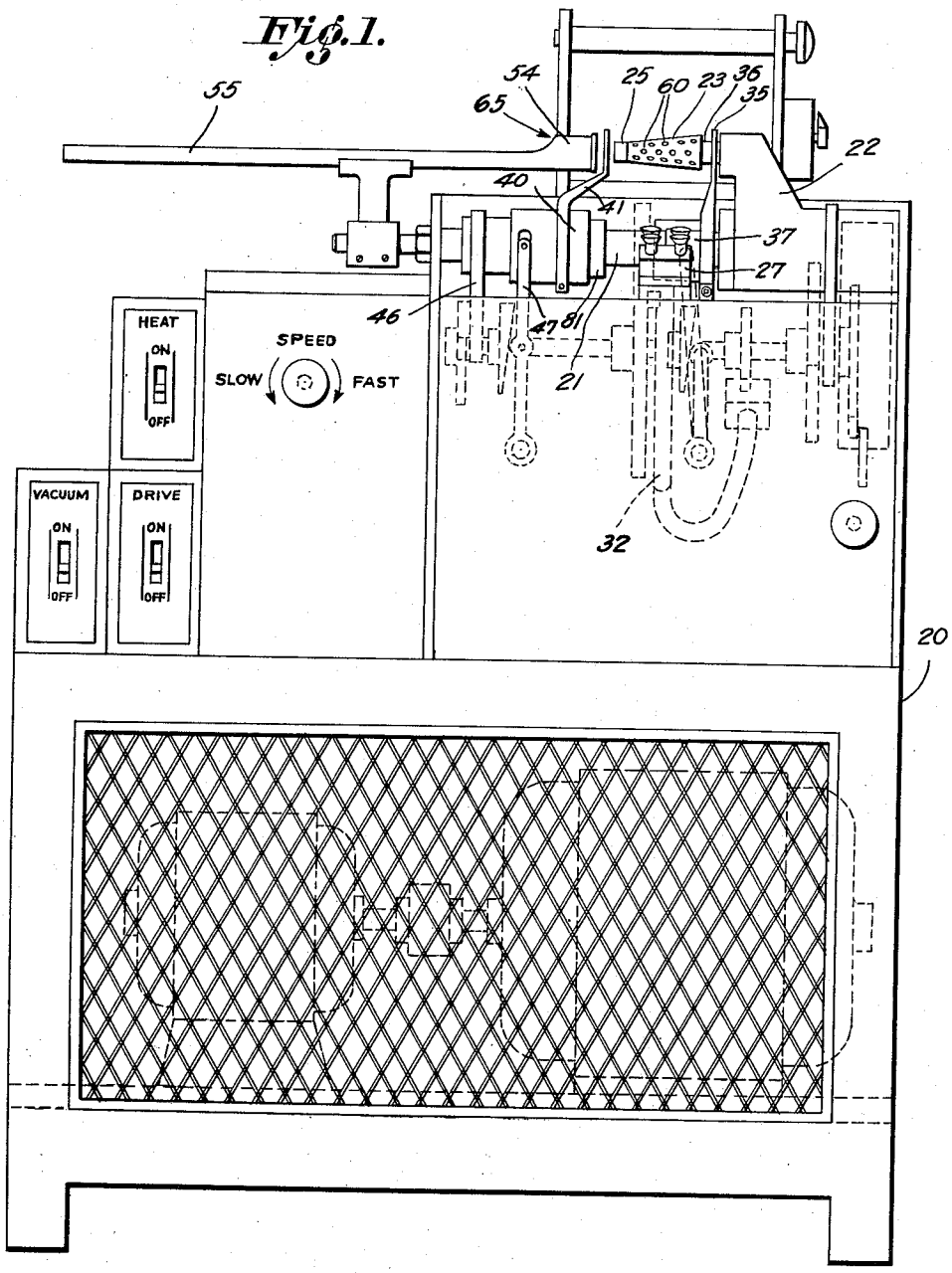
Jan. 15, 1957 F. E. MONKS 2,777,369

NECKBAND FORMING MACHINE

Filed April 30, 1953 4 Sheets-Sheet 1

Fig. 1.



