disk on the bottle head. Fig. 10 of the drawings shows the swing arm approximately at its limit of forward swing (with respect to the forward bottle
5 movement), and Fig. 12 shows the swing arm approximately at its limit of rearward downward swing (with respect to the forward bottle movement) with the disk seated on the bottle head, and the swing arm ready to swing up and forwardly on its return stroke to the approximate
10 elevated forward position shown by Fig. 10. In making its said return forward swing, the lower end of the arm moves upwardly as the arm moves away from the vertical position. In making its rearward disk applying swing, the arm moves
15 toward the vertical position, and consequently its lower end moves downwardly to the depressed position of Fig. 12.

The rotating cam 92, is so designed that the swing arm halts or dwells for an instant or very
20 short length of time in the approximate position Fig. 10, and while the arm is in this approximate position, the advancing bottle head contacts the convex side of the disk *d*, at the lower portion of its flange between the rails or fingers 63, and
25 starts the operation of sweeping or tilting the disk forwardly clear and free of the fingers 63, against the weight of the rollers 73, and the hanger carrying the same, but before the disk is tilted entirely from tracks 63, an elevated or
30 raised portion of the rotating cam edge acts on the roll 94, and the pitman 84, to quickly snap or swing the arm rearwardly to complete the operation of properly seating and depositing
35 the disk on the advancing bottle head, in approximate simulation of the natural action of the human hand in applying, centering and pressing down a disk *d*, of the peculiar dished formation shown, on a bottle head. Fig. 11,
40 shows the approximate positions of the disk and cooperating parts with respect to the bottle and arm, when the arm is at an intermediate portion of its rearward stroke from the position Fig. 10, to the approximate position Fig. 12.

The working edge or periphery of the rotating
45 cam, is preferably so shaped radially, that when the arm reaches the approximate position Fig. 12, the arm immediately starts upwardly and rearwardly on its return forward swing to elevated forward position Fig. 10, but this return
50 swing or travel of the arm is checked or retarded by the cam formation, long enough to permit the bottle on which the disk has just been deposited, to advance the disk on the bottle out of the path to be travelled by the fingers 63, on the swing
55 arm return stroke.

The weight of hanger 72, and rollers 73, press the rollers rearwardly against disk *d*, to hold the same in position on fingers 63, and against rapidly moving belts 69, for engagement by the
60 advancing bottle head (Fig. 10). When the advancing bottle head has engaged and begins tilting the cap forwardly along fingers 63, the rollers 73, act to hold the disk against the bottle lip while rapidly moving belts press the disk edge down
65 against said fingers, and as the disk leaves the free forward ends of fingers 63, the presser bar 77, comes into action (Fig. 11) with rearward pressure against the central portion of the disk to prevent the disk from slipping down in front
70 of the bottle head, particularly under the action of the belts 69, against which the upper portion of the disk flange is then pressing. These belts 69, are constantly travelling at a speed in excess
75 of the speed of forward travel of the bottles, and

while the belts assist in the operation of quickly tilting the cap onto the bottle head, the quick rearward jump or swing of the arm and the restraining action of rollers 73, and presser bar 77, prevent the belts from discharging the disk, when its lower edge leaves fingers 63, downwardly in front of the bottle head. As the arm moves rearwardly and the bottle forwardly, from the intermediate position shown by Fig. 11, the rollers 73, and presser bar 77, tilt the disk rearwardly and downwardly approximately on the advancing edge of the bottle lip as a fulcrum, to horizontal operative position properly centered and pressed down on the bottle head, the final downward seating of the disk being aided by the thumb or heel 76, which comes into action as the swing arm approaches the vertical position, Fig. 12, and furthermore this thumb 76, remains in contact with the disk central portion while the rollers 73 and presser rod drop from the rear portion of the seated disk as the bottle advances from the swing arm and thus prevents the disk from being tilted from the bottle mouth by the drag of said rollers and bar. Before the bottle has advanced sufficiently far with respect to the swing arm, to cause the thumb 76, to drag off the rear portion of the disk, the swing arm starts on its forward elevating return stroke and thereby lifts said thumb clear of the disk.

The elongated bearing of the hanger 72, on its pivot, permits longitudinal movement of the weighted hanger and its roller to accommodate slight variations in bottle lengths and variations in the angular positions of the hanger, while the spring and swingable mountings of the presser bar and thumb 76, accommodate slight variations in bottle lengths and angular positions of said parts.

The swing arm or mechanical hand deposits the hood cap disks on the bottles, before the bottles reach and are delivered onto the bottle stool and cap head rotors, although we do not wish to so limit all features of our invention as the swing arm can be adapted to seat hood cap disks on successive bottle heads after such bottles have been delivered onto the lowered bottle stools of the stool rotor, although we prefer and gain advantages by providing each bottle with a hood cap disk while the bottles are advancing to said rotor.

We have by dotted circles A, B, respectively, Fig. 4, indicated the length of the path travelled by each bottle while being advanced by the star wheel, during the disk applying operation of the swing arm or mechanical hand. The circle A, indicates the approximate position of each bottle when it meets the swing arm Fig. 10, and the circle B, indicates the approximate position of the bottle when the disk is fully seated thereon and the swing arm is approximately in position, Fig. 12.

The bottle carrying rotor and hood capping mechanisms

The example illustrated provides a constantly advancing horizontally arranged rotor 98, concentric with and usually centered and rotatably on the fixed upright post or column 17, and this rotor drives and continuously advances a circular series of uniformly spaced, preferably similar, vertical bottle stools or supports 99, in an endless circuit, each being vertically movable with respect to the rotor.

Each bottle stool is provided with a bottom roller 100, travelling on a fixed circular track

101, embodying elevated and depressed portions whereby the elevation of each bottle stool is determined, and whereby the bottle stools are raised and lowered, as hereinafter explained, or, for instance, as explained and disclosed by and in our hereinbefore mentioned pending patent application. The bottle-receiving top faces of these stools 99, are preferably flat so that the upright bottles can slide thereonto and therefrom and the lateral or horizontal dimensions of said top faces with respect to the bases of the bottles, are such that the bottles can stand and be maintained thereon in upright positions. This rotor is constantly rotated in one direction in timed relation to the disk feed, conveying and delivering mechanisms, by any suitable power transmission means, not shown, and usually arranged within the gear box at the base of the machine.

