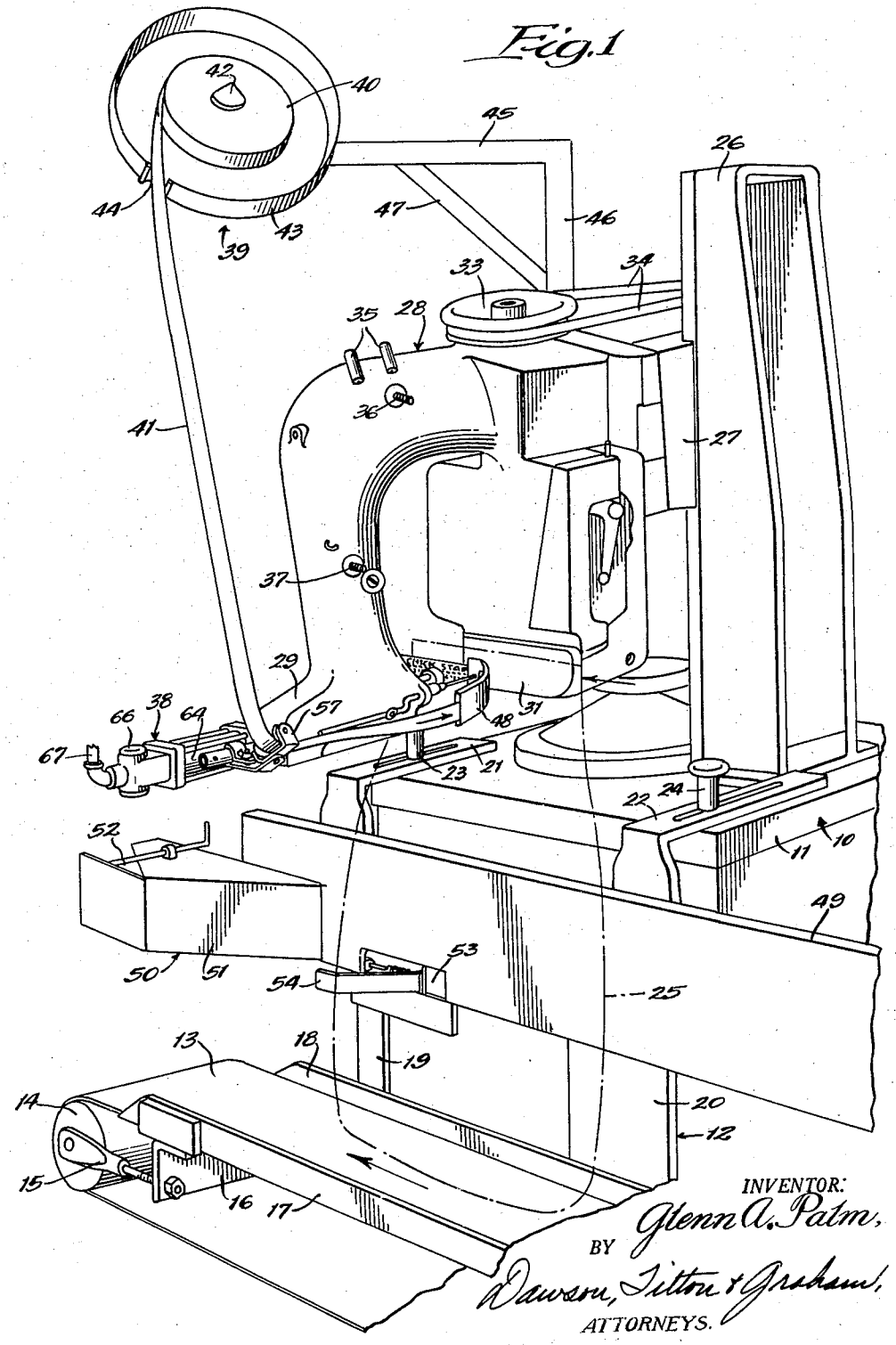
Sept. 9, 1958 G. A. PALM 2,850,993

PACKAGING APPARATUS

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Fig. 1



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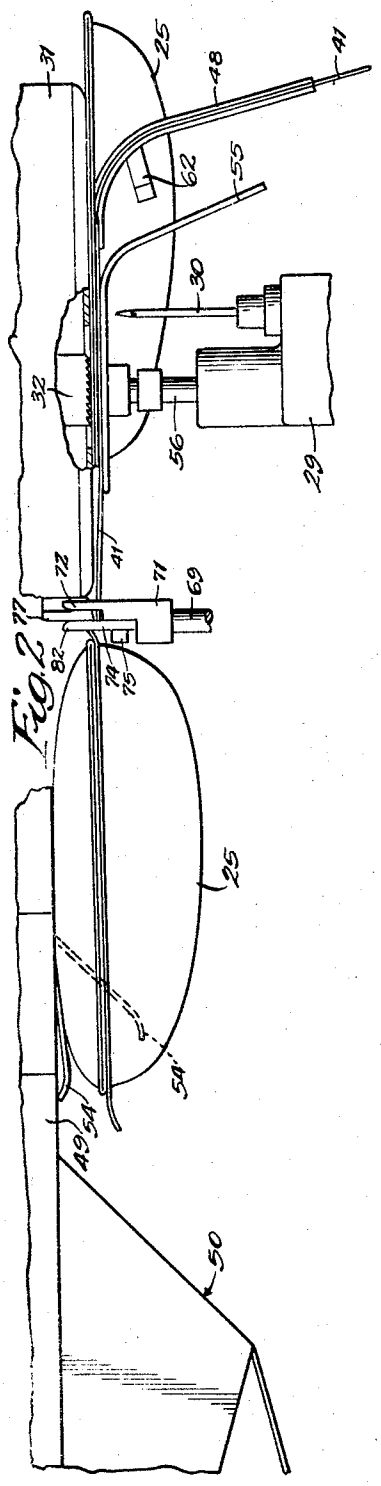