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BY Richard L. Underwood

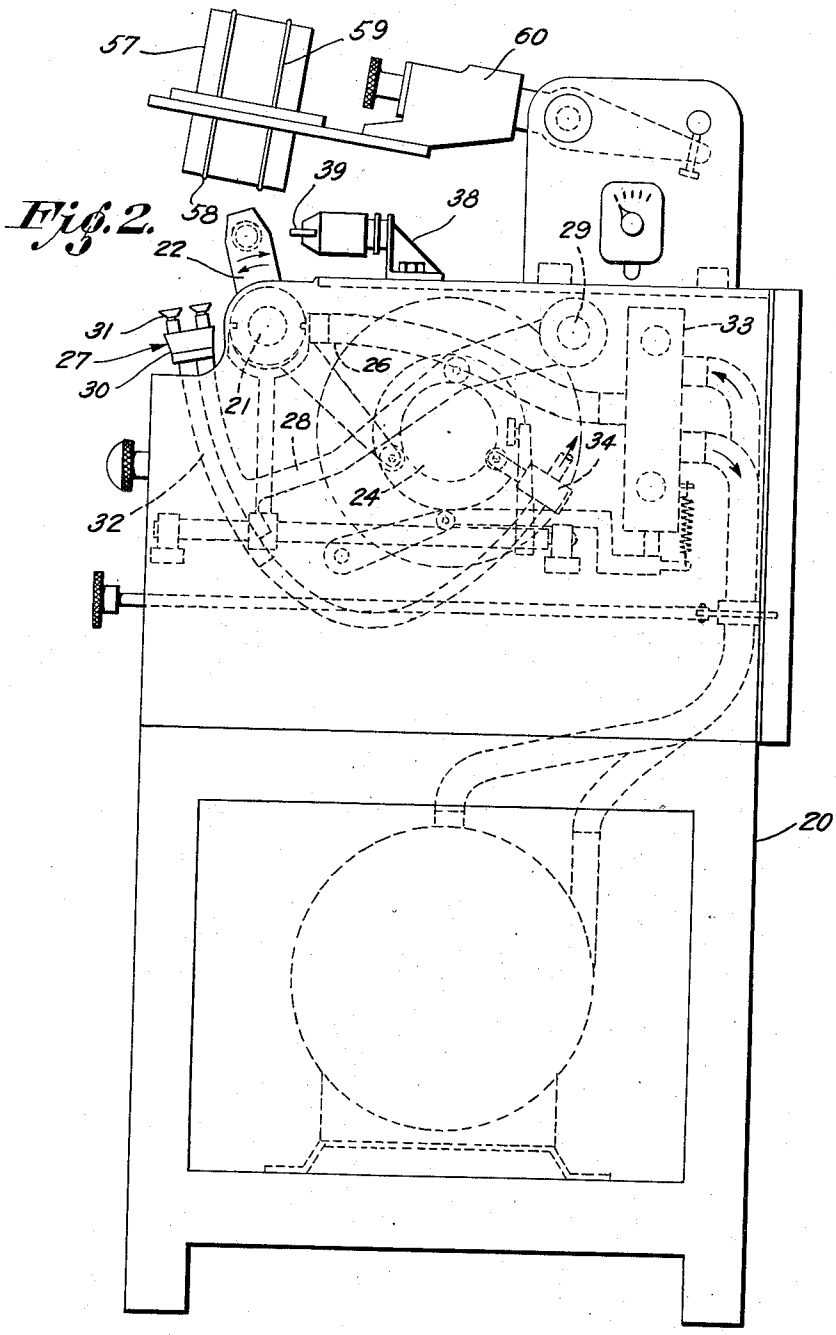
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NECKBAND FORMING MACHINE

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Fig. 2.



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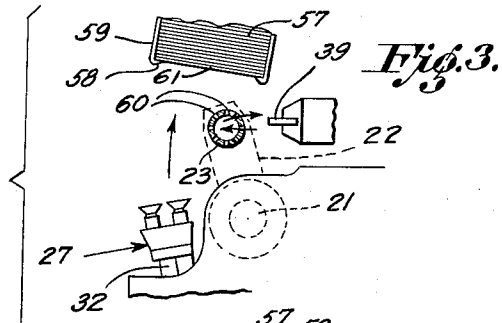


Fig. 3.

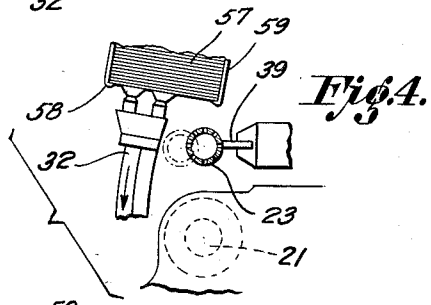


Fig. 4.

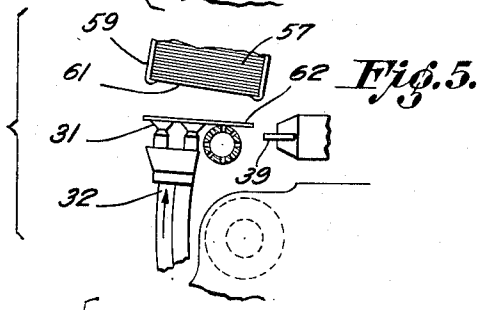


Fig. 5.

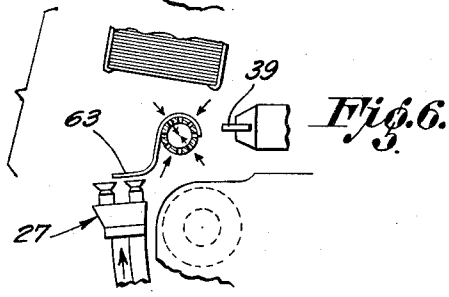


Fig. 6.

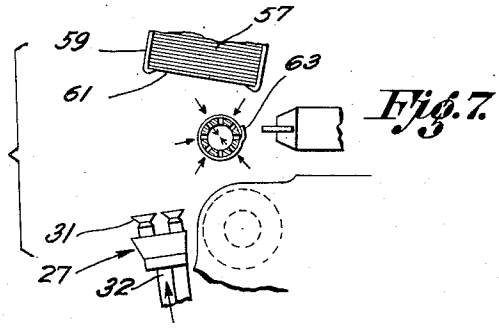


Fig. 7.