Another horizontally disposed constantly advancing rotor 102, is arranged in alignment with and a distance above the bottle stool rotor 98, and is likewise concentric with and rotates on the center column 17, and is suitably driven with and in the same direction and speed as said bottle stool rotor, but is preferably vertically adjustable with respect thereto to accommodate runs of bottles of different vertical lengths, such as one run of quart size bottles, and so on.

This rotor 102, carries an endless or circular series of vertical hood cap contracting and clamping heads or what we generically designate as hood capping heads 103, each arranged above and vertically alined with a bottle stool 99, so that for each stool 99 there is a hood capping head 103 normally relatively fixed against vertical movement, and arranged above and vertically alined therewith. Each hood capping head, in the particular example referred to, embodies a downwardly open mouth or head formed to vertically receive a relatively upwardly moving bottle head carrying a skirted hood cap disk, centered thereon and conditioned for hood capping, and to gather and depress the hood cap skirt downwardly to annular depending form around the bottle head, as the bottle head moves upwardly therein, and also embodies a ring clamp concealed within the head to close and contract inwardly completely around said depending skirt and press the same annularly and radially, closing the pleats or folds of surplus disk material, tightly against the surface of the bottle and thus hold the same tightly pressed and/or compressed to hood cap securing form until permanently set as by cooling of a hot binder or evaporation of a binder solvent.

Any suitable means is provided to expand or open and contract or close the ring or annular clamps of said heads 103, so that, for instance, the clamps will be successively expanded to release hood capped bottles at a hood capped bottle discharge station, and will remain open and expanded until said heads successively reach the disk carrying bottle head receiving station, where said clamps will be successively contracted and will thus remain contracted throughout the major portion of their circle of travel until they successively approach said discharge station. For instance, each clamp can be spring actuated or controlled to normally assume closed or contracted clamping position, and by a movable member carrying a roll 104, to travel on a relatively fixed cam or track 105, and to be thereby held back to maintain the clamp in expanded or opened

position and then released for automatic contracting to clamping position.

The track 101, that controls the vertical positions or elevations of the bottle stools, is in this example, arranged, to elevate the successive disk carrying bottles to carry the bottle heads into their respective expanded hood capping heads and to thus hold the bottles elevated until they successively approach or reach the bottle discharge position where the stools drop to their low positions and thus travel in their low positions to successively receive bottles carrying disks.

Our hereinbefore identified pending application, discloses an example of such an arrangement of cooperating bottle stool rotor and track, and hood capping head rotor, such heads, and such clamps with controlling springs, rolls and track, although we do not wish to so limit our invention.

In this example, the annular clamps of the hood capping heads, are each provided with spring actuated controlling means, with which said cam or track 105, cooperates, to cause the clamps to successively open or expand for release of bottles at the hood capped bottle discharge station and to maintain such clamps expanded, until they have successively moved past the effective rear end of track 105, say, just beyond the bottle head receiving station, whereupon the clamps successively close or contact and thus remain until they reach the effective front end of track 105, said bottle discharge station.

Means for feeding bottles to and discharging hood capped bottles from the bottle carrying rotor

In the example shown, the bottle stools 99, are in their lowered positions while travelling across the front portion of the machine (Fig. 4) from a point in advance (in the direction of bottle stool travel) of the curved guide 106, whereby the upright hood capped bottles *b*, are successively swept laterally forward from their depressed stools onto the normally flat horizontal receiving deck 107, carried by and preferably fixed to the machine frame, and into the range of movement of the star wheel 108, constantly driven in one direction by any suitable driving means or connection from the driving gearing (not shown) within the housing in the machine base.

The fixed horizontal deck 107, which is level with the bottle-base-receiving top surfaces of the stools 99, when such stools are in lowered position, is extended laterally beyond the hood capped bottle receiving area thereof, to provide a top surface on and along which the uncovered bottles *a* are propelled in a procession for successively receiving disks *d*, and for successive delivery onto successive stools that are still in lowered positions after the hood capped bottles have been discharged therefrom. In this example, the receiving table for the upright uncovered bottles *a*, is formed by a flat top horizontal moving conveyor or platform, such as a circular rotary table 109, constantly rotated in one direction by a suitable power transmission (not shown) from the driving means in the gear box or housing in the machine base.

Any suitable guide walls, for instance, fixed walls 110, 111, carried by the deck 107, project over the rotary table 109, to form an arcuate lane or guideway, by which the procession or succession of bottles *a*, being advanced and carried by said rotary table, is brought into the range of action of the rotary horizontal star wheel 112, constantly driven in one direction by any suitable power

transmission (not shown) from the driving gearing or other means in said gear box or housing. The front portion of the star wheel projects forwardly above the rear portion of the rotary table and as the star wheel and said table preferably rotate in opposite directions, said overlapping portions of the table and star wheel rotate in the same direction, and the recesses between the radial arms of the star wheel successively receive the advancing bottles on the rear delivery portion of the table, and successively sweep the bottles rearwardly from the table and onto the flat top face of the deck 107, under the guiding influence of the arcuate wall 113, that at its front end projects forwardly over the rear delivery portion of table 109, to center successive bottles in successive recesses of the star wheel and to maintain the bottles therein and spaced thereby as the bottles are carried around by the continuously rotating star wheel to and past the mechanical hand or depending swing arm 62, etc. to successively receive disks *d*, therefrom, preferably while the bottle is advancing through dotted circle A, to and through dotted circle B, Fig. 4, and to finally deliver the bottles carrying disks *d*, onto successive depressed stools 99, of the continuously advancing rotor 98, under the restraining guiding influence of the rear end of the guiding wall 113, which extends rearwardly above the depressed stools 99, of said rotor (Fig. 4). The rear portion of the star wheel 112, hence extends over the depressed stool 99, that is advancing to, located at, and advancing from the bottle receiving station. The rotor 98, propelling the bottle stools is preferably continuously rotating or advancing, and the procession of bottles is also preferably continuously advancing to and through the disk receiving station and therefrom to the station at which successive stools receive successive bottles. In Fig. 4, the station at which successive depressed stools receive successive bottles carrying disks *d*, is located by reference letter *d*, indicating a disk on the head of a bottle just shoved by star wheel 112, onto the depressed stool advancing through said station. The successive stools 99, start moving upwardly as they advance past the bottle receiving station, to carry their heads and the disks thereon into successive hood capping heads. This upward movement of said successive stools begins while the star wheel is projecting over such stools, and hence we, preferably, couple the radially projecting arms of the star wheel to the center head or hub of said wheel through the medium of hinge or flexible joints 114, that will permit each arm to be engaged and lifted by the rising stool thereunder, and to then drop back to normal horizontal position as it slips forwardly past said stool.

