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[54] AUTOMATIC STUFFER FOR SLEEPING BAGS

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[52] **U.S. Cl.** **53/258,** 53/125

[51] **Int. Cl.** **B65b 5/00, B65b** 39/00

[58] **Field of Search** 53/125, 255, 258, 259

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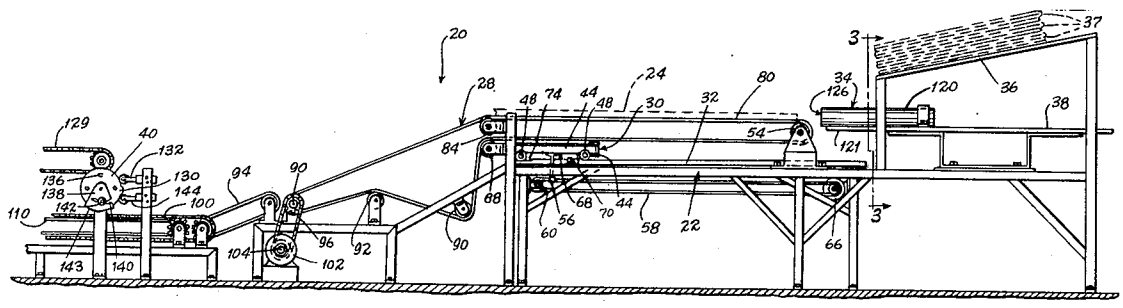
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[57] **ABSTRACT**

A machine for automatically stuffing a sleeping bag batting into an empty ticking. The machine comprises a reversible carriage which is adapted to receive a cut-to-length batting from a feed conveyor and carry it into an empty ticking with the carriage contacting the closed end of the ticking stretched over a funnel which receives the batting in such a fashion that the ticking is pulled inside out to cover the batting. After carrying the batting into the ticking, the carriage is reversed to receive another batting length. A stuffing conveyor is designed to transfer the batting from the feed conveyor into overlying relation with the carriage which is elevatable in its batting-receiving position to take the batting off the conveyor and then transfer it into the ticking. The stuffing conveyor is controlled to move the batting at a greatly faster rate of speed than the feed conveyor in order to provide ample time and space for working. Special control means comprising a timer disc or wheel is synchronized with the speed of the feed conveyor to operate the carriage and the supplementary stuffing conveyor with means for adjusting the control or timer disc to accommodate different lengths of batting. Limit switch control means are further provided for reversing the carriage and stopping it for the next batting-receiving operation.