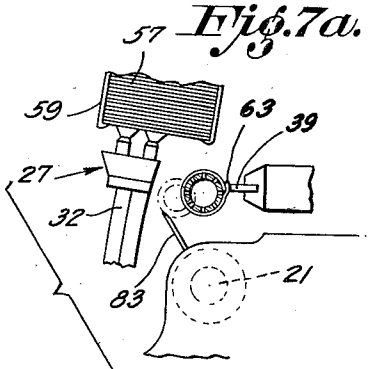


Fig. 7a.

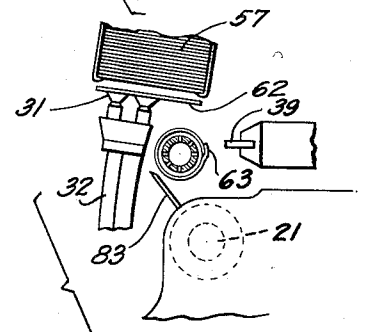


Fig. 7b.

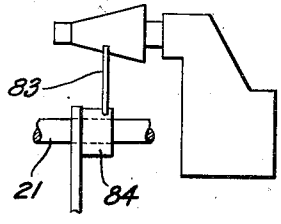


Fig. 7c.

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Fig. 8.

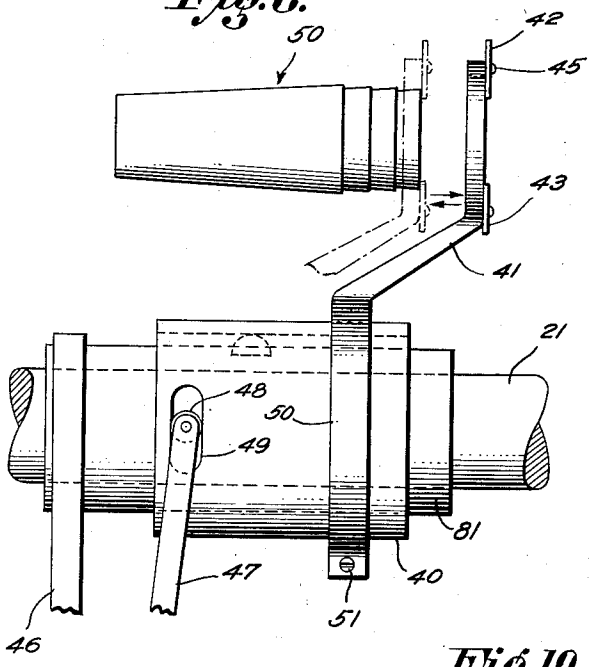


Fig. 9.

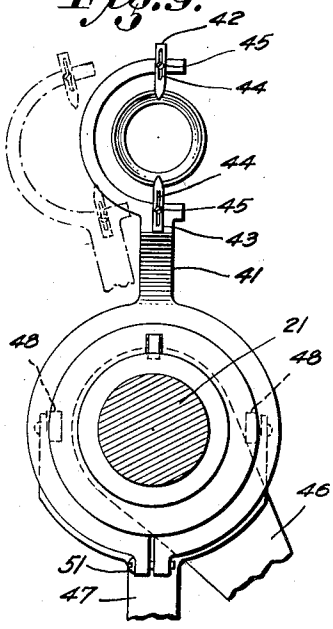
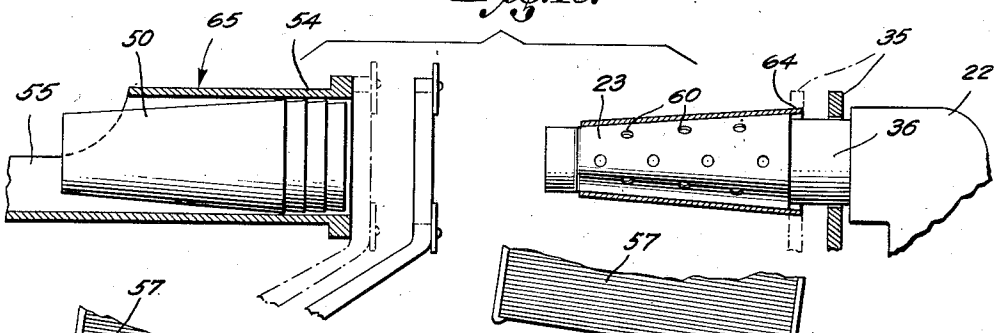


Fig. 10.



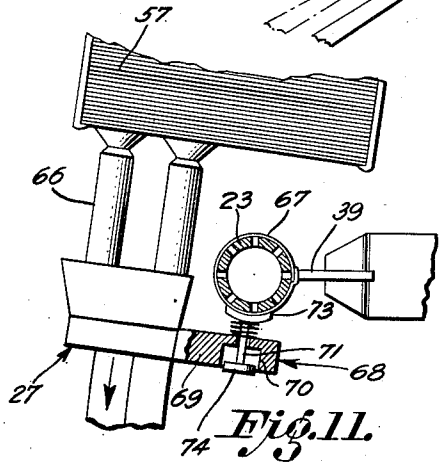


Fig. 11.