The stools are all depressed as they advance from the hood capped bottle discharge station to the bottle receiving station and hence the rearwardly moving arms of the star wheel move over and above depressed stools as they push successive bottles onto successive stools at the bottle receiving station but as said arms move forward with the bottles on the departing stools said arms are engaged and lifted by the elevating stools, the speed of rotation of the rotor 98, that propels the stools, and of the star wheel 112, that advances the bottles onto said stools, being so timed that the successive advancing bottles and the successive advancing stools, meet at the bottle receiving station, to provide each stool with a bottle, where the succession of bottles is unbroken.

We preferably provide means, in addition to the star wheel 112, and guide wall 113, to assure the

desired positioning or centering of each bottle on its stool, as each stool advances from the bottle receiving station. For instance, we show a comparatively short rotary vertical shaft 115, suitably supported above the rotor 98, and within the circle of bottle stools 99, advanced by said rotor, in any desirable manner, as by a bracket 116, fixed to the guide wall 113.

A horizontal star wheel 117, is fixed to the upper portion of this shaft and is located above the stool tops and behind and at an elevation to engage the bottle on the stool at the bottle receiving station, and this star wheel is constantly rotated to advance at the same speed as the advancing bottle stools. The star wheel 117, is preferably driven by an approximately similar star wheel 118, fixed to the lower portion of shaft 115, and rotated by engagement with the lower portions of successive constantly advancing bottle stools, (Figs. 3 and 4). Thus, as the bottle advances from the bottle receiving station (Fig. 4) the star wheel 117, rotates in contact therewith and the bottle enters a recess of the star wheel and is properly positioned on the stool, if not already in such position, by contact with the preferably yielding held guide and bottle positioning arm 119, (Fig. 4) arranged in front of the bottles and longitudinally of the bottle path and supported by an upright from the machine frame or deck 107.

This arm 119, arranged in front of the bottles on the advancing stools, is designed to cooperate with the star wheel 117, located behind said bottles, to successively assure the proper positioning of each bottle on its stool by direct contact therewith, as it passes the star wheel which rotates with each passing bottle.

The elongated swing arm 119, is yieldingly pressed toward the stools and star wheel 117, and is arranged approximately tangentially of the circular path in which the bottle stools travel, and is constantly spring pressed toward its limit of movement toward the bottle on the stool advancing from the bottle receiving position.

Any suitable spring 119a, can be provided to yieldingly press the arm 119, to its normal position and any suitable means, such as a part of the frame structure or other device can provide a stop 119b, to predetermine such normal position.

The means establishing a channel or bottle guideway leading to the star wheel 112, are approximately but diagrammatically illustrated, as the procession of uncovered bottles can be successively brought into operative relation to star wheel 112, to be conveyed forward thereby, by other means than platform 109, such as by hand, or by any suitable conveying or advancing organization, for instance such as disclosed by our hereinbefore mentioned patent application. Our novel and advantageous mechanism partially illustrated by Fig. 4 and other figures of the accompanying drawings, for advancing the uncovered bottles to star wheel 112, is not claimed herein as it forms subject matter for separate patent application.

The bottle conveying, guiding, and centering mechanisms shown, are adapted for runs of bottles of the same rated capacity and sizes, such as quarts. For runs of bottles of other capacities and sizes, adjustments and replacements, are provided. For instance, the star wheel 112, is removable, and is replaced by star wheels adapted to different bottle capacities and the same replacement arrangement can be provided for centering star wheel 117.

The fixed upright posts 120, (Figs. 1, 2 and 4)

are rigid with the base box or housing 121, that supports deck 107. These posts 120, aid in supporting the upper supporting structure 122, that embodies deck 19, which is, preferably, vertically adjustable with the rotor 102, with respect to the lower bottle stool rotor 98, to accommodate runs of bottles of different capacities, as hereinbefore explained.

The bottle detector

It is generally desirable, to supply a hood cap disk *d*, to the swing arm or mechanical hand 62, etc. only when an uncovered bottle is in line for presentation to said arm to receive such disk, and hence we prefer to provide the apparatus with any suitable bottle detecting means that will serve to stop the discharge of a disk *d*, to said arm when no bottle will reach the arm to receive the disk.

As an example, we show a spring-impelled horizontally-swingable bottle contacting and detecting arm 123, arranged, in the example shown, above the bottle advancing platform 109, and the fixed horizontal deck 107, and below the star wheel 112, and normally yieldingly held projecting into the path of the advancing bottles, approximately at the point where the platform 109, delivers the bottles successively into the star wheel 112, in such manner that each advancing bottle will contact and swing the arm rearwardly, and will then slip past and release the arm to engage the immediately succeeding bottle before the arm completes its forward spring-actuated swing, but if there is a break in the bottle procession with no following bottle, the arm will complete its forward swing to its normal position and thereby actuate means to prevent a disk delivery to the swing arm 62, for location on the bottle that should occupy the vacant star wheel recess (Fig. 4). This spring-impelled bottle-actuated arm 123, is through the medium of any suitable movement transmitting mechanism, operatively connected to control the clutch 24, by which the sleeve 23, is operatively connected to and disconnected from the drive shaft 20 (Fig. 3) in such manner that the clutch is released and the sleeve 23, operatively disconnected from shaft 20, and at rest, when the detector arm 123, is in normal forward position shown by dotted lines Fig. 4, as when there is no bottle to force the arm rearwardly, and the clutch is applied and sleeve 23, is driven by and rotating with shaft 20, so long as the arm 123, is held in the rearward position, approximately as shown by full lines Fig. 4, by the unbroken succession of bottles advancing into star wheel 117, whereby the initial feeder and the screw conveyer shafts, are actuated, to successively deliver disks to said shafts and from said shafts to the disk applying swing arm 62, etc.

