April 2, 1963 G. L. ORME 3,083,742

BINDING MACHINE

Filed June 16, 1958

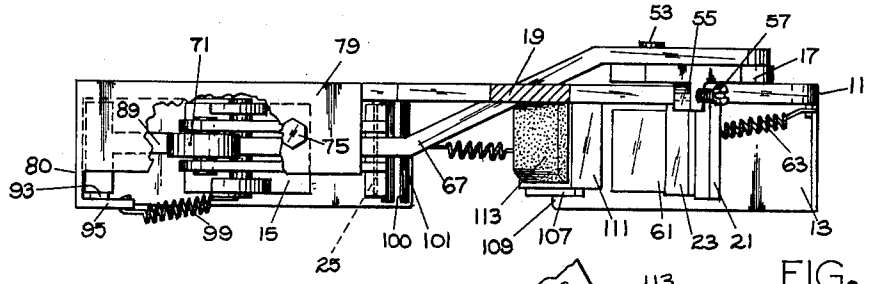


FIG. 2

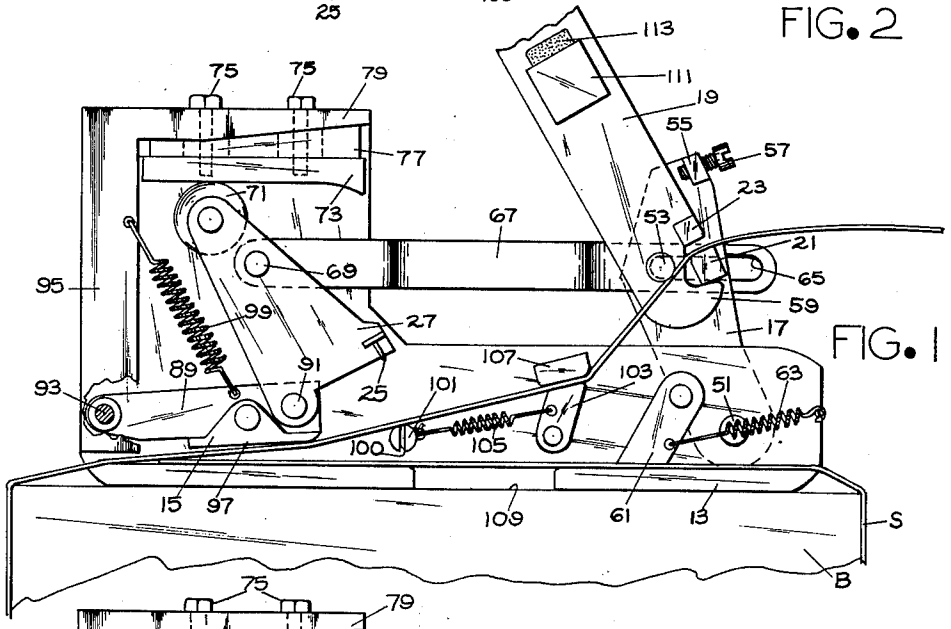


FIG. 1

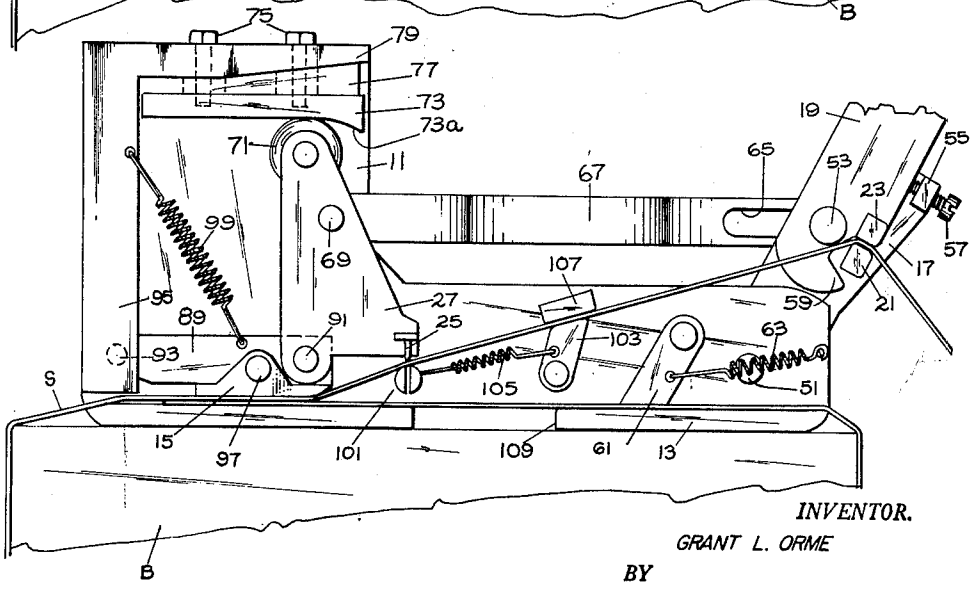


FIG. 3

INVENTOR.
GRANT L. ORME
BY
BUCKHORN, CHEATHAM & BLORE
ATTORNEYS

United States Patent Office 3,083,742 Patented Apr. 2, 1963

3,083,742

BINDING MACHINE

Grant L. Orme, Finn Rock, Oreg.