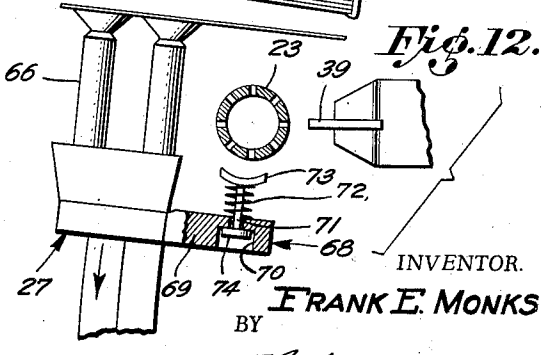


Fig. 12.

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United States Patent Office 2,777,369
Patented Jan. 15, 1957

2,777,369

NECKBAND FORMING MACHINE

Frank E. Monks, Pittsburgh, Pa., assignor to Fuller Label & Box Company, Pittsburgh, Pa., a corporation of Pennsylvania

Application April 30, 1953, Serial No. 352,140

5 Claims. (Cl. 93—79)

This invention relates to a machine for and the process of forming tubes or bands from single blanks of flexible material. While the invention in its broadest aspects is in no way limited to the particular type of band or tube, or to the many variable uses to which such band might be put, it has for purposes of illustration been described herein with particular reference to neck bands for bottles.

This application is a continuation-in-part of my original application filed October 8, 1948, Serial No. 53,557, now United States Patent No. 2,667,108.

An object of the invention is to facilitate the speed and accuracy of manufacture and particularly to improve upon the broad concept of utilizing fluid or pneumatic pressure in the process of manufacture. The use of vacuum or suction and/or pressure in the manufacture of tubes or bands from blanks of flexible material is not broadly novel. However, a particular desideratum of this invention is to utilize pressure means, especially pneumatic pressure, to accomplish as many as possible of the various operations necessary to form a complete band.

A further object of the invention is to utilize fluid pressure in a sequential manner and direct such force successively at different phases of manufacture to accomplish the necessary operations. An important phase of the invention resides in the manner in which the various parts of the mechanism are associated with one another and in relation to a fluid pressure source to accomplish this end.

An overall advantage sought to be derived through this invention is the simplification of mechanism adapted to withdraw individual sheets from a pile of blanks, form the tube or band, and then stack the bands successively as they are formed in such manner that the nested or stacked bands do not bind and therefore ready removal of individual bands from the nested stack is possible.

As hitherto stated, the invention has been illustrated herein in conjunction with a band adapted to be slipped over the neck of a bottle and to this end the blank is such that a tube or band is formed, a forming mandrel of similar shape being utilized in this particular instance. Likewise, the blank used for this particular adaptation of the invention is such that the band when formed is frusto-conical in shape, having a squared bottom and a square top. These bands may be readily positioned over the necks of bottles.

In accordance with my inventions, the fluid condition within the picker may be controlled by a picker valve to develop a small volume of air with a high negative pressure so that the label blank will be more firmly held on or to its face. Sucking the label blank around the mandrel requires, on the other hand, a large volume of air at relatively low pressure. Thus it is apparent that the use of two separately and independently controlled air systems is beneficial in obtaining high speed operation, particularly when the blanks are formed of relatively stiff material.

By my invention a picker removes a single blank from a stack by means of suction and delivers the blank to a

forming mandrel. The picker hesitates at an intermediate hesitating position while a predetermined suction is established on the surface of the mandrel after which a slight positive pressure blow in the picker disengages the blank therefrom; the picker then moves to a retracted position. The blank is whipped around the mandrel and formed into a neck band by pneumatic means only; no auxiliary devices are needed. The mandrel is then preferably pivoted to a heat seal iron and then back to its original position. To eject the sealed neck band from the mandrel, a positive pressure is established within the mandrel. If the neck band has an abrupt taper, a brake means is employed to restrain kick-off until a predetermined time. If the neck band has a slight taper, a hook-shaped kicker provides the necessary impetus to initiate movement at a predetermined time. The ejected neck band is then stacked by a stacking mechanism. During the heat sealing and ejection operations, the picker moves up and withdraws a second blank which is placed in contact with the mandrel immediately after kick-off of the previously formed band.

Various other objects and meritorious features of the invention will be apparent from the following description taken in conjunction with the drawings, wherein like numerals refer to like parts throughout the several figures, and wherein:

Fig. 1 is a front elevation of my improved machine;

Fig. 2 is a side elevation;

Figs. 3 to 7*c* illustrate various phases of operation of the forming mechanism and the brake means;

Figs. 8 to 10 illustrate various phases of operation of the mandrel freeing and stacking operation, and

Figs. 11 and 12 illustrate a modification of various phases of operation of the forming mechanism.

Referring now to Figs. 1 and 2, the mechanism comprises a case broadly designated by the numeral **20**. The operating mechanism enclosed within the case **20** is shown in phantom and in a schematic manner to indicate the general location of the various structures, all of the power units being enclosed within the confines of the case. The design shown in Figs. 1 and 2 results in a machine which occupies a minimum of space and substantially reduces the operational hazards to the man in charge of the machine. For the purpose of clarity, the important linkages have been accentuated in Figs. 1 and 2.

Pivotally mounted on mandrel shaft **21** is an arm **22** at the free end of which is mounted a horizontally extending forming mandrel **23**, having spaced holes **60** spread over its entire forming surface. The pivotal movement of arm **22** about shaft **21** is controlled by suitable linkage operatively connected to a suitable box-cam on the cam shaft **24**.