As an example, we show a vertical rock shaft 124, with the detector arm 123, fixed to and projecting laterally from its lower end. This rock shaft is carried by and mounted in a bracket 125, fixed to and projecting forwardly from the upper supporting frame 122, of the machine.

A crank arm 126, is rigid with and projects laterally from the upper end of rock shaft 124, and this crank arm 126, is operatively coupled by push and pull connecting rod 127, with the upwardly projecting crank arm 128, rigid with horizontal transverse rock shaft 129, mounted in the rear portion of frame 122, adjacent to the sleeve 23, and clutch 24. The rock shaft 129, is provided with a rearwardly projecting crank arm 130, rigid

therewith, and the free end of this arm 130, is operatively coupled to the free end of the transversely and horizontally disposed vertically swingable clutch controlling lever 131, fulcrumed at its opposite end, at 132, to said frame 122. The free ends of arm 130, and lever 131, are pivotally joined to swing vertically together and against independent vertical swing, and the vertical coiled expansion spring 133, is secured to frame 122, and to the free end of lever 131, to yieldingly hold the lever in, and to constantly act to return it to clutch releasing or unlocking position, in this example at its limit of upward movement, and to yieldingly hold the detector arm 123, in and constantly acting to return the same to its normal forward position shown by dotted lines Fig. 4, as is possible when no bottle is present to push said arm rearwardly. Thus, when the detector arm 123, is pushed to its rearward position by an advancing bottle and is thus held by an unbroken succession of said bottles, the crank arm 130, holds the clutch controlling lever 131, depressed in inoperative position against the tension of spring 133, and so long as said lever is thus held in inoperative position, the clutch is in operative adjustment and driving position with the sleeve 23, driving both the initial feeder 9, and the screw conveyers 34, 35, and disks *d*, are delivered to the swing arm 62, etc. in timed relation to the advancing bottles, to cause deposit of a disk on each bottle.

However, should a bottle be missing, for any reason, from the procession being delivered to star wheel 112, the detector arm 123, will under the power of spring 133, swing forward, permitting arm 130 and lever 131, to swing upwardly, thus restoring lever 131, to its normal position wherein it cooperates with the clutch to operatively disconnect sleeve 23, from its drive shaft 20, whereupon the sleeve comes to rest and the feeder ceases to deliver disks to the conveyer screws and the screws cease delivery of disks for application to the bottle heads.

The clutch and its operating or controlling lever can be of any suitable type or types, although we happen to show a spring-impelled pin type clutch with the clutch controlling lever 131, provided with a cam for withdrawing the spring impelled locking pin of the clutch. However, we do not wish to so limit our invention.

In the example shown, the driving connections to various disk advancing mechanisms are so timed, that a disk will be delivered to the screw conveyers, and a disk will be discharged from the screw conveyers at each complete revolution of said conveyers, and for each bottle delivery to the bottle stool at the bottle receiving station, i. e. for each stool as it arrives at said station, and with respect to the particular star wheel 112 shown having six bottle recesses, for each one-sixth of a revolution thereof, although we do not desire to so limit our invention. Also, in the particular example illustrated, the detector arm 123, determines the presence or absence of a bottle, in the first or receiving recess of star wheel 112, (Fig. 4), and thus determines whether a disk should be dropped into swing arm 62, etc. on the next complete rotation of the screw conveyers, in as much as the disk to be delivered on the bottle in the star wheel recess immediately in advance of the recess guarded by detector arm 123, is already in or is being delivered to said swing arm, and the delivery thereof to said bottle is being initiated as said bottle leaves its position shown by Fig. 4.

If so desired, a pivoted latch 134, can be provided to temporarily or detachably lock the bottle detector mechanism in inoperative adjustment, with the detector arm 123, withdrawn from the bottle path and the clutch lever 131, held in inoperative position and the clutch in operative driving adjustment.

Operation

In the example illustrated, the initial feeder is normally continuously operating to deliver an unbroken procession of spaced disks *d*, to the receiving end of the elongated screw conveyer trough made up of constantly rotating screw shafts 34, 35, arranged within the disk conditioning chamber. This delivery of relatively cool disks to said conveyer is preferably timed with respect to the speed of screw shaft rotation, to cause a disk delivery for each complete screw shaft rotation or revolution, with a conditioned disk discharged to the disk applying swing arm for each screw shaft revolution, and said disk delivery from said conveyer is preferably timed with relation to the speed of rotation of the continuously rotating bottle stool and hood capping head rotors and the means feeding bottles thereto, to cause a disk delivery to said swing arm for each bottle stool arriving at the bottle receiving station and for each bottle advancing to said station.

When starting the machine for hood capping a run of bottles, and presuming that all of the disks had been previously exhausted from the conditioning chamber and the screw conveyer therein; the machine is operated to fill the screw conveyer in the conditioning chamber approximately to capacity before beginning to assemble bottles on the feed platform 109, for delivery to the star wheel 112. When the forced air heating system of the oven is in normal operation, the disks that have been carried by the screw conveyer through the oven and have arrived approximately at the discharge end thereof, have been subjected to the disk conditioning influences in the oven for a sufficient length of time to be in the proper state or condition for hood capping purposes. During normal operation, a long line of edgewise arranged parallel rotating disks will be under constant advancing movement in the oven or conditioning chamber, and these rotating disks in this example, will be spaced apart longitudinally of the screw shafts at least sufficiently for the free passage of air between the disks, preferably to discharge a disk on each complete revolution of the coating screw shafts, owing to the fact that relatively cool disks were successively delivered to said screw shafts, preferably, at intervals equal to one for each complete screw shaft revolution. The delivery of the conditioned disks from the oven and screw conveyer therein, to the mechanical hand or swing arm for deposit on the bottle heads while being advanced by the star wheel 112, is thus timed with the speed of advance of the bottles, with the result that each bottle advancing from said mechanical hand carries a disk *d*, properly positioned and centered on its head, and each such bottle is deposited on successive bottle stools at the bottle receiving station.