17 Claims, 15 Drawing Figures



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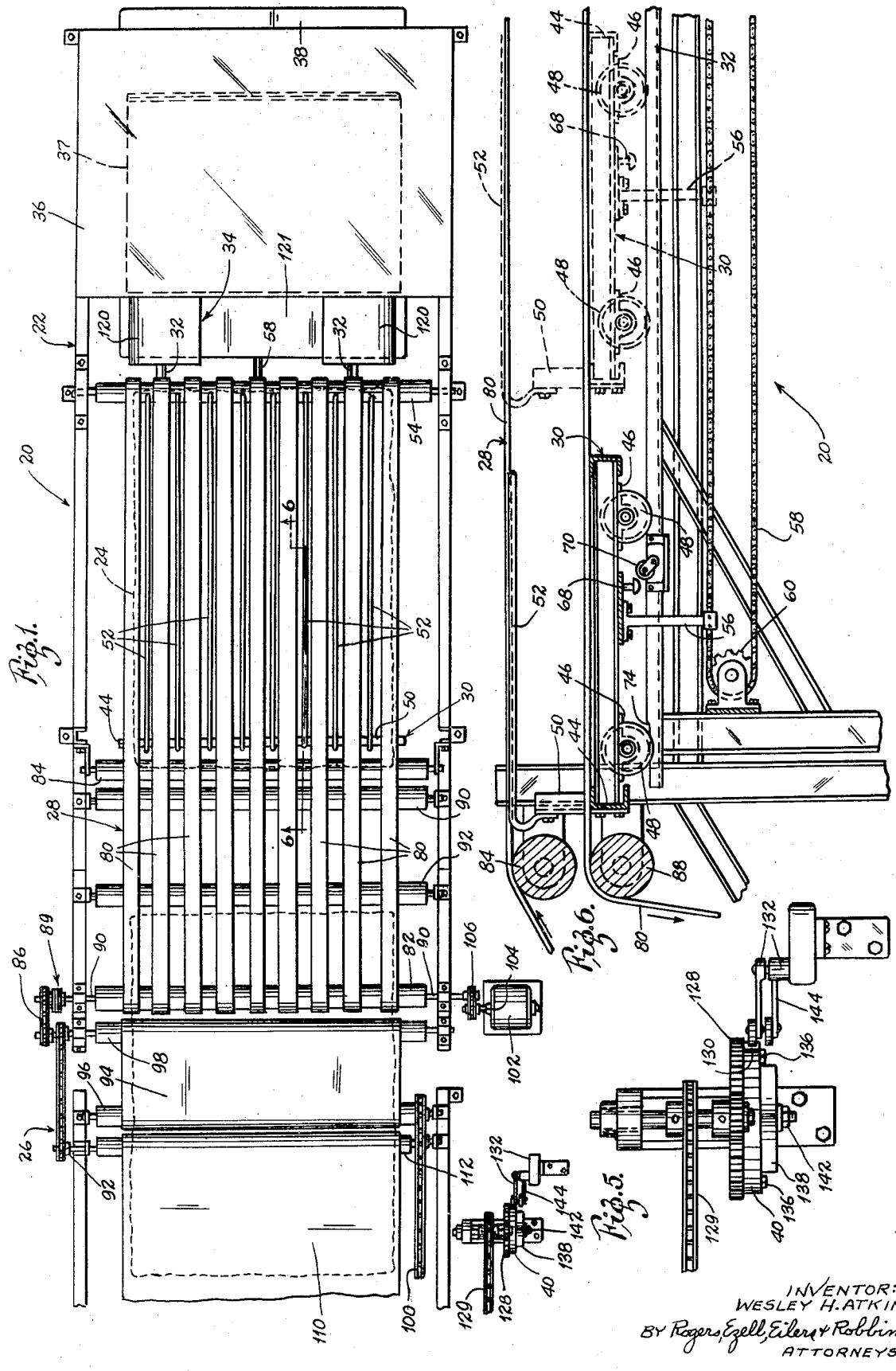


Fig. 1.

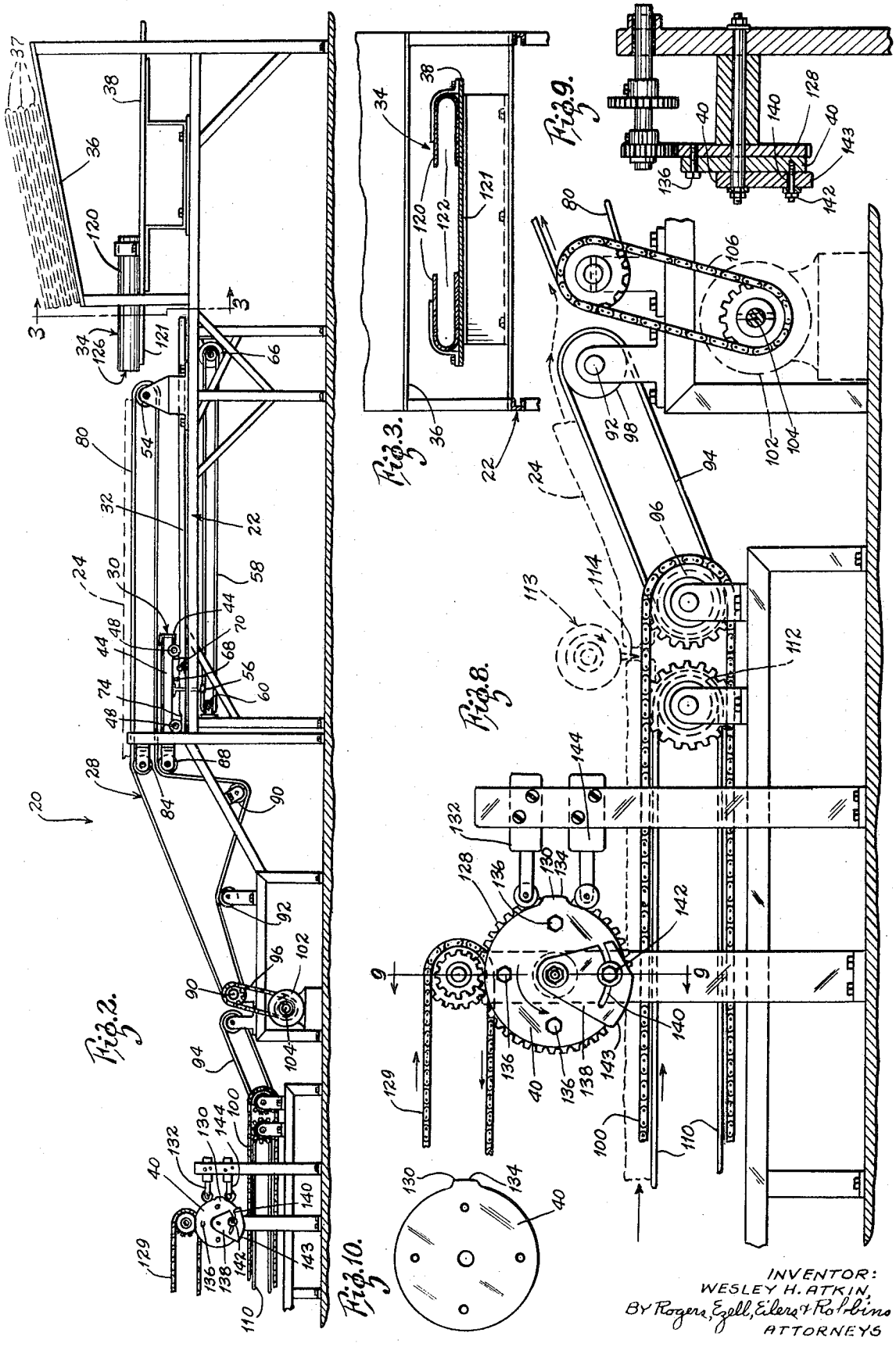
Fig. 6.