Mandrel **23** provides a frusto-conical surface which has spaced holes spread over its entire forming surface for the establishing of predetermined pressure conditions thereover. Beyond the forming portion of the mandrel **23**, the tube is closed by an outer end cap **25**. At the inner end a hose **26** is placed in fluid communication with the mandrel through suitable ports in the mandrel shaft **21** and the mandrel arm **22**. A mandrel air valve **33**, which is operated through suitable linkages by a cam on cam shaft **24**, controls the pressure conditions at the surface of the mandrel.

A picker broadly designated by the numeral **27** is supported at the outer free end of arm **28** which is pivotally mounted on shaft **29**. Suitable contact means are provided on arm **28** for engagement with a movement controlling box-cam on the cam shaft **24**. The picker **27** may be made of any suitable material such as steel, plastic, etc. and it embodies a body **30** from which extends a

plurality of spaced rubber suckers **31**. Connected to the body **30** is a hose **32** for transmitting to the suckers **31** predetermined pressure conditions established by a picker air valve **34**. This valve is operated through suitable linkage by a cam on cam shaft **24**, and it may be tapped into the main pneumatic lines to which the mandrel air valve **33** is connected; or it may be piped to a separate pump (not shown).

The kick-off mechanism for neck bands of slight taper comprises a hook-shaped member **35** which is slidably positioned at the mandrel reduced portion **36** between the apertured forming portion of the mandrel **23** and the arm **22**. The hook-shaped member **35** is fixedly connected to a bushing **37** slidably mounted on the mandrel shaft **21**, reciprocating motion being imparted to the bushing **37** by suitable linkages connected to a cam on the cam shaft **24**.

An electric heat seal iron **39** is preferably fixedly mounted on the casing **20** by means of a bracket **38**. The heat seal iron is equipped with a spring-type buffer means for cushioning the impact of the mandrel **23** upon engagement therewith and for compensating for slight misalignment between the iron and the mandrel.

As best seen in Figs. 8–10, the stacking mechanism for the formed and sealed bands includes a stacker arm **41** which has an open arcuate portion at its free or upper end, the shape of the upper end being such that diametrically opposed stacking fingers **42** and **43** may be added to enable efficient and preferably controlled stacking of the neck bands. Each stacking finger has a longitudinal slot **44** through which passes an adjusting set screw **45** which is in turn threaded into the stacker arm **41** for allowing adjustment of the finger into proper engagement with the peripheral edge of the large end of a formed neck band. By means of this construction neck bands of varying diameters may be efficiently stacked, it being understood that various size mandrels may be used in my machine.

The stacker arm **41** is fixedly secured to a control barrel **40** by means of a split ring portion **50** and threaded connector **51**. The control barrel **40** is mounted on a sleeve **81**; a feathered key between sleeve **81** and control barrel **40** permits reciprocating motion between them, but prevents oscillating motion. A stacker oscillating cam arm **46** is rigidly secured to the sleeve **81**, the arm **46** being actuated in a predetermined manner through suitable linkages connected to a cam on the cam shaft **24**. Through the above-described mechanism the stacker arm **41** is pivoted between a retracted position (shown in phantom in Fig. 9) and a neck band engaging position (shown in Fig. 9).

Reciprocating movement of the stacker arm **41** between the neck band engaging position (shown in Fig. 8) and a neck band stacking position (shown in Fig. 8 in phantom) is accomplished by means of a stacker reciprocating cam yoke **47** which has rollers **48** slidably received in transverse slots **49** in the outer surface of the control barrel **40**. Through suitable linkages connected to a cam on the cam shaft **24**, the control barrel **40** is reciprocated on the sleeve **81** in a predetermined manner thereby causing the stacking of neck bands in the nested fashion of the stack **50** by the stacking fingers **42** and **43**.

As seen in Fig. 10, a stack tube **65** is provided for supporting the nested neck bands; it is aligned with the mandrel and is tubular in cross section at its receiving end **54** and takes the form of a trough **55** at its other end.

A suitable support for blanks (Fig. 2) holds a stack of blanks **57** by means of the toed-in end portions or stops **58** of guide rods **59** and is mounted on a position adjusting means broadly indicated by numeral **60** which enables movement of the stack vertically and horizontally to facilitate proper alignment with the mandrel. The stops protrude only a short distance over the bottom edge of the stack and, while they very effectively restrain movement of the stack past them, it is very easy to snap past them a single label from the bottom of the stack.

If two or three labels tends to stick together, which is sometimes caused by static electricity or offset of printing inks, the rather sharp edges of these stops effectively separate the bottom label from those adhered above it as it is snapped past the stops. These stops are adjustable and their interference with movement of the stack can be increased or decreased as demanded by the weight and character of the sheet material being formed. In the embodiment shown, the support is arranged at an angle slightly tilted from the vertical allowing the labels to progress from top to bottom via their own weight, i. e., gravity. However, in some instances one might wish to arrange the stack at some other angle, in which case it might be necessary to supplement or replace the gravity feed by a mechanical substitute such as a mechanical ratchet operated elevator with a pile height governor, springs, weights, compressed air cylinder, etc.