The rotors 98 and 102, continuously rotate as one, with their complementary vertically movable stools and hood capping heads, and hence, the successive stools that have received bottles carrying disks, at the bottle receiving station, successively rise as they leave said station to initi-

ate the hood capping operation by cooperation with their respective heads and their annular clamps and this hood capping operation continues almost throughout the full revolution of such rotors, whereupon the stools begin to successively descend to clear the finished or completely hood capped bottle heads from their respective hood capping heads, for discharge of the hood capped bottles at the hood capped bottle discharge located in Fig. 4 by the sweep or guide arm 106. Where binder carrying hood cap disks conditioned by heat in the oven, are employed, the hood capping and clamping heads grip and clamp the hood caps in hood cap securing form until approximately permanently set in such form by cooling, and then discharge the hood capped bottles. In this example, we thus provide a continuously advancing succession of hood cap disks, with a long procession thereof always maintained in the oven while moving forward, with a continuously advancing procession of bottles successively receiving disks from said disk succession, with said bottles carrying such disks continuously advancing and successively delivered to successive bottle stools and hood capping heads of constantly advancing series of such stools and heads, with a resulting constantly advancing rotary series of stools and heads carrying bottles and conducting the hood capping operation simultaneously on a multiplicity of bottles while such procession of bottles is moving forward, with resulting capacity for continuous operation and high speed.

The disclosure hereof is for illustrative and explanatory purposes, but is not intended for the purpose of restricting and limiting the invention for various changes, departures, modifications, and substitutions can be made without departing from the spirit and scope of our invention as defined by the following claims when construed as broadly as permitted by the prior art.

Desiring to cover and protect all features of our invention, both generically and specifically, as fully and completely as is possible under the law, what we claim is:—

1. Apparatus for applying flexible sheet material flaring skirted hood cap disks to container heads for contraction and securing thereon; embodying mechanisms for successively conveying such disks to and delivering the same on container heads for hood capping the same including means to advance said disks while held vertically on edge; a magazine having a discharge outlet, for receiving a stack of such disks and advancing the same to said outlet; and an initial feeder movable back and forth on its operative and return strokes to successively remove the end disks of said stack through said outlet and bodily carry said disks to and discharge the same in a vertical position to said means.

2. Apparatus for applying flexible sheet material flaring skirted hood cap disks to container heads for contraction and securing thereon; embodying means for successively conveying such disks to and delivering the same on container heads for hood capping the same; a magazine having a discharge outlet, for receiving a stack of such disks and advancing the same to said outlet; and an initial feeder movable back and forth on its operative and return strokes to successively remove the end disks of said stack through said outlet and bodily carry said disks to and discharge the same in a vertical position to said means, a chute being provided to guide the

vertically arranged disks discharged by said feeder and deliver the same successively in predetermined position to said means.

3. In combination; a disk conditioning chamber; conveyer means in said chamber for advancing disks in said chamber; a magazine arranged exteriorly of and at an elevation with respect to said chamber, said magazine having a bottom disk discharge outlet, said magazine adapted to receive and feed a stack of said disks to said outlet for dispensing one by one therefrom, and means to successively remove disks from said stack through said outlet and deliver said disks successively to said conveyer means.

4. In combination; a disk conditioning chamber; conveyer means in said chamber for advancing disks in said chamber; a magazine arranged exteriorly of and at an elevation with respect to said chamber, said magazine having a bottom disk discharge outlet, said magazine adapted to receive and feed a stack of said disks to said outlet for dispensing one by one therefrom, and means to successively remove disks from said stack through said outlet and deliver said disks successively to said conveyer means, a housing being provided forming a chamber into which said outlet opens and through which said disks move from said outlet to said conveyer means, said last mentioned chamber being in open communication with the interior of said conditioning chamber.

5. In combination; a magazine for a stack of hood cap disks; an oscillating suction feeder, movable back and forth in a curved path between the magazine discharge and the station at which the feeder discharges the disk in a vertical position, for successively removing disks from said magazine; disk conveying mechanism; and a vertical guide chute for receiving disks from said feeder and delivering the same in vertical position to said mechanism.

6. In combination; hood cap disk conveying mechanism; a hood cap disk magazine; a feeder for successively removing disks from said magazine and delivering the same to said mechanism, said feeder including a rock shaft having a lateral swing arm provided with a disk extracting and carrying suction cup; and actuating mechanism for said shaft including a rotary driven annular cam, and means for oscillating said rock shaft to move said cup on its operative and return strokes including a lever operatively associated with said cam to be rocked thereby to move said cup on an operative and return stroke for each revolution of said cam.

7. In combination; means to provide a supply of hood cap disks; driven conveying mechanism for successively delivering hood cap disks for locating on bottle heads; a feeder for successively delivering said disks from said supply to said mechanism; bottle advancing means for a procession of bottles to be hood capped; driving connections for said feeder and said disk conveying mechanism, driving means, a clutch for actuating said connections from said driving means; means for constantly advancing a procession of bottles to be hood capped; and a bottle detector including means to throw said clutch out of operative driven relation with said driving means, said detector being actuated by the absence of a bottle from said procession to throw said clutch out of driven relation with said driving means.

8. In combination; means to successively present flanged hood cap disks to the heads of successive bottles for hood capping; and hood cap

disk conveying mechanism for successively delivering said disks to said means, said mechanism including longitudinally elongated rotary screw conveyers cooperating to rotate and advance a plurality of said disks to form a procession of separated disks.

9. In combination; means to successively present flanged hood cap disks to the heads of successive bottles for hood capping; and hood cap disk conveying mechanism for successively delivering said disks to said means, said mechanism including longitudinally elongated rotary screw conveyers cooperating to rotate and advance a plurality of said disks to form a procession of separated disks, said conveyers being all simultaneously rotatable in the same direction and arranged to maintain the disks in vertical positions while rotating and advancing the same.

10. In combination; several parallel longitudinally elongated rotary screw conveyers, and means for simultaneously rotating said conveyers in the same direction, said conveyers cooperating to constantly advance and rotate a procession of hood cap disks and maintain the disks separated and in vertical positions transversely of the longitudinal axes of the several conveyers.

