March 18, 1958 D. G. KINGSLEY 2,827,201

APPARATUS FOR FEEDING CLEATS TO BOX-MAKING MACHINES

Filed Sept. 20, 1954 4 Sheets-Sheet 1

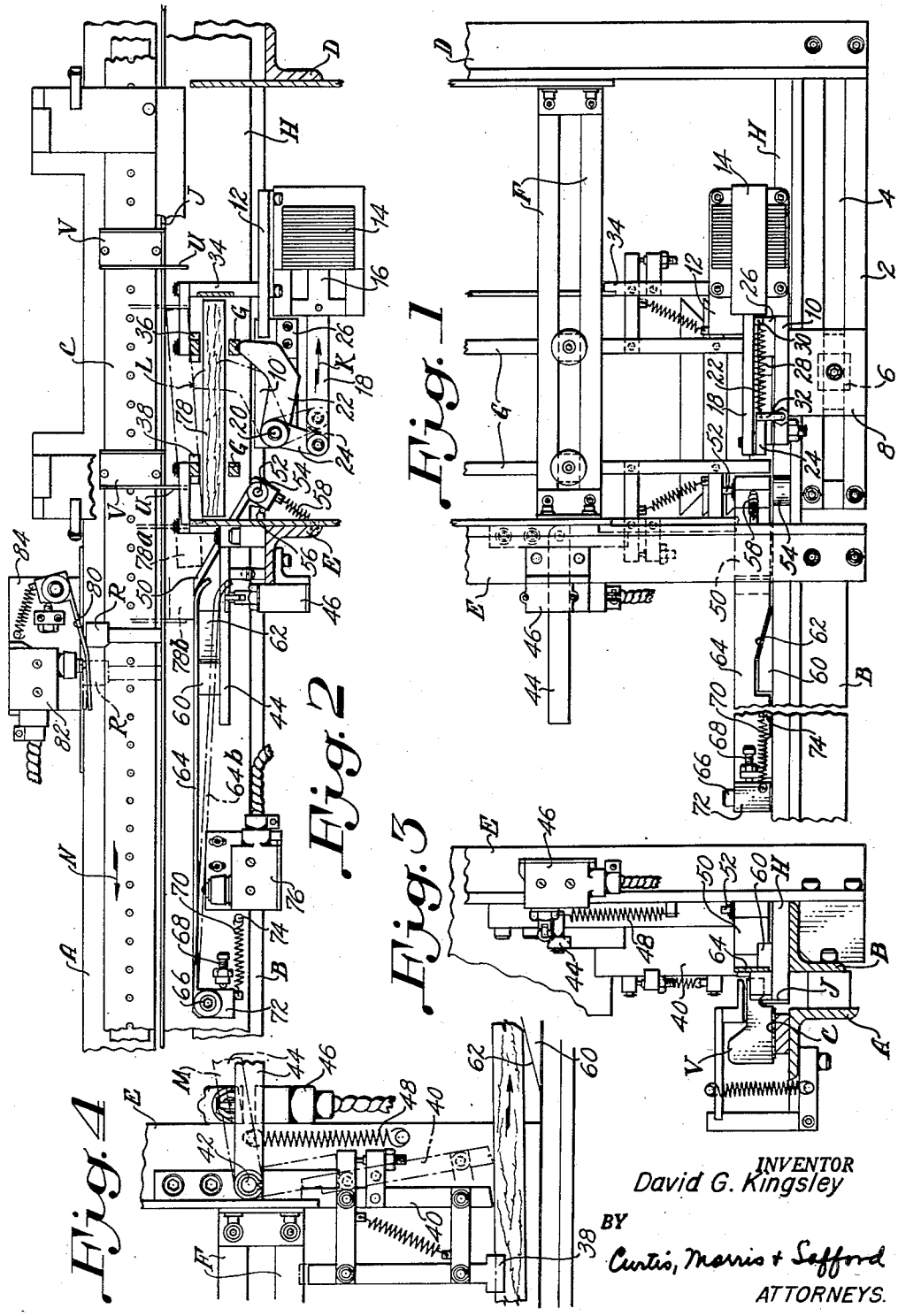


Fig. 1

Fig. 2

Fig. 3

Fig. 4

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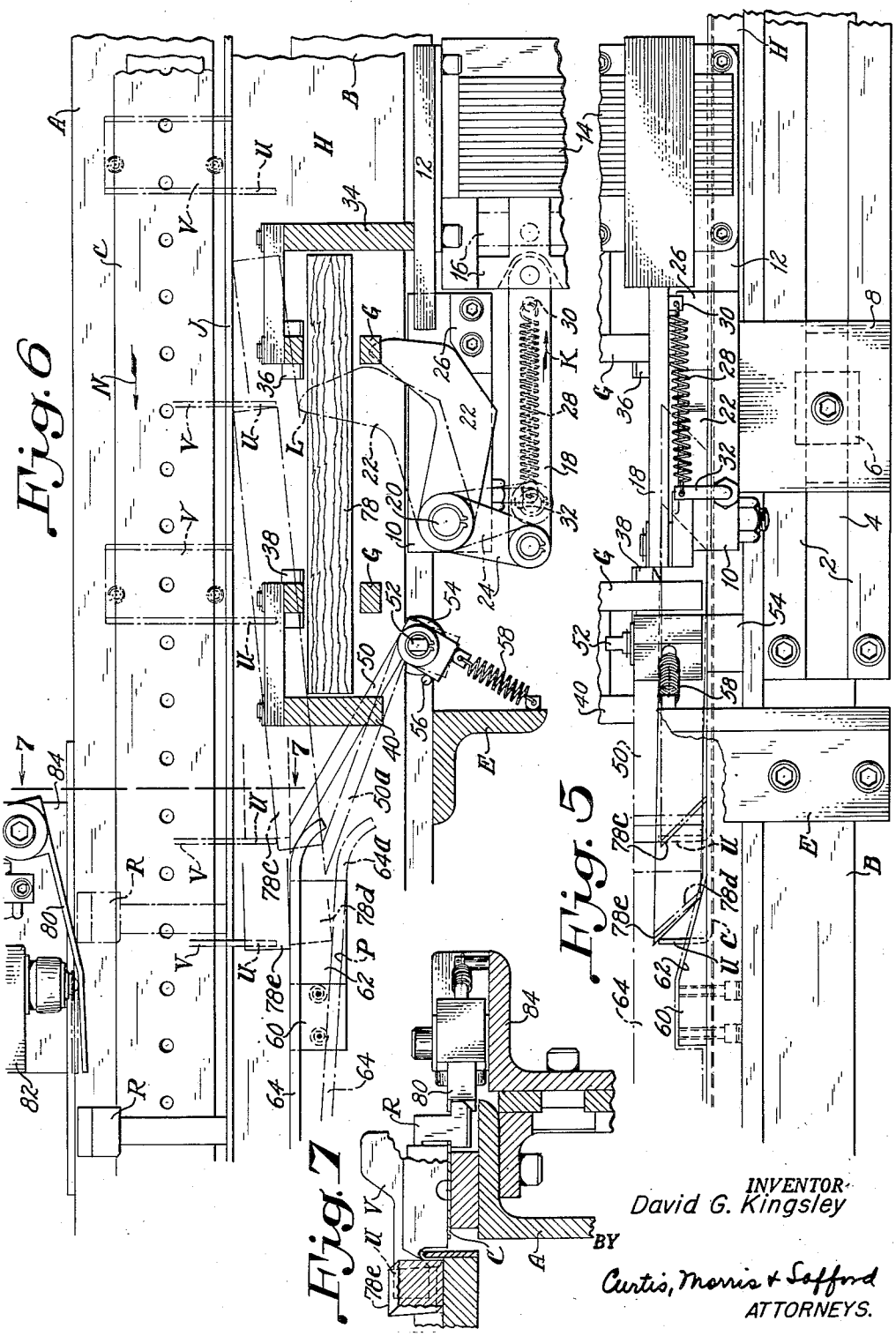