The power system for my machine preferably includes a control linkage designed with three positions: (1) pressure means shut off and clutch disengaged; (2) pressure means turned on and clutch engaged; (3) pressure means on and clutch disengaged. Positon 3 has certain obvious advantages with setting up and positioning a new job.

When the control linkage is placed in position 2, the pressure means is on and the clutch is engaged and my machine operates in an automatic sequential manner as follows: The picker **27** is pivoted upwardly from its retracted position of Fig. 3 to a blank engaging position (Fig. 4) where the rubber suckers **31** engage the outermost blank **61** on the underside of the stack **57**.

At this point a suction condition exists in the hose **32** through actuation of the picker air valve **34**, the suction being transmitted to the rubber suckers **31**.

The blank **61** adheres to the rubber suckers due to the suction and is drawn or snapped out of the stack when the picker **27** is permitted to move to an intermediate hesitating position (Fig. 5).

It will be noted that the picker **27** moves past the outer face of the mandrel **23** and engages the outer portion of the blank **61**. Upon withdrawal and movement of the picker **27** to its intermediate hesitating position, the inner portion of the removed blank **61** is brought into surface-to-surface contact with the mandrel **23**.

When the label contacts the mandrel the picker **27** momentarily hesitates at the intermediate hesitating position while predetermined vacuum conditions are established in the mandrel which results in transferring the label from the picker to the mandrel. In order to complete the transfer of the label from the picker to the mandrel a slight blow is established in the picker just before it moves from its intermediate position to its retracted position. Application of the blow before the picker starts toward its retracted position prevents even the slightest movement of the label out of proper register on the mandrel.

The suction condition present over the entire surface of the mandrel then completes the wrapping of the neck band whereby the overlap **63** of the blank is placed over the underlap **62** in proper sequence entirely without any movement of the mandrel, without any grippers or other mechanical contraption. This wrapping is entirely pneumatic.

The completely wrapped neck band is shown in Fig. 7 and the picker **27** is in the fully retracted position.

The mandrel **23** is then pivoted toward the heat seal iron **39** (Fig. 7*a*). The underface of the blank overlap **63** is coated with a heat-sealable adhesive and when the overlap is pressed into engagement with the heat seal iron **39**, a smooth and strong seal is made.

Simultaneously with the movement of the mandrel to the heat seal iron, the picker **27** moves upwardly toward the stack **57** to pick the next label from the bottom of the stack. This is shown in Fig. 7*a*.

Immediately upon the completion of the heat seal the pressure condition at the forming surface of the mandrel is reversed from a suction to a blow.

It will be readily appreciated that by this method the pick up operation and the heat seal operation occur at the same time. In practice these two operations have required the two longest time periods of all operations and the combination of them into a simultaneous process has resulted in an unexpectedly greater efficiency of operation.

Referring now to Figs. 7*a*–7*c* and 8–10, the kick-off or ejection operation will be seen to involve a kick-off step from the mandrel **23** and a stacking step in the trough **55**.

It will be appreciated that under certain specific and critical conditions the mere establishment of a positive pressure blow at the mandrel surface will satisfactorily kick off the neck band at the proper time. To guarantee exact timing of the kick-off, however, neck bands having abrupt tapers are restrained by a brake means, and neck bands having a slight taper are given a starting push by a starting kick-off means.

When forming an abruptly tapered neck band a brake rod **83** is employed for frictionally engaging and restraining movement of the formed neck band from the mandrel until the proper time. The brake rod **83** is shown moving to released position in Fig. 7*b* and the neck band is flying off the mandrel. As seen in Figs. 7*a*–7*c*, the rod **83** extends from a barrel-like member **84** which is oscillated on the mandrel shaft **21** in a predetermined manner by means of a suitable linkage connected to a cam on cam shaft **24**. Use of the brake means not only guarantees exact timing of the kick-off but also insures the establishment of sufficient power for a satisfactory kick-off, thereby eliminating premature, misaligned, and incomplete transfer of the formed band to the stacking device **65**.

When forming a slightly tapered neck band, mere reversal of air in the mandrel is sometimes not sufficient to bring about a satisfactory kick-off and therefore the hook-shaped member **35** is employed. The axial dimension of the formed band is slightly greater than that of the mandrel and therefore the hook-shaped member **35** on sliding movement (shown in phantom in Fig. 10) engages the projecting portion **64** of the band to loosen it. This loosening action permits a component of the air blast through the mandrel holes **60** to blow the band into the receiving end **54** of the band stacking device broadly designated as **65**.

It will be understood, therefore, that when the neck bands have a slight taper, the kick-off hook **35** initiates and times ejection; but when the neck bands have an abrupt taper, release of the brake means initiates and times ejection.

As soon as the band has been blown into the nest of previously formed neck bands, the stacker arm **41** is oscillated from its retracted position (shown in phantom in Fig. 9) toward the mandrel and into its neck band engaging position by the stacker oscillating cam arm **46**. The previously adjusted fingers **42** and **43** are then aligned for engagement with the edge of the neck band.

The stacker arm **41** is then moved axially away from the mandrel by the action of the reciprocating cam yoke **47** on the control barrel **40** to push the newly formed neck band along the band stacking device **65**, thus leaving the receiving end free and clear for reception of a subsequently blown band.