11. In combination; several parallel longitudinally elongated rotary screw conveyers, and means for simultaneously rotating said conveyers in the same direction, said conveyers cooperating to constantly advance and rotate a procession of hood cap disks and maintain the disks separated and in vertical positions transversely of the longitudinal axes of the several conveyers, said conveyers having relative quick acting screw portions at their disk receiving ends.

12. In combination; several parallel longitudinally elongated rotary screw conveyers, and means for simultaneously rotating said conveyers in the same direction, said conveyers cooperating to constantly advance and rotate a procession of hood cap disks and maintain the disks separated and in vertical positions transversely of the longitudinal axes of the several conveyers, said conveyers having relative quick acting screw portions at their disk receiving ends, and also having quick acting screw portions at their discharge ends.

13. In combination; a hood cap disk advancing screw conveyor of open-top trough form arranged to support and advance and rotate a procession of hood cap disks in vertical position arranged transversely of the trough, said trough embodying several spaced elongated parallel rotary screw conveyers relatively arranged to form the disk supporting trough, and means for rotating said conveyers.

14. Bottle hood capping apparatus including mechanisms for advancing a succession of flanged hood cap disks from a supply to successive bottle heads for hood capping, and a hood cap disk conditioning chamber, said mechanisms embodying disk advancing and rotating means to assemble in said chamber a procession of spaced parallel hood cap disks and to rotate and constantly advance said disks in said chamber and successively discharge the same therefrom, and mechanism to successively deliver disks to said conveyor means to replenish said procession in said chamber.

15. Bottle hood capping apparatus including mechanisms for advancing binder-carrying hood cap disks from a supply to successive bottles for hood capping; a conditioning chamber through which said disks are conveyed; and means for maintaining a flow of heated air approximately

under pressure in said chamber and in contact with the disks therein for conditioning said disks.

16. Bottle hood capping apparatus including a binder carrying hood cap disk conditioning chamber for bringing the disks to a condition for hood capping and contracting and holding to securing condition on bottle heads; means for maintaining heated air circulating in said chamber; and disk conveying means for advancing a multiplicity of said disks in a procession through said chamber while rotating and maintaining said disks separated for uniform conditioning and exposure to said heated air.

17. Bottle hood capping apparatus including a conditioning chamber; conveying mechanism for advancing a multiplicity of binder-carrying hood cap disks through said chamber while maintaining the disks separate and their side faces exposed; means for heating air and forcing the same under pressure in an endless circuit into, through and from said chamber to contact all of said disks therein and to maintain approximate constant high temperature in said chamber.

18. Bottle hood capping apparatus including a housing forming a longitudinally-elongated binder carrying hood cap disk conditioning chamber; means establishing an endless air passage including the interior of said chamber; means exteriorly of said chamber and within said passage to highly heat the air therein; means to maintain an endless forced circuit of highly heated air through said passage and across said chamber; conveyor mechanism to assemble an advancing procession of hood cap disks in and longitudinally of said chamber and exposed throughout their surfaces to the forced air circulation and to advance each cap longitudinally through the chamber and discharge the same therefrom; and means to successively deliver hood caps to said conveyor mechanism for assembly into said procession in said chamber.

19. Bottle hood capping apparatus including means for advancing a plurality of hood caps for conditioning to a temporary state for delivery and contracting on bottle heads to secured hood capping form thereon, in combination with means and mechanism for highly heating air and for forcing said hot air into contact with and heating relation to said plurality of said disks and for maintaining such disks in said hot air for conditioning.

20. Bottle hood capping apparatus including mechanism to assemble and convey a plurality of hood cap disks, in combination with means establishing an endless hot air circuit with said mechanism arranged to expose said disks in said circuit, means for highly heating the air in said circuit, and means for forcibly driving the air in said circuit.

21. Bottle hood capping apparatus including a hood cap disk conditioning chamber; an air heating chamber having heating means, said conditioning chamber having a restricted hot air inlet from said heating chamber; said conditioning chamber having a hot air outlet remote from said inlet; a pressure blower having its suction inlet connected with said outlet and its pressure discharge connected with said heating chamber; and mechanism for carrying hood cap disks in said conditioning chamber.

22. Bottle hood capping apparatus including an elongated hood cap conditioning chamber or tunnel; rotary screw conveyers extending through said tunnel to assemble and advance a multiplicity of said disks in said tunnel for conditioning

tioning; means for delivering disks to said conveyers, means to receive conditioned hood cap disks discharged from said conveyer; and means and mechanism to maintain highly heated air under approximate pressure and circulation in said tunnel.

23. Bottle hood capping apparatus including a housing providing a hood cap disk conditioning tunnel; another housing at the exterior of said first named housing and cooperating therewith to form an air heating chamber provided with heating means and having an outlet into said conditioning chamber and an exhaust manifold having an inlet from said conditioning chamber; means to withdraw air from said manifold and to force said air under pressure into said air heating chamber; and mechanism for carrying a multiplicity of hood cap disks through said conditioning chamber while exposing each disk to the conditions within said chamber.

24. Bottle hood capping apparatus including means for conditioning binder carrying hood cap disks to a temporary state for hood capping and for successively discharging conditioned hood caps one by one, a swing arm for successively receiving the conditioned disks one by one and depositing the same on the heads of successive advancing bottles; and means for advancing bottles with their heads successively traversing the free end of said arm to receive said disks therefrom in timed relation to the discharge of conditioned hood cap disks to said arm.

25. In a bottle hood capping apparatus, a hood cap disk applying arm at its free end having relatively stationary spaced disk upholding fingers between which the bottle head is adapted to pass, and friction disk feed means to press the disk downward with its edge engaging said fingers.

26. In a bottle hood capping apparatus, a depending hood cap disk applying arm at its free end having means to hold a hood cap disk exposed for picking up by a bottle head, said arm being swingable to rock and press the disk down to operative position on the bottle head in combination with actuating means to swing said arm rearwardly toward the bottle on its disk depositing stroke and quickly upwardly and forwardly in the direction of bottle movement on its return stroke.