Filed June 16, 1958, Ser. No. 742,072
3 Claims. (Cl. 140—93.2)

This invention relates to binding machines for tightening a strap or other elongated binding element around an article or articles of commerce to be bound and then securing together adjacent end portions of the taut binding element to provide the desired bound package.

It is a main object of the present invention to provide a single machine for accomplishing the above function.

Another object of the invention is to provide a machine as just described having a single handle by which all the desired operations may be carried out upon operation of the handle.

A further object of the invention is to provide a machine of the type just described capable of use with a roll or long length of binding element, which machine is operable to cut off a section of the binding element after the element has been tightened and secured around the article or articles to be bound, so that it is not necessary to cut the binding element into sections prior to application to the article or articles to be bound.

Various other objects of the invention will be apparent from the following description taken in connection with the accompanying drawings wherein:

FIG. 1 is a side elevational view of a machine embodying the concepts of the present invention, showing the machine resting on a package to be bound, and showing the parts in the positions they occupy at the commencement of a cycle of operation;

FIG. 2 is a top view of the machine; and

FIG. 3 is a view similar to FIG. 1 but showing a subsequent stage of operation.

General Description

The particular embodiment of the invention disclosed is adapted to tighten a paper strap about a bundle to be bound, and to press overlapped adhesively covered portions of the strap together to effect a bond between such portions. However, the machine could with minor modifications to be described hereinafter, handle other types of binding element, such as, heat sensitive plastic strip, steel tape, wire, cord, and the like.

The machine shown has a frame including an L-shaped upright wall **11** and a laterally projecting horizontal integral cantilever base **13**. The machine is placed on or is supported just above a bundle B to be bound, and a section of strap S is manually wrapped around the article in a manner to be presently described more in detail so that an end of the strap is below a presser foot **15**, the strap thereafter passing around the bundle and then again under the presser foot to provide a return portion overlying the end of the strap. Then the strap passes through the machine to the supply, not shown. The end of the strap beneath the foot **15** is coated on its upper face with an adhesive material prior to the strap being passed around the bundle. An articulated handle having a lower portion **17** and an upper portion **19** is swingable from the position shown in FIG. 1 to the position shown in FIG. 3 to (1) first grip a portion of the strap between a pair of jaws **21** and **23** on the handle parts **17** and **19**, respectively, then (2) draw the strap tightly about the bundle, then (3) pull the presser foot **15** downwardly to press the upper strap portion against the lower adhesively coated strap end, and then (4) cut off the strap by means of a knife **25** mounted on a knife carrier **27**. During the movement of the handle from its left-hand to its right-hand position, the jaws

21 and **23** allow controlled slipping of the strap through the jaws after the proper tension of the strap about the bundle is achieved.

The adhesive material utilized is of quick drying variety and thus the machine may be readily and immediately removed from the package or vice versa, by shifting the machine and package relatively sideways relative to one another to remove the base **13** from under the strap around the package.

Specific Description

The lower part **17** of the handle is pivoted at **51** on the back face of the wall **11** and is pivotally connected by a pin **53** to the upper handle part **19**. The lower handle part has a lug **55** projecting laterally at the upper portion thereof, and a regulating screw **57** is threadedly received through the lug **55** and in position to engage the lower portion of the upper handle part **19** at a place above the pivot pin **53**. The screw **57** therefore limits clockwise movement of the upper handle part **19** relative to the lower handle part **17**.

The lower jaw **21** is fixed to the lower handle part **17** whereas the upper jaw **23** is fixed to the upper handle part **19** at a place adjacent the pivot **53**. The upper handle part **19** has a hook **59** formed on the lower portion thereof engaging the jaw **21** on the lower handle part **17**. This limits the counterclockwise movement of the handle part **19** relative to the handle part **17**.

It is apparent from the description of the handle that upon clockwise movement of the upper handle part **19**, the upper jaw **23** moves toward the lower jaw to grip the strap S therebetween. By appropriate adjustment of the screw **57**, the amount of pressure can be regulated.

The opposed faces of the jaws **21** and **23** are slightly rounded so that the strap S can slip between the jaws after the pressure determined by the position of the screw **57** is achieved. In other words, after the tension on the bundle reaches the desired amount, the strap will slip between the jaws rather than breaking the strap or excessively tightening the strap about the bundle.