Fig. 6

Fig. 5

Fig. 7

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APPARATUS FOR FEEDING CLEATS TO BOX-MAKING MACHINES

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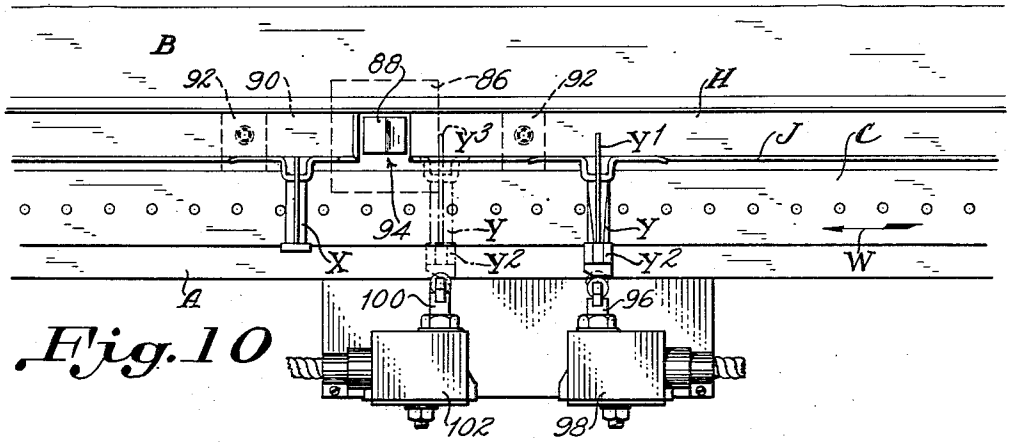


Fig. 10

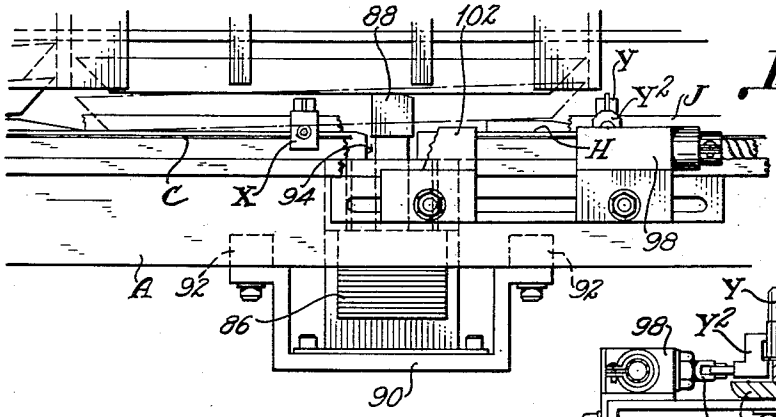


Fig. 9

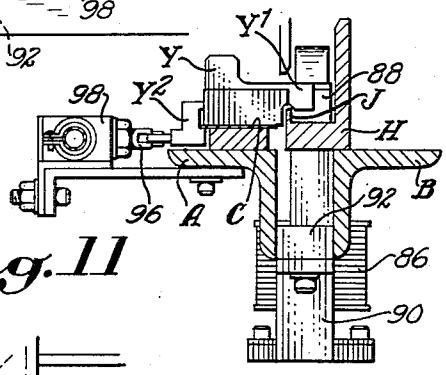
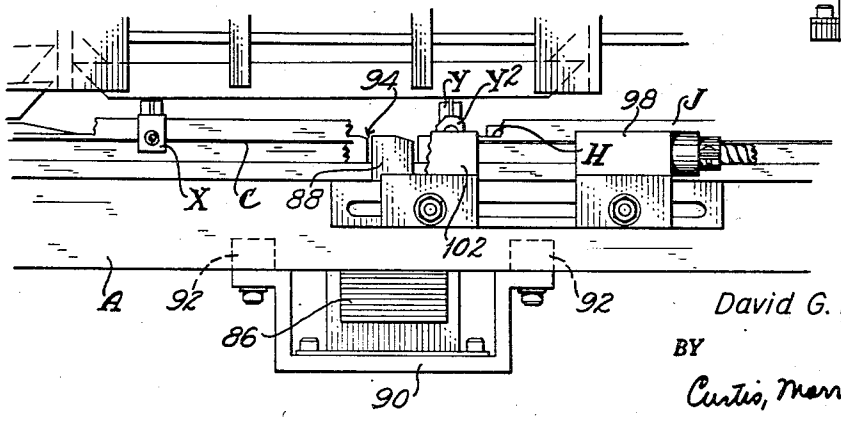