Fig. 2

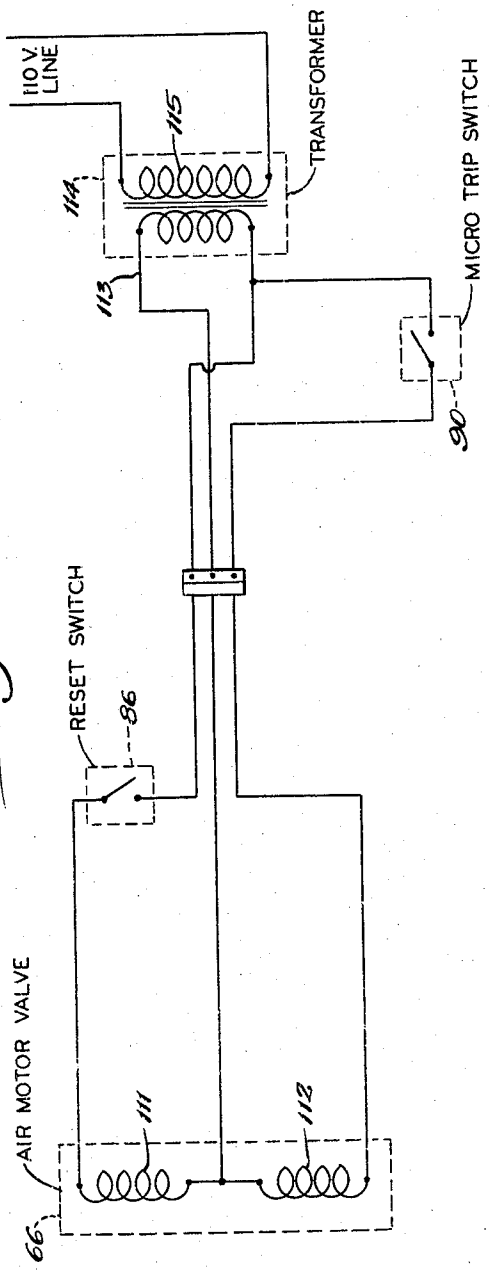


Fig. 3

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PACKAGING APPARATUS

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Fig. 4

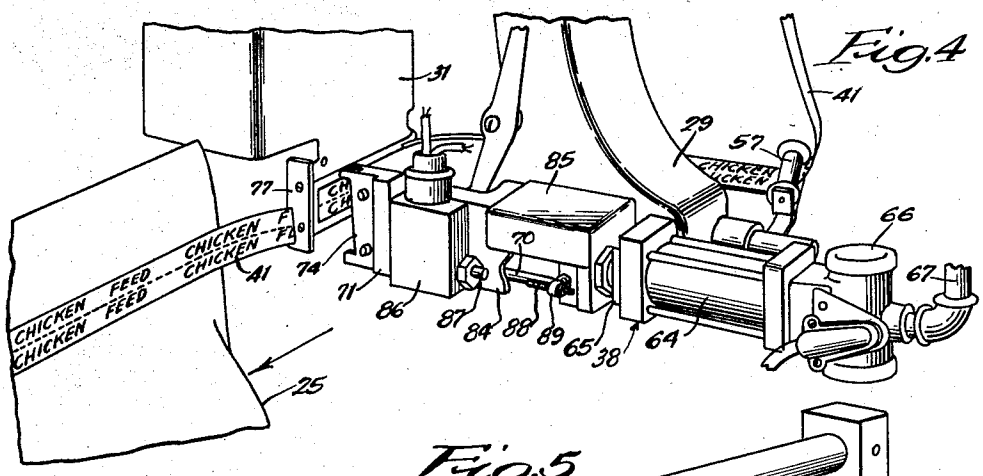


Fig. 5

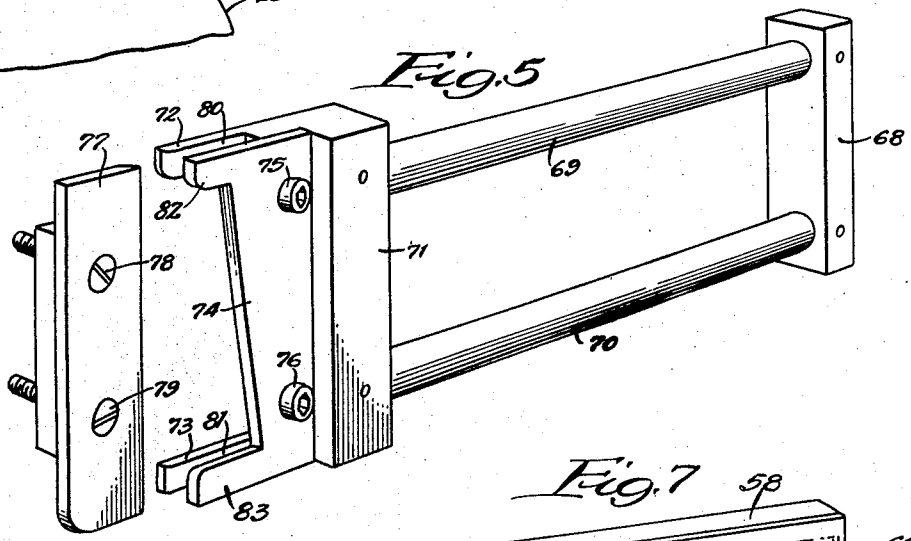


Fig. 7