Fig. 5.

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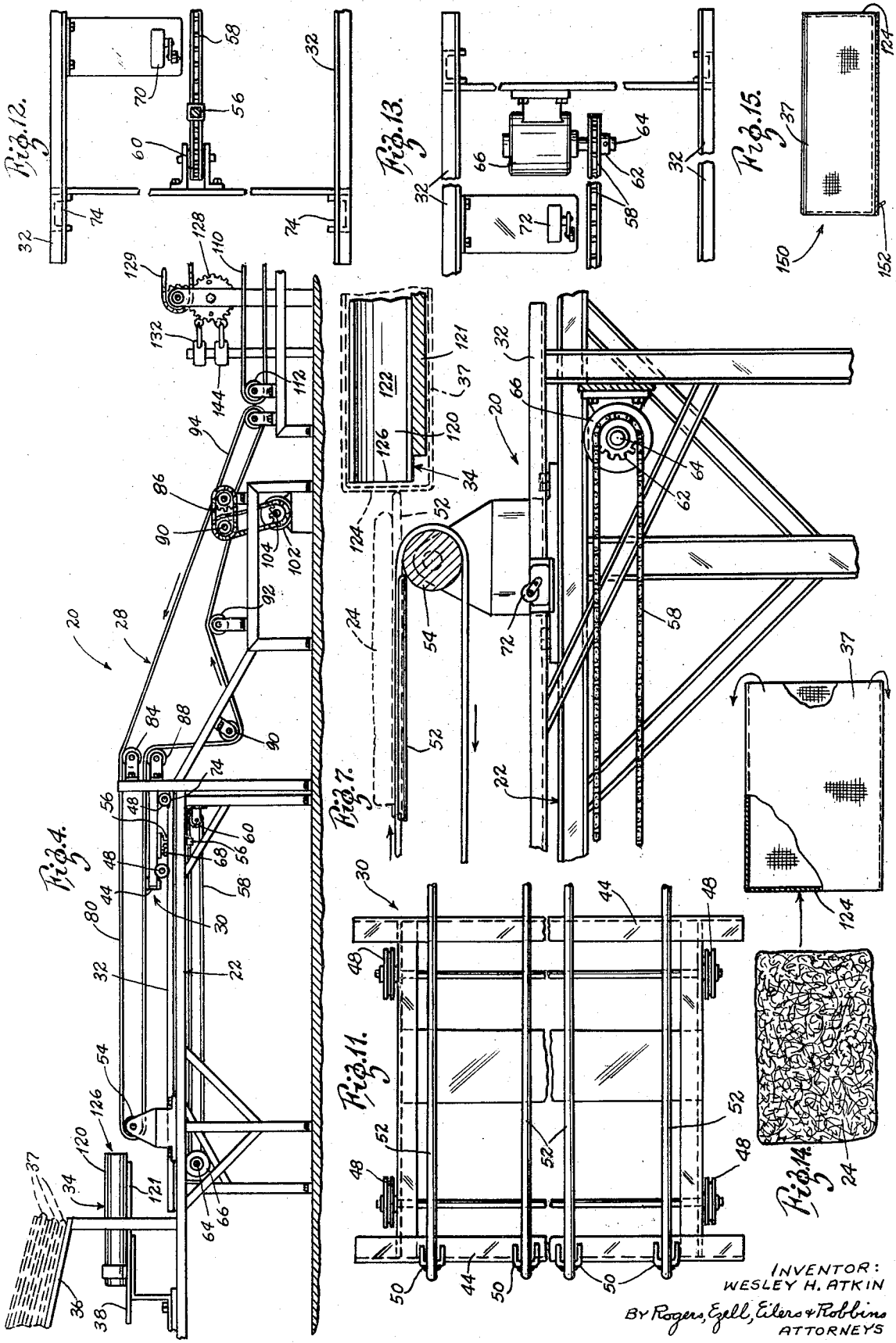
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AUTOMATIC STUFFER FOR SLEEPING BAGS