27. A bottle hood capping machine having a hood cap disk applying arm having lateral free end disk upholding fingers spaced to straddle the bottle head, and travelling means to press the disk down with its edge on said fingers, said arm also provided with means to press the disk down to operative position on a bottle head for subsequent contracting and securing thereon.

28. A bottle hood capping machine having a hood cap disk applying arm to hold a hood cap disk in upright position to be engaged by a bottle head, and means for swinging said arm to cause the arm to cooperate with the bottle head in tilting the disk from the arm to operative position on said head, said arm provided with yielding presser means to hold the disk to the bottle head during the tilting operation and to prevent the disk from tilting from the bottle head after being seated thereon, said arm being also provided with constantly traveling friction means acting on the disk to hold the same yieldingly at its limit of downward movement and to assist in tilting the disk from the arm onto the bottle head.

29. A bottle hood capping machine having a hood cap disk applying arm having means at its

free end to uphold a hood cap disk in position with its lower portion to engage a bottle head for tilting from the arm onto the bottle head, said arm having a guide way to direct the disk down to said means, said arm also having a thumb to press down on the disk when seated in operative position on the bottle head to temporarily hold the disk against dislodgment, said arm having means for maintaining the same in an approximate vertical position and for swinging the arm for each bottle on a rearward disk applying stroke and a forward return stroke.

30. A bottle hood capping machine having a hood cap disk applying arm provided with stop means to uphold a disk in position to laterally engage a bottle head for tilting to operative position thereon, and a succession of yielding presser means to successively come into action on said disk as the tilting thereof from said stop means down to operative position on the bottle head progresses.

31. A bottle hood capping machine having a hood cap disk applying arm; means for successively delivering hood cap disks to said arm for application thereby to the heads of successive bottles; and means for swinging said arm on its disk applying and return strokes, for each bottle and for holding said arm in approximate vertical position to receive and apply one disk at a time, said hood cap disk delivering means being timed to deliver the disk to the arm one by one at spaced intervals.

32. Means for successively advancing upright bottles past a hood cap disk receiving station; a hood cap disk applying arm provided with means to hold a hood cap disk in upright position to laterally engage a bottle head for tilting from the arm to operative horizontal position resting on said head; mechanism for delivering hood cap disks to said arm; and means for swinging said arm back and forth on its operative disk depositing and return strokes in timed relation to the bottle advance to and past said station.

33. A hood capping machine including a guide chute for vertically arranged hood cap disks; means to successively discharge said disks into said chute; a hood cap disk applying swing arm having a guide way to receive disks from said chute and convey the same to the free end of said arm for application to bottle heads; said arm being swingable to abnormal inoperative position clear of the path of disks discharged from said chute; and means for detachably upholding said arm in said abnormal position.

34. Bottle hood capping apparatus including a series of vertically movable bottle stools movable in an endless circuit past a bottle receiving station; means for advancing upright bottles in a procession for successive delivery onto successive stools at said station, said means embodying a rotating star wheel for delivering bottles onto said stools at said station and for simultaneously advancing several bottles; and mechanism for depositing successive hood cap disks on the heads of successive bottles while being advanced by said star wheel, said star wheel being advanced in timed relation to the advance of said stools, and said mechanism being actuated in timed relation to the bottles advanced by said wheel.

35. Bottle hood capping apparatus including a series of vertically movable bottle stools movable in an endless circuit past a bottle receiving station; means for advancing upright bottles in a procession for successive delivery onto successive stools at said station, said means embodying a

rotating star wheel for delivering bottles onto said stools at said station and for simultaneously advancing several bottles; and mechanism for depositing successive hood cap disks on the heads of successive bottles while being advanced by said star wheel; means for successively delivering hood cap disks to said mechanism; and a bottle detector controlling the delivery of said disks to said mechanism to stop the delivery of a disk to said mechanism whenever a bottle is absent from the star wheel behind the bottle being advanced by said wheel to the disk receiving station.

36. Bottle hood capping apparatus including a bottle stool rotor having a series of vertically movable stools movable past a bottle receiving station, means to deliver successive bottles on succeeding stools at said station; and means for positioning the upright bottles on each stool as the stool moves from said station embodying a bottle positioning star wheel the arms of which travel above the stool, means for rotating said wheel with the stools; and an opposing yielding arm to position each bottle on its stool toward said wheel.

37. A bottle hood capping machine including a rotor having an endless series of bottle stools independently vertically movable; and a rotary star wheel for successively delivering upright bottles onto successive depressed stools, the arms of said star wheel moving over said stools and being independently vertically swingable.

38. In bottle hood capping apparatus, in combination, means to advance upright bottles successively through a hood cap disk receiving station; mechanism to detachably hold a hood cap disk in a vertically disposed position extending transversely across the path of the advancing bottle head at said station with the central portion of the concave side of the disk in position to be engaged by the front rim portion of the advancing bottle head for pulling the upstanding disk edgewise forward while the same is rocked down to operative horizontal position on the bottle head and extracted from said mechanism; and means for successively delivering the hood cap disks to said mechanism; said mechanism including longitudinally elongated relatively-fixed disk supporting slide rails extending forwardly and spaced apart for the forward passage of the bottle head therebetween, means to prevent the upper portion of the disk moving rearwardly when the disk is upheld by said rails with its lower edge resting thereon at separated points; and yielding means abutting the front of said disk and adapted to hold the same to the advancing bottle head engaging the concaved rear side of the disk and to continue in pressing contact with the disk top as the lower edge of the disk slides forwardly longitudinally of said rails during the edgewise forwardly moving and rocking of the disk to horizontal position seated on the advancing bottle head.

39. Bottle hood capping apparatus including means for advancing bottles in succession, in combination with mechanism to deposit hood cap disks in operative horizontal position on successive bottle heads while advancing, said mechanism including a holder to detachably support a hood cap disk in upstanding position extending transversely across the path of the head of the advancing bottle for wiping therefrom to operative horizontal position on the bottle head, said holder having parallel longitudinally-elongated rails extending forwardly and spaced apart for the forward passage of the bottle heads be-

tween the rails, said rails adapted to uphold the upstanding disk with its lower edge resting thereon, the lower edge of said disk adapted to slide forwardly longitudinally of said rails as the disk is drawn edgewise forwardly and tilts rearwardly and downwardly to operative horizontal transporting position on the bottle head; and means to normally hold the disk on said rails in upstanding position, including rolling means to yieldingly back the disk when upstanding and to bear down on the top thereof as the edgewise-advancing disk tilts to operative position.