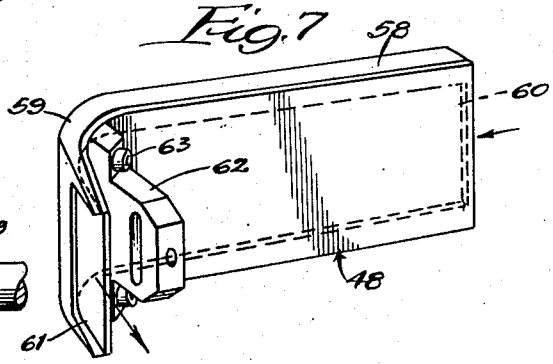


Fig. 6

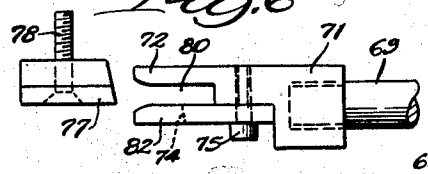
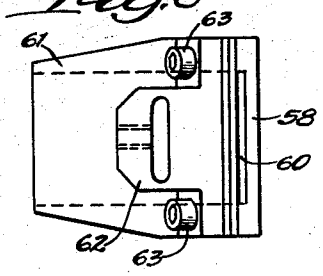


Fig. 8



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Fig. 10

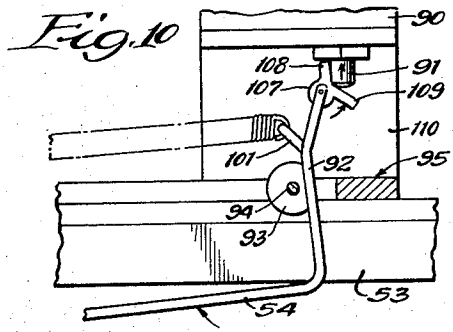
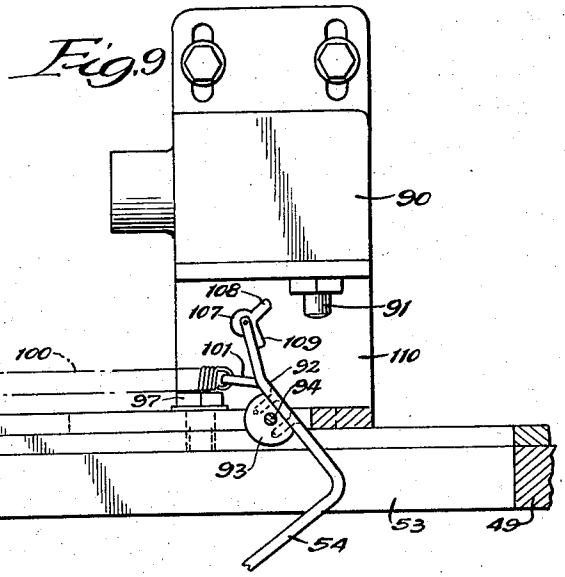