BACKGROUND OF THE INVENTION

In the past, sleeping bags have been stuffed manually with an insulating batting. Cut-to-length pieces of batting have been manually transferred from a feed conveyor and stuffed by a carriage into an empty sleeping bag ticking in such a fashion that the ticking is closed over the batting. This procedure has been laborious and time-consuming and has presented problems in quality control of the batting due to variations in thickness and negligence in the stuffing operation. Further, the speed has been dependent upon the individual operator's expertise which has been greatly subject to variation.

SUMMARY OF THE INVENTION

By means of this invention there has been provided a machine for taking a length of sleeping bag batting and automatically stuffing it into an empty sleeping bag ticking. The invention comprises a reciprocal carriage which is elevatable to take or lift the sleeping bag batting from a conveyor in a loading station and carry the batting upon support tines which contact the closed end of a sleeping bag ticking pulled over the open mouth of a funnel or baffle in such a manner that the tines push the ticking inside out to enclose the batting. After the ticking filled with the batting has been carried by the carriage through the funnel and the batting is completely enclosed, the batting-filled ticking is discharged and the carriage which, at this point, hits a reversing limit switch is returned to its initial position where it is stopped by another limit switch.

A stuffing conveyor is employed to transfer a length of a sleeping bag ticking from a main feed conveyor into overlying position over a carriage which as aforementioned is adapted to be elevated to lift the batting off the stuffing conveyor. The stuffing conveyor is provided with special control means which periodically operate the stuffing conveyor at a greatly accelerated rate of speed as compared to the feed conveyor so that the batting is moved rapidly from the feed conveyor to the loading station over the carriage in order to provide ample working space and time in the stuffing operation before the next batting is fed by the feed conveyor to the stuffing conveyor.

Both the reciprocal carriage and the stuffing conveyor are operated by a specially designed timer disc or wheel which is synchronized with the rate of speed of the main feed conveyor. The timer disc is driven by a sprocket chain connected to the main feed conveyor and in its cyclic operation cause a stuffing conveyor cam mounted on the timer disc to energize a stuffing conveyor motor to periodically accelerate the stuffing conveyor. An adjustable cam also carried by the timer disc energizes the carriage motor after the acceleration of the stuffing conveyor has carried the sleeping bag batting into overlying relation.

The automatic machine of this invention is adaptable for stuffing bags of different thickness of batting and different lengths of batting and can simply be adjusted and operated without any special expertise or training. The machine greatly simplifies and increases the speed of stuffing sleeping bags and can be operated by those relatively unskilled in the art.

The above features are objects of this invention and further objects will appear in the detailed description which follows and will be otherwise apparent to those skilled in the art.

For the purpose of illustration of this invention, there is shown in the accompanying drawing a preferred embodiment thereof. It is to be understood that the drawings are for the purpose of illustration only and that the invention is not limited thereto.