Fig. 11

Fig. 8



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APPARATUS FOR FEEDING CLEATS TO BOX-MAKING MACHINES

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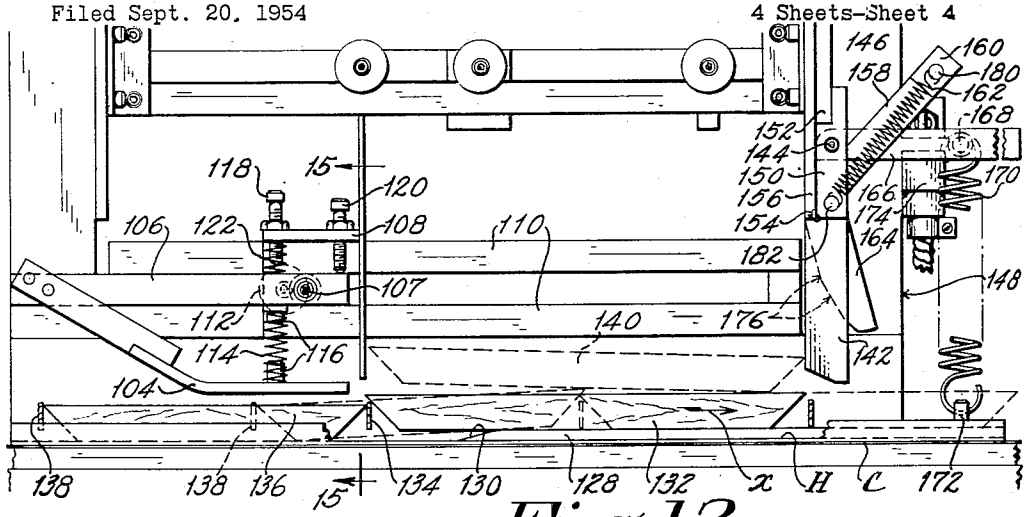