Fig. 9



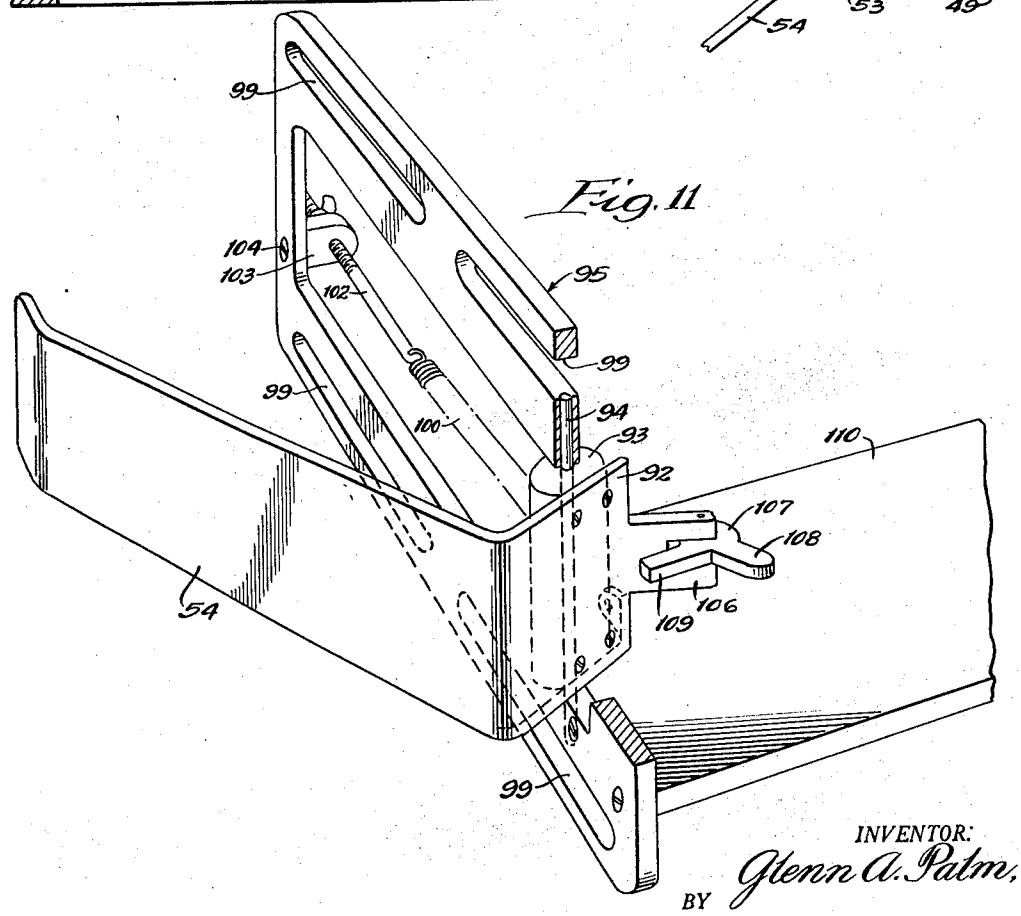


Fig. 11

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2,850,993

PACKAGING APPARATUS

Glenn A. Palm, Chicago, Ill., assignor to Metal Specialties Mfg. Co., Melrose Park, Ill., a corporation of Illinois

Application December 3, 1954, Serial No. 472,915

6 Claims. (Cl. 112—11)

This invention relates to packaging apparatus, and is particularly related to apparatus for closing bags and applying labels thereto.

In packaging bulk commodities such as grain, animal feed, etc., the material is first fed into bags in measured amounts, and the bags are thereafter carried through machinery that is operative to seal the open upper end thereof. The bag closing or sealing operation may be brought about by sewing together the sides of the bag adjacent the top thereof. Ordinarily, one company may package a number of different types of grain or feeds, and it is now necessary for that company to store large numbers of bags, each bag being prelabeled with appropriate indicia that may indicate source, brand name, ingredients, etc. That is to say, bags for packaging bulk material have all of the advertising information, brand name, etc. imprinted thereon when received by the packaging company.

This imposes a considerable burden upon the packager for it will be appreciated that he must stock bags for each type of commodity that he will package. Thus, vast storage areas are required, and further it frequently happens that changes are made in the information or indicia imprinted on the bags, and if the change is substantial it may mean that an entire supply of bags stored by the packager must be discarded. This is quite expensive for bags may cost as much as 17¢ to 18¢ a piece, and are frequently stored in quantities of 100,000 or more.

This problem could be obviated if some means were available for equipping unlabeled bags with appropriate labels indicating brand, ingredients, etc. at the time that the bags are closed. If this were possible, then the packager would not be required to store such large numbers of bags, and there would be no problem of discarding bags that were not imprinted with the appropriate indicia. However, heretofore no means to accomplish this result has been available.

It is, accordingly, an object of this invention to provide apparatus for closing and applying labels to bags. Another object of the invention is to provide apparatus for closing the open upper ends of filled bags and for simultaneously applying an appropriate label to the bag as a part of the closure operation. Still another object is in providing apparatus wherein bags that are filled with bulk material are advanced into sewing machinery that is operative to sew closed the open upper ends of the bags, and at the same time sew labels onto the bags at the point of closure thereof.