In the drawings:

FIG. 1 is a top plan view of the automatic stuffer with the sleeping bag batting shown in dotted lines after being cut and separated by the speed-up of the stuffing conveyor;

FIG. 2 is a view in front elevation of the automatic stuffer with a sleeping bag batting shown in dotted lines prior to being fed into the funnel stuffer;

FIG. 3 is a view in section taken on line 3—3 of FIG. 2 showing the structure of the funnel stuffer;

FIG. 4 is a view in rear elevation of the automatic stuffer;

FIG. 5 is an enlarged plan view of the mechanism for operating the control timer disc shown at the lower left-hand portion of FIG. 1;

FIG. 6 is an enlarged fragmentary view in section taken on the line 6—6 of FIG. 1 of the middle portion of the automatic stuffer and showing the actuation and elevation of the carriage in batting supporting relation in dotted lines;

FIG. 7 is an enlarged fragmentary view in vertical section taken similarly to FIG. 6 of the right-hand portion of the automatic stuffer showing the relationship of the funnel stuffer fitted with a ticking to the batting conveyor and carriage;

FIG. 8 is an enlarged fragmentary view in front elevation of the left-hand portion of the automatic stuffer;

FIG. 9 is a view in section taken on the line 9—9 of FIG. 8 showing the chain drive operation for the control disc;

FIG. 10 is a front view of the control disc;

FIG. 11 is a broken plan view of the sleeping bag batting carriage;

FIG. 12 is a broken plan view showing the front portion of the chain drive for the carriage and the support for the stop switch for the carriage;

FIG. 13 is a broken plan view of the support structure for the chain drive for the carriage and the motor and the reversing limit switch structure for the carriage;

FIG. 14 is an exploded plan view showing the sleeping bag batting and the ticking and the relation in which the batting is inserted in the ticking and covered by turning the ticking inside out; and

FIG. 15 is a plan view showing the finished sleeping bag after stitching of the open end and folding along the longitudinal center line with the addition of a zipper along the bottom and edge.

DESCRIPTION OF THE INVENTION

The automatic stuffing machine of this invention is generally indicated by the reference numeral **20** and is shown in full in FIGS. **1**, **2** and **4**. It is comprised of an elongated table **22** which receives a sleeping bag batting **24** shown in dotted lines in FIGS. **1** and **2** from a main feed conveyor **26** which is transferred to stuffing conveyor **28**. A reversible carriage **30** rides upon rails **32** supported on the table **22** and is adapted to feed the batting into the mouth of an open funnel or baffle **34** underlying a rack **36** receiving empty sleeping bag tickings **37**. A work surface or table **38** is provided at the rear of the main table to receive the enclosed batting and overlying ticking after the stuffing operation. The control of the carriage and the stuffing conveyor is accomplished through a control or timer disc or wheel **40** mounted adjacent the main feed conveyor.

The carriage **30** is best shown in FIGS. **6**, **7**, **8** and **11**. It is more or less U-shaped in form comprising a base **44** mounted upon a journal **46** supporting wheels **48** which ride upon the rails **32** extending longitudinally within the work table. The bed **44** is connected to an upstanding vertical section **50** which supports a plurality of horizontally extending tines **52** which are spaced laterally over the base of the carriage to support the batting as will be further described. The free end of the tines are supported upon an idler roller **54** of the stuffing conveyor in the rest position. Movement of the carriage is effected by a downwardly extending arm **56** which is connected to a sprocket chain **58** extending around an idler sprocket **60** connected to a forward leg of the table as best shown in FIG. **6** and a powered sprocket wheel **62** connected to a drive shaft **64** of a motor **66** connected to a brace at the rear portion of the work table as best shown in FIGS. **7** and **13**. A contact stud **68** is also connected to the bottom of the carriage which is adapted to contact a stop limit switch **70** for stopping the carriage motor and a reversing limit switch **72** connected to a brace at the rear of the table as best shown in FIG. **12**.

The forward portion of the rails **32** are provided with detents **74** as best shown in FIG. **6** in which the carriage wheels are received so as to lower the carriage out of contacting relation with the batting. As the carriage is advanced upon its operation, it will be understood that the carriage is raised upon the rails **32** into batting-carrying relation to lift it off the stuffing conveyor as will be further described.

The stuffing conveyor **28** is comprised of a plurality of laterally spaced conveyor belts **80** as best shown in the plan view of FIG. **1**. The conveyor belts are so spaced as to receive the tines **52** of the carriage when the carriage is elevated in such a fashion that the tines pass through the spaces between the conveyor belts **80**. The stuffing conveyor is driven by a drive shaft **82** and the conveyor is guided around idler rollers **84** at the forward end of the table roller **54** at the rear end of the table which further acts to support the free ends of the tines of the carriage, roller **88** at the forward end of the table, and tension rollers **90** and **92**, likewise mounted at the very forward portion of the table as best shown in FIG. **2**.