40. Bottle hood capping apparatus including means for advancing a procession of bottles successively through a hood cap disk receiving station, in combination with mechanism for detachably holding a hood cap disk in upstanding position transversely across the path to be travelled by the head of each advancing bottle with the concaved rear side of the disk in position to be engaged by the front rim portion of the advancing head to slide the disk edgewise forwardly and downwardly from said mechanism to operative horizontal position on the bottle head, said mechanism being movable on a backward stroke toward each forwardly advancing bottle head and on its forward return stroke from said head; and actuating mechanism timed to move said mechanism on its rearward and return forward strokes, for each advancing bottle head; and means to successively deliver hood cap disks in upright position to said mechanism.

41. Bottle hood capping apparatus including a holder for detachably maintaining successive hood cap disks in upstanding position transversely across the path to be travelled by the heads of successive advancing bottles, said holder providing relatively stationary parallel longitudinally-elongated forwardly extending hood cap disk supporting slide rails, each of slight transverse slide surface area, said rails adapted to support each disk with its bottom edge resting thereon, and slidable forwardly on said slide surfaces of said relatively stationary rails when the bottle head wipes the disk therefrom, said rails being spaced apart for the forward passage of the bottle head therebetween, said holder provided with means to engage the rear of the upper portion of the upstanding disk on the rails to prevent relative rearward movement of said upper portion of the disk, and to guide the same downwardly while the disk is drawn edge-wise forwardly by the advancing bottle head with the disk edge sliding forwardly on the relatively stationary rails, said holder also providing means to bear against the front side of the disk and control the tilting and forward sliding of the disk thereon as the disk rocks to horizontal position on the bottle head.

42. A device of the class described comprising cap-applying means adapted to support a cap in upright edgewise position with the lower end of the cap exposed to be engaged by the top of a bottle moving horizontally, and yieldable roller means adapted to engage the side of the cap opposite from the side the bottle engages, said roller means and moving bottle top cooperating to cause the cap to be applied on the bottle top without substantial distortion as the bottle moves past the cap applying means.

43. A device of the class described comprising cap-applying means adapted to support a cap in upright edgewise position with the lower end of the cap exposed to be engaged by the top of a bottle moving horizontally, and a plurality of

yieldable members adapted to engage the side of the cap opposite from the side the bottle engages, said yieldable members and moving bottle top cooperating to cause the cap to be applied on the bottle top as the bottle moves past the cap-applying means.

44. A device of the class described comprising cap-applying means adapted to support a cap in upright edge-wise position with the lower end of the cap exposed to be engaged by the top of a bottle moving horizontally, and a plurality of yieldable members adapted to successively engage the side of the cap opposite from the side the bottle engages, said yieldable members and moving bottle top cooperating to cause the cap to be applied on the bottle top as the bottle moves past the cap-applying means.

45. In a machine for hood capping containers, mechanism for applying or transferring a cap to the head of an advancing container, including a holder for supporting a cap in edgewise upright position across the path of the advancing container head for picking up thereby and wiping into operative horizontal position on said head, said holder provided with relatively-fixed forwardly-extending depressed cap-upholding slideways on which the lower peripheral portion of the upright cap in the holder is adapted to loosely rest, said slideways being spaced for the forward passage of the advancing container head therebetween into picking up contact with the rear side of said upright cap, said lower peripheral portion of said cap adapted to slide forward on and free of said cap supporting slideways under the forward push of said advancing head, said holder provided with means to back the top peripheral portion of said cap against rearward movement during the downward movement thereof as the lower portion of the cap is pushed forward and elevated by the advancing head; and forwardly and upwardly yieldable pressers on said holder, to guide and control said advancing cap to horizontal delivered position on said head.

46. In a machine for hood capping containers, a depending cap chute provided with fixed cap supports operatively associated therewith to uphold the cap in edgewise upright position depending across the path of the head of an advancing container, said supports being spaced apart for the forward passage of said head therebetween, said supports adapted to loosely receive the lower circumferential portion of said upright cap and to permit the same to slide thereon and therefrom under the forward push of said head, and means operatively associated with said chute and said supports to normally

prevent forward tilting of said upright cap and to guide and control said cap in its passage from said normal upright position under the advancing movement of said head to its delivered horizontal position on said head.

47. In a machine for hood capping containers, a cap holder for yieldingly and releasably holding a cap in upright edgewise position for picking up by the head of an advancing container for deposit thereon in the horizontal position, said holder including upwardly and forwardly movable cap guiding and controlling means normally arranged in front of said upright cap to resist forward tilting thereof, and adapted to control and guide the cap under the advancing pull of said container head from said cap upright position toward said cap horizontal position, said means adapted to be pushed forwardly and upwardly by contact with the front face and to ride on the top face of said cap as it advances against and tilts under said means.

48. A machine for hood capping containers, having a holder for upholding a cap in upright edgewise position for picking up by an advancing container and deposit thereon in horizontal position, and a succession of yielding pressers for guiding and controlling the cap being advanced from said holder by said container head, each presser being movable on an axis and having a rounded cap-top-contacting surface.

49. A machine for hood capping containers, having a holder for upholding a cap in upright position for picking up by an advancing container head for deposit thereon in horizontal position, including a series of yielding pressers adapted for guiding and controlling the advance of said cap under the push of said head, from its position in said holder to its horizontal delivered position on said head, said pressers including a cap-top-contacting rotary roller.

50. In a machine for hood-capping containers; means to hold a cap in substantially-vertical edgewise position depending into the path of an advancing container head for picking up thereby and transfer thereto in horizontal operative position seated on said head, said means including a forwardly-extending succession of downwardly pressing and independently upwardly and forwardly yieldable cap controlling and guiding members for successively coming into action on said cap, while the cap is under the advancing push of said head, and for maintaining constant guiding control of said cap from said upright position to its final deposit to horizontal position on said head.

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