A further object of the invention is in the provision of apparatus that automatically sews closed the open upper ends of bags filled with bulk commodities such as grain, etc. and that, as part of the same sewing operation, affixes labels to the bags, the apparatus functioning to sever the labels from a continuous label strip automatically and in appropriate lengths for accommodating the bags to which they are affixed. Additional objects and advantages will appear as the specification proceeds.

An embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a broken perspective view showing the apparatus; Figure 2 is a broken top plan view showing a portion of the apparatus; Figure 3 is a schematic wiring diagram of the control circuit; Figure 4 is a broken perspective view showing the label severing portion of the apparatus; Figure 5 is a perspective view of the severing knife; Figure 6 is a broken top plan view of the severing blade illustrated in Figure 5; Figure 7 is a perspective view of the label guide; Figure 8 is a broken side view in elevation of the guide illustrated in Figure 7; Figure 9 is a broken top plan view with parts shown in section of a portion of the control mechanism; Figure 10 is a broken top plan view partly in section showing an alternate position of the control mechanism illustrated in Figure 9; and Figure 11 is a broken perspective view with portions in section of the control mechanism illustrated in Figures 9 and 10.

Reference will first be made to Figure 1 in particular which shows the mechanism in its entirety. The apparatus comprises a base member designated generally with the numeral **10**, and that provides a bed plate **11** having a conveyor **12** hung thereon. The conveyor comprises an endless belt **13** entrained at one end about a roller **14** and similarly entrained at its other end about a drive roller not shown. It will be apparent that conventional drive means will be provided for rotating the drive roller to move the endless belt **13** in the direction shown by the arrow in Figure 1. If desired, the roller **14** may be adjustably carried by the adjustable arm **15** so that the roller can be moved to tighten or loosen the endless belt.

The conveyor **12** is equipped with a frame **16** having flanges or wall members **17** and **18** extending upwardly therefrom and along the longitudinal edges of the endless belt **13**. The frame **16** is carried by the hangers **19** and **20** that are generally L-shaped and provide legs **21** and **22** that rest upon the bed **11** of the base member. As is shown in Figure 1, the legs **21** and **22** are slotted so that they can receive the bolts **23** and **24** that are threadedly received within the bed **11**, and thereby adjustably anchor the hangers upon the bed. The conveyor **12**, and particularly the endless belt **13** thereof, functions to carry bags **25** from a source of supply to the closing apparatus that will be subsequently described. A bag **25** is shown in phantom in Figure 1.

A standard **26** is rigidly secured to the bed plate **11** and extends upwardly therefrom. The standard in turn carries a support **27** that is rigidly secured to a sewing machine **28**. The sewing machine is substantially conventional and is provided with a head **29** that carries the usual needle **30** (Figure 2) that is reciprocated through appropriate and conventional drive mechanism provided by the sewing machine **28**, and which is not illustrated in the drawings. The sewing machine also provides a base or anvil **31** having a serrated advancing member **32** (Figure 2) that is operative to advance material through the machine as is well known in the art. The reciprocating member **32** is also driven by suitable drive means provided by the machine **28** and which is not shown. The sewing machine is equipped with a pulley wheel **33** having a belt **34** entrained thereabout that is driven through conventional and well known motor apparatus that is not shown since it forms no essential part of this invention. The sewing machine has the usual thread guides **35** and tensioning thread guides **36** and **37** through which thread is fed to the needle **30**.

Mounted upon the sewing machine **28**, and in substantially parallel alignment with the head **29** thereof, is a label severing mechanism that is designed generally with the numeral **38**, and which will be subsequently de-

scribed in detail. It is also apparent in Figure 1 that a holder 39 is provided for rotatably supporting a roll 40 from which an endless label strip 41 is fed. The holder 39 is equipped centrally with a stub shaft 42 that extends through an opening provided centrally in the roll 41. The holder also provides an annular flange 43 having a discharge opening 44 through which the endless strip 41 is fed. The holder 39 is supported above the machine 38 upon an arm 45 having a downwardly turned portion 46 secured to the support member 27. The arms 45 and 46 may be reinforced by the cross member 47. A guide 48 mounted adjacent the needle 30 delivers the endless strip 41 along the top of the bag 25.

It is also apparent from Figure 1 that a guide wall 49 extends along the conveyor 12 and in spaced relation therewith. The bags 25 being advanced by the endless belt 13 rest against the guide wall 49. At the end of the guide wall 49 adjacent the discharge end of the belt 13, the guide wall is provided with an outwardly and forwardly angled abutment member 50 that functions to guide closed and labeled bags from the endless belt 13. If desired, the forward wall 51 of the abutment member may be hinged and equipped with an adjusting screw 52, so that the angle that the wall 51 forms with the guide wall 49 can be varied as desired.