Normal powering of the stuffing conveyor is effected at the same rate of speed as the main feed conveyor by a sprocket chain **86** connected through a conventional overriding clutch **89** to a drive shaft **90** for the conveyor roller **82**. The sprocket chain **86** is connected to a sprocket wheel **92** driven by the main feed conveyor. The main feed conveyor has an extension conveyor **94** for transferring the batting to the stuffing conveyor which is powered by a roller **96** and a roller **98**. The roller **98** is driven by a main feed conveyor sprocket chain **100** as best shown in FIGS. **1** and **8**.

The aforementioned clutch **89** on the drive roller **82** of the stuffing conveyor is for the purpose of permitting stuffing conveyor motor **102** to override the sprocket chain connection to the main feed conveyor system by a faster drive shaft speed and provides for the great acceleration of the stuffing conveyor to several times the rate of speed of the main feed conveyor. It will be understood that by the control system to be described, the stuffing conveyor motor **102** operates only intermittently to separate a cut length of batting from the batting of the main feed conveyor and convey it to an overlying relationship over the reversing carriage for the stuffing operation. The stuffing conveyor motor **102** has a drive shaft **104** which is connected to the drive shaft **90** of the stuffing conveyor drive roller by sprocket chain **106** as best shown in FIGS. **1** and **4**.

The main feed conveyor is of conventional construction and is best shown in FIGS. **1, 4** and **8**. It is comprised of a conveyor belt **110** which receives a continuous ribbon of batting and terminates over the conveyor roller **112** which is driven by the sprocket chain **100**. The main feed conveyor also drives the conveyor roller **96** through a sprocket chain connection between rollers **96** and **98** as shown in FIG. **1** as previously described in such a fashion that the extension conveyor **94** serves to transfer the batting from the main conveyor **110** and feed it to the stuffing conveyor. It will be understood that the continuous ribbon of batting is adapted to be cut by conventional means such as the rotary cutter **113** shown in dotted lines in FIG. **8** which has a blade **114** which periodically cuts the batting at desired lengths appropriate to that required for stuffing different sized sleeping bags.

The funnel **34** is best shown in FIGS. **1, 2, 3** and **7**. It is comprised of a pair of oppositely mounted U-shaped members **120** which are mounted on a forwardly extending section **121** of the working table **38**. This structure provides an open area **122** within which the batting and the supporting tines **52** of the carriage are adapted to be fed. The funnel **34** is adapted to receive an open-ended bag ticking **37** within which the batting is to be stuffed. The ticking is gathered over the funnel in the fashion as shown in FIG. **7** such that the closed end **124** covers the open mouths **126** of the funnel members. The contact of the ends of the tines **52** of the carriage with the closed end **124** will then turn the sleeping bag inside out and carry it within the interior of the funnel with the batting covered by the ticking which will be best understood by reference to FIG. **7**.

The control mechanism for the carriage in the stuffing conveyor which comprises as its integral component the timer disc **40** is best shown in FIGS. **1, 2, 5** and **8**. The timer wheel **40** is connected to a sprocket wheel **128** which is driven by a sprocket chain **129** connected to the main feed conveyor. A stuffing conveyor starter cam **130** is provided by a raised portion of the periphery of the wheel and as best shown in FIG. **10** is adapted to engage at the proper rotational position a contact switch **132** which is adapted to energize the stuffing conveyor motor **102**. The cam **130** has a circumferential surface **134** which provides for a period of dwell of the switch **132** upon its surface for a short period of operation of the stuffing conveyor motor to transfer the batting from the main feed conveyor to the loading station overlying the carriage. The timer disc **40** is connected to the sprocket wheel **128** by bolts **136**.

The timer wheel **40** further carries an adjustable cam **138** mounted on the outside face of the timer disc as best shown in FIG. **8**. The cam **138** is provided with a slot **140** and an adjustment bolt **142** which fits through the slot and is connected to the timer disc in order that the cam **138** can be adjusted either closer to or further away from the stuffing conveyor cam **130** to accommodate different lengths of batting. The cam **138** has an extended arcuate surface **143** which is concentric with the timer wheel **40** and the sprocket wheel **128** in order that the carriage can be operated for the period of time necessary for its complete cycle. The cam **138** operates the carriage motor **66** through a limit switch **144**, which energizes the carriage motor **66**. This motor has a reversible field in order that the reversing limit switch **72** can reverse the motor and return the carriage to its rest position.