As soon as the band has been completely pushed into the band stacking device **65**, the stacker arm **41** is oscillated out of axial alignment with the mandrel and translated back toward the mandrel to assume its retracted position to allow the kick-off of another neck band.

The timed relation of the sequence of operations hitherto described may be such that a completely formed band is blown into the stacking device **65** as soon as the stacker arm **41** has oscillated back to a retracted position. As the process continues and more bands are pushed into the stacking device, they slide along the trough **55** which may be five or six feet long. An operator can remove a strip of the nested bands from this trough without stopping or interfering with the production of the machine. Also the machine can be loaded with label blanks without stopping the operation thereof.

If desired a protruding tab may be embossed into the overlap by a small die (not shown) in the mandrel which has its counterpart recessed into the heat seal iron. The tab would be embossed into the overlap when the mandrel is moved to the heat seal iron to effect a heat seal. Since such a tab would be formed under heat and pressure of the sealing iron, it might be said that it is not merely embossed but actually molded into the overlap. Because it is molded and because it is formed from the double-ply overlap, the tab possesses the maximum possible strength which can be had. The tab serves to keep the cones from wedging tightly into each other during handling and shipment. Cones kept loosely nested by these tabs speed up their application in the bottling line. Without the tabs, the cones may become tightly nested into each other and cause the bottlers no end of trouble in separating them.

In the machine described above wherein the mandrel reciprocates to and from the heat seal iron the advantages are twofold: First, the electrical leads to the heat seal iron and the thermostat are not subject to continuous stressing and therefore do not become fatigued and broken. Also secondly, the heat seal iron can be adjusted easily for the various tapers of the many mandrels used without readjusting any operating linkages. This feature is a very great time saver for set-ups.

In Figs. 11 and 12 is shown a modification of the braking mechanism. It will be noted that the picker **27** is slightly modified and that in the embodiment shown the heat seal iron **39** reciprocates to and from the mandrel **23** to accomplish the heat sealing operation. The mandrel **23** in Figs. 11 and 12 is stationary. When the elongated rubber suckers **66** engage the bottom blank in the stack **57**, a brake means **68** is moved into engagement with the previously formed neck band **67** surrounding the mandrel. When the heat sealing operation has been completed the contact between the heat seal iron **39** and the neck band is broken. As this contact is broken, positive air pressure is delivered to the mandrel and at the proper time the brake means **68** is released to deliver the neck band **67** to the band stacking device **65**.

In the embodiment shown in Figs. 11 and 12, the brake means generally designated by numeral **68** includes an extension **69** rigidly affixed to the picker **27**. Slidably mounted within a hole **70** in the extension **69** is a brake **71** which is biased upwardly toward the mandrel by a spring **72** seated on the upper surface of extension **69** and the lower surface of an arcuate brake plate **73**. The hole **70** has an enlarged portion at its lower end to receive a head **74** which upon engagement with the extension **69** limits the upward movement of the brake **71**.

In operation the brake plate **73** is pressed downwardly by the mandrel as the picker **27** proceeds upward to the stack. On the return of the picker, the brake action of the brake **71** exists until the head **74** abuts against the extension **69**. At the instant the brake is released, the neck band is shot from the mandrel.

In this manner, accurate timing of the kick-off action is obtained and premature kick-off which causes clogging is eliminated. It will be appreciated that the brake means **68** may be moved into engagement with the neck band by other means, such as its own linkage system, thereby enabling the use of a movable mandrel and a fixed heat seal iron.

The machine described is capable of a high rate of production. The valvular action of picking a label off the pile and wrapping it around the mandrel is extremely fast and is limited only by the amount of vacuum applied and by the speed with which the picker can be reciprocated. The machine may be coupled to a multi-stage

centrifugal air blower which develops only a two-pound negative pressure, yet the pickup and wrap operation is so fast that one can just barely get a glimpse of the overlap and being whipped around the mandrel.

The mechanism is extremely simple in that it involves no rotating mandrel, no grippers within the mandrel to grab the blank; no gripper insertion device and no complicated mechanism to operate grippers or insertion device. Mandrels are simple to machine and install since there is no working mechanism contained in them—the mandrel consists only of a piece of steel tubing turned to the correct taper on the OD and drilled circumferentially with a plurality of holes. Indeed, in the simplicity of this mechanism lies its novelty.

This mechanism, however, is not limited to the particular arrangement described. It can equally well form a part of another machine which performs other operations on the band. For example, one might wish to close the tops of the bands. In such a case, one might construct a machine having, for example, six mandrels spaced evenly around the circumference of a turntable, the axis of the mandrels being parallel to the axis of the turntable. The table would be activated by a Geneva motion which would intermittently move the table through a sixth of a revolution and thereby bring successively each mandrel to pause at the No. 1 position. At the No. 1 position would be the stack rack and mandrel valve which would serve to pick a label from the bottom of the stack and wrap it around the mandrel. This mandrel would then move to position 2 where the wrap would be heat sealed. At positions 3, 4 and 5 other operations would be performed to close and form the top of the band. At position 6 the band would be pushed out into the delivery trough. Of course, with six mandrels there would be six bands in progress at all times.