The guide wall 49 is provided with an opening 53 therein adjacent the lower edge thereof. A lever 54 extends outwardly through the opening 53, and through appropriate circuits and operating mechanism functions to actuate the label severing apparatus 38 in a manner that will be described hereinafter.

As is shown best in Figure 2, bags 25 that are filled with material and that have an open upper end are advanced along the conveyor 12, and the side walls of the bag are advanced between the anvil 31 of the sewing machine and the guide 48, and ultimately under the foot 55 provided by the sewing machine and which is moved toward the anvil 31 and particularly the reciprocating member 32 thereof by a plunger 56. The walls of the bag are thereby held together so that reciprocation of the needle 30 will cause the same to puncture and penetrate the walls of the bag and carry thread thereto in a sewing operation, all as is well known in the art. At the same time, the label strip 41 which is drawn through a guide roller assembly 57 (Figure 1) is advanced through the guide 48 and is discharged through the inner end thereof along the upper edge of the bag 25. Thus, the needle 30 in its reciprocatory movement punctures both the walls of the bag and the label 41, and while sewing closed the bag also sews the label thereto.

The guide is seen best in Figures 7 and 8, and comprises elongated section 58 that is turned laterally at one end as is shown at 59. The guide is provided with a channel or passage 60 extending therethrough that opens forwardly and laterally, as shown at 61, to deliver the endless label strip 41 contiguous to the upper end of the bag 25. The guide member 48 has a support member 62 releasably secured thereto by cap screws 63, and the member serves as a means for mounting the guide upon the sewing machine so that it is rigidly held in the position illustrated in Figure 2.

The label severing apparatus 38 comprises an air cylinder 64 having the usual piston mounted for reciprocatory movement therein, and that is equipped with a ram 65. The piston within the cylinder 64 is reciprocated by supplying air under pressure alternately to the opposite ends thereof through the solenoid controlled valve 66 that is connected through a conduit 67 to a suitable source of air under pressure. The ram 65 is rigidly secured to a bar 68 that carries a pair of spaced-apart parallel rods 69 and 70 that, at their forward end portions, are rigidly connected to a blade carrier 71 that is provided with a pair of spaced-apart legs 72 and 73. The carrier member 71 provides a mounting for a knife 74 that is secured thereto by the set screws 75 and 76. With this arrangement, reciprocation of the piston and the ram 65 causes the knife 74 to move toward and away from a stationary knife blade 77 that is rigidly carried by the anvil 31 of the sewing machine. If desired, the screws 78 and 79 may be used to secure the stationary knife 77 to the anvil of the sewing machine.

It is apparent from Figure 5, and also from Figure 6, that the forward or sharpened edge of the stationary blade 77 is adapted to slide into the spaces 80 and 81 provided between the leg 72 of the carrier and leg 82 of the knife 77, and between the leg 73 of the carrier and leg 83 of the blade 74. Such movement causes the sharpened edges of the knife blades 74 and 77 to engage each other and to sever the label strip 41 as is shown in Figure 4.

A bracket 84 is secured to the head 29 of the sewing machine and encloses a portion of the rods 69 and 70. Similarly, a shield 85 extends outwardly and over the rods 69 and 70 and is carried by the head 29 of the machine. A switch 86 is rigidly secured to the bracket 84, and is provided with a switch lever or push button 87 that is adapted to be actuated through engagement with the threaded set screw 88 that is adjustably carried by the bar 68. Engagement between the button 87 and threaded plunger 88 is brought about at the instant that the knife blades 74 and 77 meet to sever the label strip 41. It will be apparent that the instant at which the switch 86 is tripped can be adjusted by changing the axial position of the threaded set screw within its nut 89 that is secured to the bar 68.

It will be apparent from what has been said that the air cylinder 64 is a two-way cylinder and is moved in one direction to engage the knife blades 74 and 77 when pressure fluid is supplied to the outer end thereof through the solenoid controlled valve 66, and is operative to separate the knife blades as shown in Figure 4 when pressure fluid is supplied to the opposite end thereof, also through the solenoid valve 66. Movement of the piston to separate the knife blades is brought about by actuation of the switch 86 when the button 87 thereof is depressed. Actuation of the cylinder so as to move the knife blades into severing relation is brought about by actuation of a switch 90 that is equipped with a depressible button 91 (Figures 9 and 10). The switch 90 is actuated when a bag has been moved through the sewing machine and has had the open upper end thereof sewn closed and has had a label affixed thereto, as is seen by the bag 25 illustrated in Figure 4. The manner in which the switch 90 is actuated will now be described.

As has been seen in Figure 1, the guide wall 49 is provided with an opening 53 through which a lever or arm 54 extends outwardly and over the endless conveyor belt 13. The arm 54 is turned laterally and inwardly at its inner end, as shown at 92, and that end portion of the arm is rigidly secured to a rotatable shaft 93 having an axle 94 extending therethrough. The axle is journaled in appropriate passages provided in a mounting plate 95 that, as is shown in Figure 9 in particular, is rigidly secured by means of cap screws 96 and 97 to a carrier plate 98 that is welded or otherwise rigidly secured to the guide wall 49 on the inner side thereof. The member 95 is slotted as is shown at 99, and since shanks of the cap screws 96 and 97 extend therethrough, the precise position of the member 95 relative to the guide wall 49 can be changed as desired.