OPERATION

In the operation of the automatic stuffing machine, an operator will first of all insert a ticking inside out over the funnel **34** in the fashion shown in FIG. **7**. This is the only operation required by an operator until the batting is inserted by the automatic stuffing operation into the sleeping bag ticking and discharged at the discharge station **38** at the rear of the worktable.

The operation of the automatic stuffing machine is started with the feed of batting by the main conveyor and the cut of the batting to the desired length by the cutter **112** to present the selected length of batting to the extension conveyor **94**. This conveyor, in turn, transfers the batting which is shown in dotted lines in FIG. **1** to the stuffing conveyor **28**. As the stuffing conveyor operates for the major portion of the cycle at the same speed as the main feed conveyor, the batting is carried onto the stuffing conveyor at which time the cam **130** of the timer disc **40** operates the contact switch **132** which in turn causes the operation of the stuffing conveyor motor **102**. The operation of motor **102** causes the increase of speed of the driven conveyor roller **82** to override through clutch **89** the connection to the sprocket chain to the main feed conveyor and greatly increases the rate of speed of the stuffing conveyor to rapidly move the batting to the position shown in dotted lines in FIG. **1** where it overlies the carriage in the loading station. At the completion of this stuffing conveyor acceleration, the cam **130** rides out of contact with the contact switch **132** and resumption of the movement of the stuffing conveyor at the normal rate of speed is continued.

The carriage operating cam **138** through the counterclockwise rotation of the timer disc **40** now causes the operation of contact switch **144** to energize the carriage motor **66** and drive the sprocket chain **58** which, through the connection of the arm **56**, causes the movement of the carriage out of the detent **74** and the elevation into supporting relation with the batting. The tines **52** will then lift the batting out of contact with the stuffing conveyor and advance over the idler roller **54**. The ends of the tines contact the closed end **124** of the ticking and the batting is moved into the interior of the funnel **34** in such fashion that the ticking is turned inside out

to enclose the batting. The batting now enclosed by the sleeping bag ticking moves through the funnel and is discharged and pulled off by an operator at the discharge station **38** to complete the stuffing operation.

The carriage at the completion of its forward movement contacts the reversing limit switch **72** shown in FIG. **12** which reverses the reversible motor **66** to return the carriage to its forward position where contact stud **68** at the bottom of the carriage contacts the stop limit switch **70** to stop the carriage in the rest position with the wheels in the detent **74** of the support rails.

The aforementioned operation completes the cycle until the timer disc **40** again through the stuffing conveyor cam **130** causes the operation of switch **132** to start a new cycle, and the operation is repeated in the aforementioned manner.

The stuffing operation provides a ticking completely encasing the batting which is then removed from the working area **38**. This assembly is then finished in conventional fashion.

The final sleeping bag **150**, after stitching of the open end and doubling over of the sleeping bag along the longitudinal axis and the addition of a conventional zipper **152** along the bottom and the side, is shown in FIG. **15**.

Various changes and modifications may be made within this invention as will be readily apparent to those skilled in the art. Such changes and modifications are within the scope and teaching of this invention as defined by the claims appended hereto.

What is claimed is:

1. A machine for stuffing sleeping bags comprising a conveyor feed means for feeding a sleeping bag batting to a stuffing means for stuffing said batting into an empty sleeping bag ticking, said stuffing means including a reciprocal stuffing carriage receiving said batting from said conveyor means and control means for moving said carriage, said carriage underlying a frame upon which said batting is fed by the feed conveyor means and being provided with means for elevating it into a carrying relation with the batting, said carriage being further provided with a plurality of rigid elongated batting supporting members engageable in supporting relation with the batting upon the elevation of said carriage, said elongated supporting members being moved by the advancement of the carriage into the mouth of an elongated funnel into the interior of a sleeping bag ticking, said sleeping bag ticking being open at one end and closed at a second end and being pulled over the funnel to present said closed second end over the mouth of said funnel in engageable relation with said elongated supporting members in such a manner that as the carriage advances the elongated supporting members carry the batting into the interior of the funnel with the sleeping bag ticking being pulled over the funnel to enclose the batting by the contact of the elongated supporting members with the closed end of the ticking.