Fig. 12

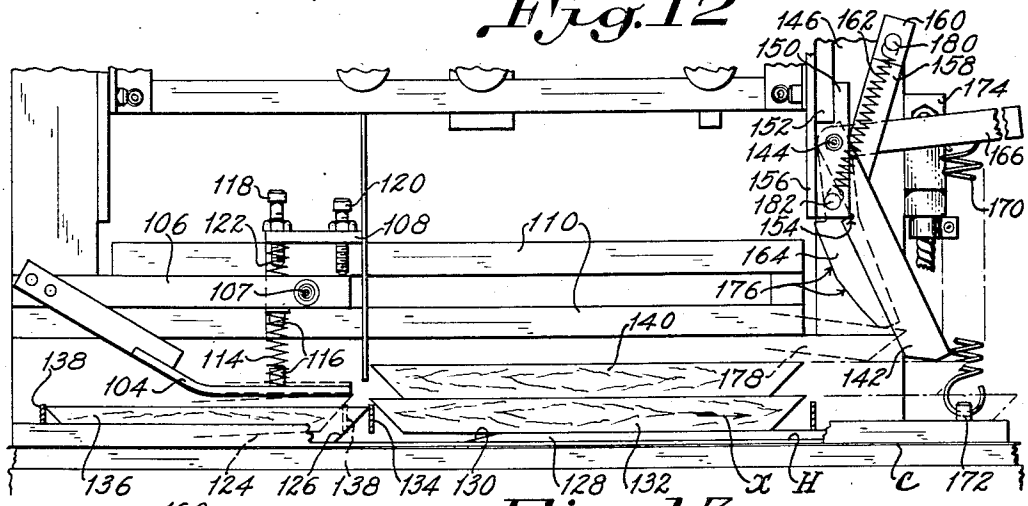


Fig. 13

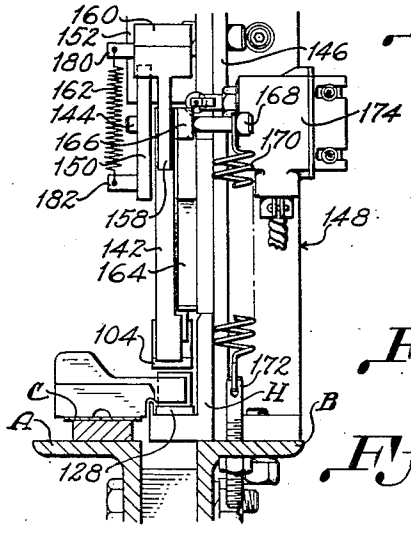


Fig. 14

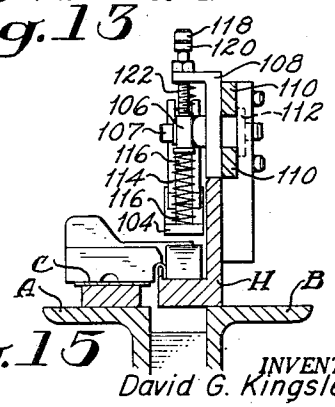


Fig. 15

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2,827,201

APPARATUS FOR FEEDING CLEATS TO BOX-MAKING MACHINES

David G. Kingsley, Mountain Lakes, N. J., assignor to Stapling Machines Co., Rockaway, N. J., a corporation of Delaware

Application September 20, 1954, Serial No. 457,066

2 Claims. (Cl. 221—116)

This invention relates to apparatus for dispensing cleats to wirebound box-making machines of the type disclosed in United States Patent No. 2,304,510, issued December 8, 1942.

In such machines, properly assembled cleats and side material or slats are conveyed beneath a transverse bank of stapling units by which staples are driven over longitudinally extending binding wires, through the side material or slats and into the cleats to form wirebound box blanks. Each of these box blanks comprises a plurality, usually four, box sections or sides which are foldably secured together by the binding wires. The cleats are frequently provided with mitered ends which fit snugly together when the box blanks are folded around to set up the box. Where the box has oblong ends, two lengths of cleats are required, with alternate sections of the box blanks having cleats of different length.

The cleats and side material or slats are conveyed through the box-making machine by continuously moving conveyor bands which carry adjustably positioned projecting push elements which engage the cleats and side material or slats and maintain their properly assembled relationship.

In United States Patent No. 2,658,631, issued November 10, 1953, there is disclosed apparatus for mechanically dispensing cleats into proper position in the spaces ahead of the push elements on the conveyor bands of a wirebound box-making machine. This apparatus eliminates some of the manual labor which has previously been required in the laying of cleats and thereby enables a substantial reduction in the cost of producing wirebound boxes and crates.

The present invention is in the nature of an improvement over the invention of said Patent No. 2,658,631, to the end of achieving a more dependable supply of cleats to the conveyor bands of wirebound box-making machines. The invention allows greater flexibility in positioning of the cleat dispensing units when cleats of two different lengths are being fed. The invention provides means for feeding mitered cleats whose length exceeds specified tolerances, as well as means to facilitate the movement of cleats supplied from the first of two cleat dispensing units, beneath the column of cleats contained within the hopper portion of the second cleat dispensing unit. The invention also provides a dual safety gate having one member which opens to permit egress of two adhering cleats, thus clearing a slight cleat jam without interrupting production of the box-making machine while its other member opens only in the event of a serious cleat jam or other malfunction and the opening of this second member stops the conveyor bands in order to prevent possible damage to the elements involved.