The arm 54 is spring biased so that it extends outwardly and angularly over the conveyor belt 13 by means of a coil spring 100 that, at one end, is secured to a hook member 101 carried by the arm, and that at its other end is secured to an adjusting pin 102 that is threadedly received within a boss 103 secured to the member 95 by a screw 104. Tension on the spring 100 can be varied by simply changing the axial position of the pin 102 by rotating it relative to the threaded boss 103. A winged

lock nut **105** threadedly receiving the pin **102** therein may be utilized to lock the pin in any selected axial position relative to the boss **103**.

The inner end portion **92** of the arm **54** is equipped with a bifurcated lug **106** that pivotally carries between the spaced legs thereof a key **107**. As is seen in Figures 9 and 10, the key **107** has angularly oriented legs **108** and **109** that are adapted to engage the plunger **91** of the switch **90** when the arm **54** is swung inwardly toward the guide wall **49**. Such movement depresses the plunger **91** and actuates the switch **90**. As is shown best in Figures 9 through 11, the switch **90** may be mounted upon a plate **110** that, in turn, is rigidly secured by screws or other suitable means to the carrier member **95**.

As is illustrated best in Figure 3, the solenoid controlled valve **66** is provided with a pair of solenoid coils **111** and **112** that are connected respectively through the reset switch **86** to the secondary coil **113** through the trip switch **90** to the secondary of the transformer **114**. The primary winding **115** of the transformer is connected to a suitable source of power such as a 110-volt A. C. line.

Operation

In operation of the apparatus, bags **25** that have been filled with material, and that must have the open upper ends thereof closed, are fed either mechanically or manually onto the endless belt **13** that, at the same time, is being driven through appropriate apparatus. At the same time, the drive means for the sewing machine **28** is actuated and it is thereby conditioned for a sewing operation. As the bags advance between the anvil **31** and guide **48**, and ultimately between the foot **55** and reciprocating member **32** of the sewing machine, the walls of the bag are sewed together by the needle **30**. At the same time, the endless label strip **41** will be fed through the guide **48** and into contiguous relation with the open end of the bag **25**, so that the label will be secured to the bag as it is being sewn closed.

The conveyor **13** will be generally synchronized with the sewing machine **28** so that the bags **25** will be advanced uniformly through the sewing machine. The bag will continue to be advanced by the belt **13** after a sewing operation has been completed and the open end thereof closed and a label affixed thereto. This advancement of the bag will continue to draw the endless label strip **41** from the apparatus.

Ultimately, the advancing bag **25** will engage the lever arm **54**, as is shown best in Figure 2, and will swing it inwardly toward the guide wall **49**. Inward movement of the arm **54** will cause the switch **90** to be tripped, completing the circuit through the solenoid coil **112**. Fluid under pressure will then be supplied through the valve **66** to the outer end of the air cylinder **64**, and the blade **74** of the severing knife will be advanced into relation with the stationary blade **77**, as is shown in Figure 2, and the label strip **41** will be severed together with the thread used to sew it to the bag. The bag **25**, however, is still being moved along the conveyor and will engage the angular wall **51** of the abutment member **50**, and the bag will be pivoted outwardly thereby so as to release the arm **54**. Because of the construction of the key **107** that is carried by the arm **54** and that trips the switch **90**, return movement of the arm under the biasing influence of spring **100** will release the switch **90** and break the circuit through the solenoid coil **112**. The bag **25** will be guided off of the conveyor belt **13** by the abutment member **50**, where it will be loaded onto trucks, etc. for removal.

When the circuit through the solenoid coil **112** is broken, the circuit through solenoid coil **111** will be completed because the reset switch **86** will be tripped when the severing knife is moved into the label severing position shown in Figure 2. Thus, the outer end of the air cylinder will be exhausted through the valve **66**, and at the same time pressure fluid will be supplied to the inner end of the cylinder to drive the piston thereof outwardly and move the severing knife into the position shown in Figure 4. At this moment, a subsequent bag **25** is moving into position to be closed by the sewing machine.

It is apparent that the apparatus described is operative to automatically close the open upper ends of bags and simultaneously therewith, and as part of the same sewing operation, to affix a label to the bag. The label is provided by an endless label strip drawn from a parent roll, and it is advanced automatically through the apparatus and severed automatically into appropriate lengths after it has been secured to the bag. The labels can carry any desired indicia which may be, for example, written information or in the form of colors, etc. Therefore, users of the equipment are not required to store large numbers of bags for each different type of commodity packaged and for each different brand name, etc. Instead, a single type of bag may be stocked, for the labels that can designate source and ingredients, etc. are affixed to the bags as they are closed. Therefore, if different batches of a commodity are being packaged, or if the commodity is being packaged for different retail sources, it is only necessary to change the label roll rather than the bag, and that is a simple operation requiring only that one roll be lifted from the spindle **42** and replaced with another, and further requiring only that the new label strip be threaded through the rotatable guide **57** and through the guide member **48**.