It is pointed out at this time that the free end of the strap is kept beneath the presser foot **15** at the time the strap is being tightened by a pawl **61** which is urged by a spring **63** in a counterclockwise direction and thus enables the strap to be passed beneath the pawl in a direction from right to left, but prevents retraction of the strap in a direction from left to right.

The pin **53** of the handle fits in a long slot **65** formed in the right-hand end of a link **67**, which is bent, as best shown in FIG. 2, to pass over the wall **11**. The slot provides a lost motion connection between the link and the handle. The left-hand end of the link is pivoted at **69** to the knife carrier **27** adjacent the upper end thereof. The carrier comprises a pair of spaced plates, which for convenience are both identified by the reference numeral **27**. The link **67** fits between these plates. Journaled between the upper ends of the knife carrier plates above the link **67** is a roller **71** engaging a track member **73**. The track member is supported by screws **75** which thread into the track member and extend through slots in a wedge member **77** and also through a laterally extending top ledge portion **79** of the frame of the machine. The longitudinal position of the wedge member determines the spacing between the foot **15** and the base **13** and thus determines the pressure applied to the overlapped strap portions. By loosening the screws **75**, the position of the wedge member may be changed and then held by again tightening the screws.

If desired, the wedge member may have threaded studs projecting through an end wall **80** of the frame, and nuts could be provided on the studs to assure against

accidental displacement of the wedge member from a particular position in which it has been set.

The lower end portions of the knife carrier plates **27** straddle the right-hand end of a presser foot arm **89** and are pivoted at **91** thereto. The left-hand end of the presser foot arm is pivoted at **93** between the wall **11** and a front wall plate **95** secured to the end wall **80** of the frame. Adjacent its right-hand end, the presser foot arm **89** is pivotally connected at **97** to the presser foot **15**. A spring **99** urges the presser foot arm in a counterclockwise direction.

The knife **25**, previously mentioned, is disposed above a slot **100** in an anvil **101** over which the strap passes. The anvil is secured to the wall **11**.

In addition to the pawl **61**, a pawl **103** is provided and urged by spring **105** in a counterclockwise direction toward a lug **107**. The purpose of this pawl will presently be explained.

The base member **13** is recessed at **109** to enable an end of the strap S, formed after a cutting operation, to be readily grasped for a subsequent cycle of operations.

An adhesive applicator in the form of a container **111** and an adhesive impregnated sponge **113** is mounted on the handle part **19** to be disposed in a convenient location relative to the operations to be carried out.

The operation of the device is as follows. The strap is assumed to be in the position shown in FIG. 1 with its adhesively coated end beneath the presser foot **15** and on the base **13**, and then extending under the pawl **61** and around the bundle and again under the foot **15**, then over the anvil **101**, between the pawl **103** and the lug **107** and between the jaws **21** and **23** to the supply.

The first movement of the handle part **19** to the right brings the handle part against the screw **57** and brings the jaw **23** against the strap S to apply a predetermined pressure to the strap. Further clockwise movement of the handle pulls the strap S tightly around the bundle, the pawl **61** holding the end portion of the strap on the base **13** in place and against movement. This tightening of the strap is accomplished with the presser foot **15** raised because the pivot pin **53** merely moves along the slot **65** without moving the link **67**.

Still further clockwise movement of the handle does pull the link **67** to the left and thus causes clockwise movement of the carrier **27**. The carrier now acts as a push rod to swing the presser foot in a clockwise direction to firmly press the overlapped strap portions together and effect a joint therebetween. Maximum pressure occurs just as the line extending through the pin **91** and the axis of the roller **71** reaches a vertical position. The knife **27** has not as yet engaged the strap S.

Still further movement of the handle moves the carrier over center and in engagement with a curved portion **73***a* of the track member. This portion has the axis of the pin **91** as its center of curvature. Thus there is no further downward movement of the foot **15** as the carrier swings beyond the position shown in FIG. 3, but the knife is forced through the strap and into the anvil slot **100** to sever the strap. Thus the pressure of the foot **15** is maintained constant during the entire cutting movement of the knife **25**.

During the movement of the handle from left to right the strap will slip between the jaws **21** and **23** when the desired tension in the strap has been reached.

The bundle B is now securely bound and the machine is moved rearwardly to remove the base **13** from under the strap S to facilitate the binding of a second bundle. The spring **99** assists the return of the handle to its initial position. The newly cut end of the strap S held by the pawl **103** may be readily grasped because of the recess **109** in the base **13** and pulled to the left to provide a new portion of strap for passage about the second bundle. The new strap end is wiped across the sponge **113** to coat the proper face thereof with adhesive material. The adhesive applicator is merely illustrative and other forms, such as a roller type could be employed.