2. A machine for stuffing sleeping bags comprising a conveyor feed means for feeding a sleeping bag batting to a stuffing means for stuffing said batting into an empty sleeping bag ticking, said stuffing means including a reciprocal stuffing carriage receiving said batting from said conveyor means and control means for moving said carriage, said conveyor feed means comprising a main feed conveyor and a stuffing conveyor, said stuffing conveyor overlying said carriage and having control means for periodically increasing the rate of speed to a faster rate than that of said main feed conveyor to provide time for the stuffing operation without interrupting the feed batting from the main feed conveyor.

3. The machine of claim **2** in which said carriage underlies said stuffing conveyor out of contact with said batting and is provided with means for elevating it into carrying relation with the batting.

4. The machine of claim **3** in which said stuffing conveyor is comprised of a plurality of laterally spaced conveyor belts and said carriage is provided with a plurality of rigid elongated batting supporting members engageable in supporting relation with the batting upon the elevation of said carriage, said elongated supporting members being positioned between said laterally spaced conveyor belts and being elevatable through the spaces therebetween into batting carrying relation above said laterally spaced conveyor belts.

5. The machine of claim **4** in which said elongated supporting members are moved by the advancement of the carriage into the mouth of an elongated funnel into the interior of a sleeping bag ticking in contact with the closed end of a sleeping bag ticking pulled over said funnel, the contact of said elongated supporting members with the closed end of the bag operating to pull the bag inside out and enclose the batting carried by the carriage.

6. The machine of claim **1** in which reversing limit switch means are provided for reversing the carriage after the batting has been stuffed into the empty sleeping bag and a stop limit switch operable to stop the carriage upon return to its original position to receive a new batting.

7. The machine of claim **1** in which said elevating means comprises means for powering the carriage out of a detent receiving wheels supporting the carriage in a railway aligned with the conveyor feed path.

8. The machine of claim **1** in which said elevating means comprises means for powering the carriage out of a detent receiving wheels supporting the carriage in a railway aligned with the conveyor feed path, said powering means comprising a chain drive connected to a prime mover.

9. The machine of claim **1** in which said control means comprising a rotary control disc member operable by the movement of the feed conveyor and a carriage cam mounted on said control disc member operable to energize a prime mover means for moving said carriage.

10. The machine of claim **1** in which said control means comprising a rotary control disc member operable by the movement of the feed conveyor and a carriage cam mounted on said control disc member operable to energize a prime mover means for moving said carriage, reversing limit switch means are provided for reversing the carriage after the batting has been stuffed into the empty sleeping bag and a stop limit switch operable to stop the carriage upon return to its original position to receive a new batting.

11. The machine of claim **2** in which the control means for the stuffing conveyor comprises a rotary control disc member operable by the movement of the feed conveyor and a stuffing conveyor cam mounted on said control disc member operable to actuate a prime mover means to drive said stuffing conveyor at an increased rate of speed.

12. The machine of claim **11** in which the stuffing conveyor is provided with a drive means connected to the prime mover for the stuffing conveyor and drive means for the main feed conveyor and clutch means mounted on said shaft permitting the prime mover for the stuffing conveyor to drive the drive shaft and override the drive means for the main feed conveyor.

13. The machine of claim **11** in which the control means for the carriage comprises a carriage cam mounted on said control disc member operable to energize a prime mover means for moving said carriage.

14. The machine of claim **13** in which reversing limit switch means are provided for reversing the carriage after the batting has been stuffed into the empty sleeping bag and a stop limit switch operable to stop the carriage upon return to its original position to receive a new batting.

15. The machine of claim **4** in which the control means for the stuffing conveyor comprises a rotary control disc member operable by the movement of the feed conveyor and a stuffing conveyor cam mounted on said control disc member operable to actuate a prime mover means to drive said stuffing conveyor at an increased rate of speed, reversing limit switch means are provided for reversing the carriage after the batting has been stuffed into the empty sleeping bag and a stop limit switch operable to stop the carriage upon return to its original position to receive a new batting.

16. The machine of claim 13 in which the timer disc is provided with means for adjusting the peripheral distance on the periphery of the timer disc between the carriage cam and the stuffing conveyor cam to accommodate different lengths of batting.

17. The machine of claim 13 in which the carriage cam has means for adjustment on the periphery of the timer disc in relation to the stuffing conveyor cam to accommodate different lengths of batting.

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