Also the instant invention may be used for dispensing neck bands singly in a manner such that they fall over the neck of a bottle. A roller chain conveyor may be equipped with cups into which the bands are blown. The bands, in a vertical position, may then be removed by hand or blown from the cups downwardly over the neck of a bottle. The formation of the bands and the movement of the conveyor may be controlled by a photocell which is activated each time a band is removed from a cup.

I claim:

1. In a machine adapted to form a band from a single flat blank of sheet material, the combination of a mandrel having spaced holes spread over its entire forming surface for the establishment of predetermined pressure conditions thereover, a stack of blanks, a picker mounted for oscillating movement from a retracted position past said mandrel to a pick-up position in contact with a blank in said stack, picker pressure means for producing suction in said picker when in the pick-up position and for maintaining this condition until said picker has moved past said mandrel on return to its retracted position, mandrel pressure means for producing a suction condition over the entire forming surface of said mandrel to accomplish formation of a neckband from a picker-delivered blank, heat seal means, and mandrel moving means for oscillating the mandrel and the formed neckband into engagement with said heat seal means to seal the overlapped margins thereof.

2. In a machine adapted to form a band from a single flat blank of sheet material, the combination of a mandrel having spaced holes spread over its entire forming surface for the establishment of predetermined pressure conditions thereover, a stack of blanks, a picker mounted for oscillating movement from a retracted position past said mandrel to a pick-up position in contact with a blank in said stack, picker pressure means for producing suction in said picker when in the pick-up position and for maintaining this condition until said picker has moved past said mandrel on return to its retracted position, mandrel pressure means for producing a suction condition over the entire forming surface of said mandrel to accomplish formation of a neckband from the picker-delivered blank, heat seal means, mandrel moving means for oscillating the mandrel and the formed neckband into engagement with said heat seal means to seal the overlapped margins thereof, means for freeing the sealed band from the mandrel, and means for nesting the bands successively freed including a stack tube axially aligned with said mandrel which receives the leading edge of the freed band, stacker means, and means for moving said stacker means into a position behind the rear edge of said freed band and for moving said stacker means into pushing engagement therewith to accomplish nesting in said stack tube.

3. In a machine adapted to form a band from a single flat blank of sheet material, the combination of a mandrel having spaced holes spread over its entire forming surface for the establishment of predetermined pressure conditions thereover, a stack of blanks, a picker mounted for oscillating movement from a retracted position past said mandrel to a pick-up position in contact with a blank in said stack, picker pressure means for producing suction in said picker when in the pick-up position and for maintaining this condition until said picker has moved past said mandrel on return to its retracted position, mandrel pressure means for producing a suction condition over the entire forming surface of said mandrel to accomplish formation of a neckband from the picker-delivered blank, heat seal means, mandrel moving means for oscillating the mandrel and the formed neckband into engagement with said heat seal means to seal the overlapped margins thereof, means for freeing the sealed band from the mandrel, and means for nesting the bands successively freed including a stack tube axially aligned with said mandrel which receives the leading edge of the freed band, stacker means including an arm having an opening therein, fingers adjustably secured to said arm and extending inwardly of said opening to enable engagement thereby with the rear edge of said band, a control barrel rigidly secured to said arm, oscillating means connected to said control barrel for moving said arm behind the rear edge of said freed band, and reciprocating means connected to said control barrel for moving said fingers into pushing engagement with said rear edge to accomplish nesting in said stack tube.

4. In a machine adapted to form a band from a single flat blank of sheet material, the combination of a mandrel having spaced holes spread over its entire forming surface for the establishment of predetermined pressure conditions thereover, a stack of blanks, a picker, picker moving means connected to the picker for oscillating the picker from a retracted position past said mandrel to a pick-up position in contact with a blank in said stack, picker pressure means for producing suction in said picker when in the pick-up position and for maintaining this condition until said picker has moved to an intermediate hesitating position on return to its retracted position, mandrel pressure means for producing a suction condition over the entire forming surface of said mandrel to accomplish formation of a neckband from the picker-delivered blank, said picker pressure means producing a slight blow when said picker is in the intermediate hesitating position to release cleanly and completely the withdrawn blank, heat seal means, mandrel moving means for oscillating the mandrel and the formed neckband into engagement with said heat seal means to seal the overlapped margins thereof, and means for freeing the sealed band from the mandrel, said picker moving means being operatively connected to said picker to move it to the pick-up position during the heat sealing operation to present a second blank to said mandrel immediately after the freeing of the previously sealed neckband from the mandrel.

5. In a machine adapted to form a band from a single flat blank of sheet material on a mandrel, the combination comprising means for freeing the sealed band from the mandrel, means for nesting the bands successively

freed including a stack tube axially aligned with said mandrel which receives the leading edge of the freed band, stacker means including an arm having an opening therein, fingers adjustably secured to said arm and extending inwardly of said opening to enable engagement thereby with the rear edge of said band, a control barrel rigidly secured to said arm, oscillating means connected to said control barrel for moving said arm behind the rear edge of said freed band, reciprocating means connected to said control barrel for moving said fingers into pushing engagement with the said rear edge to accomplish nesting in said stack tube, a brake means, and moving means connected to said brake means for moving the brake means into engagement with a previously formed band on the mandrel and for maintaining said contact

until the heat sealing operation has been completed, said moving means releasing the resultant sealed band at a predetermined time to enable precise control of the kick-off of the band from the mandrel.

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