The invention is not intended to be limited to the particular linkage shown between the handle and the knife **25** and foot **15**, as other linkages could be used. Also, the invention is not intended to be limited to a paper strap binding machine, since the foot **15** and the base **13** could readily be adapted for securing parts of other types of binding elements together. For instance, an electrical heating element could be incorporated in the foot **15** or in the base **13**, or in both to effect the securement of parts of a heat sensitive binding element together. Or a spot welding head could be provided on the foot or base **13** to secure parts of a steel strap or wire together. It is believed unnecessary to explain other adaptations since these will readily be known to those skilled in the art.

The term "bundle" has been used in the specification to designate the article or articles to be wrapped, but the term "object" will be used in the claims to designate whatever it is that is to be bound, whether a single article or several articles.

In the event there is considerable slack in the strap S at the commencement of a cycle of operation, the handle may be pumped back and forth within the limits of movement provided by the slot **65** to take up this slack. During the pumping operation the pawl **103** permits the strap to be pulled therepast to the right but prevents movement of the strap to the left, thus retaining the strap immovable during counterclockwise movement of the handle.

Having described the invention in what is considered to be the preferred embodiment thereof, it is desired that it be understood that the invention is not to be limited other than by the provisions of the following claims.

I claim:

1. A binding machine for (*a*) tightening an end portion of a flexible binding element about an object to be bound, (*b*) securing the end of said portion to a return part of the element and, (*c*) cutting off the portion to separate it from the remainder of such element, said machine comprising a frame for positioning near the end of said portion and next to said object, a single operating handle mounted on said frame for pivotal movement about a single fixed axis, said handle having means for gripping said element in spaced relation to said pivotal axis of said handle to enable tensioning of the binding element when said handle is moved in one direction, a mechanism for effecting the securement of said end of said portion to said return part, a cut-off mechanism, said securement mechanism being pivotally mounted on said frame, said cut-off mechanism being pivotally connected to said securement mechanism, a linkage between said handle and said cut-off mechanism to pivot the cut-off mechanism to its operative position during pivotal movement of said handle, and means whereby the pivotal movement of said cut-off mechanism causes operation of said securement mechanism in advance of the complete operation of said cut-off mechanism.

2. A binding machine for (*a*) tightening an end portion of a flexible binding element about an object to be bound, (*b*) securing the end of said portion to a return part of the element and (*c*) cutting off the portion to separate it from the remainder of such element, said machine comprising a frame for positioning near the end of said portion and next to said object, a single operating handle mounted on said frame for pivotal movement about a single fixed axis, said handle having means for gripping said element in spaced relation to said pivotal axis of said handle, a presser foot mechanism mounted on said frame for pivotal movement about a single fixed axis and operable when actuated for pressing two portions of said binding element together for the purpose of securing such portions together, a cut-off member pivotally connected to said presser foot mechanism in spaced

relation to the pivotal axis of said presser foot mechanism, a link pivotally connected to said cut-off mechanism and having a lost motion connection with said handle whereby the cut-off mechanism is pivoted after the binding element is tensioned, a fixed anvil member adjacent said cut-off member, means on said frame for forcing said cut-off member toward said anvil and said presser foot member toward its fully operative position upon pivotal movement of said cut-off member, said anvil being spaced from said cut-off member a distance sufficient to enable said presser foot mechanism to reach its fully operative position before said cut-off member reaches its fully operative position.

3. A binding machine for (*a*) tightening an end portion of a flexible binding element about an object to be bound, (*b*) securing the end of said portion to a return part of the element and (*c*) cutting off the portion to separate it from the remainder of such element, said machine comprising a frame for positioning near the end of said portion and next to said object, a single operating handle mounted on said frame for pivotal movement about a single fixed axis, said handle having means for gripping said element in spaced relation to said pivotal axis of said handle, a presser foot mechanism mounted on said frame for pivotal movement about a single fixed axis and operable when actuated for pressing two portions of said binding element together for the purpose of securing such portions together, a cut-off member pivotally connected to said presser foot mechanism in spaced relation to the pivotal axis of said presser foot mechanism, a link pivotally connected to said cut-off mechanism and having a lost motion connection with said handle whereby the cut-off mechanism is pivoted after the binding element is tensioned, a fixed anvil member adjacent said cut-off member, said cut-off mechanism carrying a roller engaging a cam surface on said frame for causing movement of said cut-off member and said presser foot mechanism toward their fully operative positions upon pivotal movement of said cut-off member.

References Cited in the file of this patent

UNITED STATES PATENTS

1,778,530	Kool	Oct. 14, 1930
2,036,866	Frost	Apr. 7, 1936
2,076,276	Porter	Apr. 6, 1937
2,336,264	Leslie	Dec. 7, 1943
2,622,844	Abbott	Dec. 23, 1952
2,643,687	Schlage et al.	June 30, 1953
2,651,900	Heilman	Sept. 15, 1953
2,779,566	Keeble	Jan. 29, 1957