While in the foregoing specification an embodiment of the invention has been set out in considerable detail for purposes of illustration, it will be readily apparent to those skilled in the art that numerous changes may be made in those details without departing from the spirit and principles of the invention.

I claim:

1. In bag closure and label affixing apparatus wherein bags are advanced by a conveyor through a sewing machine, and wherein a continuous label strip is sewn onto a bag as it is advanced through the machine, a severing knife unit adjacent the outlet end of said machine and arranged to sever a label strip portion secured to a bag from the continuous label strip comprising a fluid pressure actuated cylinder equipped with a plunger having a knife blade affixed thereto, a stationary knife blade adapted to be engaged by said first-mentioned knife blade upon actuation of said plunger, a valve for controlling the supply of fluid pressure to said cylinder, a solenoid for controlling said valve and circuit means for said solenoid including switches adapted to be actuated in accordance with the movement of a bag along said conveyor, one of said switches being mounted along said conveyor for actuation by the movement of a bag therealong and the other of said switches controlling said solenoid so as to return said plunger to retracted position, that switch being mounted adjacent said plunger and adapted to be actuated by the movement thereof into a label severing position.

2. The apparatus of claim 1 in which said first-mentioned switch comprises a plunger and an actuating lever therefor, said actuating lever being pivotally mounted with a portion thereof extending outwardly and generally across said conveyor, spring biasing means for holding said actuating lever in released position, and a pivotal finger carried by said actuating lever and being engageable with said plunger to depress the same when the actuating lever is pivoted laterally by the movement of a bag along said conveyor.

3. The apparatus of claim 1 wherein said second-mentioned switch is equipped with a plunger, and in which the plunger for said fluid pressure cylinder is provided with an adjustable pin engageable with the plunger of said second-mentioned switch when the knife blades are in strip-severing engagement.

4. The apparatus of claim 1 in which said plunger is equipped adjacent the outer end thereof with a carrier

member having offset, spaced-apart legs, one of said cutting knives being rigidly mounted upon said carrier member and in spaced relation with the offset legs thereof, the other of said cutting knives being receivable between the spaces defined between the offset legs and the cutting knife secured to said carrier member.

5. In label affixing and bag closing apparatus, a conveyor adapted to receive bags thereon and to advance the same from one position to another, a sewing machine having a head oriented in substantial parallel alignment with said conveyor intermediate the ends thereof and being adapted to receive the upper end of a bag being advanced by said conveyor, said sewing machine being operative to sew closed the open upper end of a bag advanced therethrough, a spindle support member carried by said apparatus and being adapted to rotatably receive a roll of indicia labels, an elongated guide member having a passage therethrough and being turned laterally at its inner end to provide a discharge outlet adjacent and extending along the line followed by the open end of a bag advanced through said sewing machine, said guide member being adapted to have an endless indicia strip drawn therethrough from said spindle, a power actuated severing knife assembly arranged to sever indicia portions that are secured to a bag from such endless indicia strip, and control means for actuating and releasing the severing knife unit, said control means comprising an actuating switch operatively arranged with said power driven severing knife unit and being oriented along said conveyor for actuation by a bag advanced by said conveyor and subsequent to a sewing operation, and a reset switch operatively arranged with said unit and being actuated by the movement thereof into strip severing position to return the unit to released condition.

6. In label affixing and bag closing apparatus, a conveyor adapted to advance open-ended bags therealong with the open ends thereof upwardly oriented, a sewing machine mounted in spaced relation above said conveyor and intermediate the ends thereof, said sewing machine having a head equipped with sewing means, means carried by said apparatus for supporting an elongated strip of labels, a label guide having a passage therein for passing a label strip therethrough, said guide having an outlet end adjacent said sewing means and facing in the direction of advance of said conveyor for directing a label strip into contiguous relation with the open end of a bag advancing therepast, a severing knife unit having a fixed blade carried by said apparatus adjacent one side of said conveyor and a movable blade supported by said sewing machine, said unit being positioned adjacent the discharge end of said sewing means, and power control means for reciprocating said movable blade into and out of engagement with said stationary blade to sever a label interposed therebetween, said power means comprising an actuating switch mounted along said conveyor adjacent the discharge side of said sewing means for engagement with a bag being advanced therethrough, said actuating switch being arranged with said power means for energizing the same to move said movable blade into engagement with said stationary blade, and a reset switch carried by said head and being actuated by the movement of said movable blade into engagement with said stationary blade and being arranged with said power means for returning said movable blade to its initial position in spaced relation with the stationary blade.

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