In the drawings:

Figure 1 is an elevational view of the outer face of a cleat dispensing apparatus embodying features of the present invention.

Figure 2 is a top plan view of the apparatus shown in Figure 1.

Figure 3 is an end elevation of the cleat dispensing apparatus as viewed from the end which appears at the left in Figure 1.

Figure 4 is a fragmentary side elevational view of the inner face of the cleat dispensing apparatus, showing particularly its output end.

Figure 5 is an enlarged fragmentary view of the lower portion of the cleat dispensing apparatus.

Figure 6 is a top plan view of the portion of the apparatus shown in Figure 5.

Figure 7 is a vertical sectional view taken on line 7—7 of Figure 6.

Figure 8 is a fragmentary elevational view of the lower portion of an alternative type of cleat dispensing apparatus embodying features of the present invention, said apparatus being of the gravity feed type and including means for displacing the bottom cleat to permit a cleat pushing element to enter and continue freely beneath it.

Figure 9 is a view similar to Figure 8 except that the cleat displacing mechanism is shown in operative position, with the bottom cleat raised above its normal position.

Figure 10 is a top plan view of the portion of the apparatus shown in Figure 9.

Figure 11 is an end view of the apparatus looking toward the end which appears at the right in Figure 9.

Figure 12 is a view of the lower portion of a gravity feed-type cleat dispensing device embodying features of the present invention including, at its output end, a dual member safety gate and, at its opposite end, means for positioning tilted cleats.

Figure 13 is a view similar to Figure 12 except that the members of the safety gate and the elements for positioning tilted cleats are shown in operative position.

Figure 14 is an elevational view of the end of the apparatus which appears at the right in Figure 12.

Figure 15 is a vertical sectional view taken on line 15—15 of Figure 12.

The cleat dispensing apparatus of Figures 1–8 is adapted to be supported, as is particularly shown in Figure 3, by one of the pair of longitudinally extending side rails which form part of conventional wirebound box-making machines. One of said side rails is positioned at each side of the machine to support the conveyor bands. While each of the side rails bears cleat dispensing apparatus, it is deemed sufficient to illustrate and describe only one of the dispensing units, since they are identical except for reversal of parts.

As may be seen in Figure 3, each of the side rails is built up from a pair of angle members A and B which are bolted together in spaced relationship. To the upper surface of outer angle member B the cleat dispensing unit is detachably mounted at a convenient point adjacent the input end of the machine while the inner angle member A supports the conveyor bands C with its attached cleat pushing members V. The construction of said unit is generally similar to that of the cleat dispensing unit disclosed in the aforementioned Patent No. 2,658,631. Briefly, it comprises end walls D and E (Figure 2) spaced

apart a suitable distance and suitably braced by cross members F which are designed to support, in adjustable fashion, a plurality of vertically extending bars G which define a hopper for storing a generally vertical stack of cleats.

In Figures 1 and 5 may be seen a bracket **2** which is fastened to the outer face of angle member B and is provided with an elongated opening **4** to receive therein a suitable clamping member **6** by which the downwardly projecting leg **8** of a support plate **10** is adjustably secured. To the outer face of an upstanding flange **12** of support plate **10** is mounted a solenoid **14** which, as shown more clearly in Figures 2 and 6, has an elongated rod member **18** pivotally connected to its armature **16**.

Pivotally mounted on a stud **20** (Figure 2) projecting from the upper surface of support plate **10** (Figure 2) is an irregularly shaped finger **22** having an outwardly projecting arm **24** which is pivotally connected to the free end of the aforementioned rod member **18**. The finger **22** is slidably supported on the aligned upper surfaces of support plate **10** and the base member H of the dispensing unit.

As shown particularly in Figure 3, this base member H is supported on the upper surface of outer angle member B and has at its inner face adjacent conveyor band C a vertical flange J which serves as a stop for the cleats ejected from the cleat dispensing unit and also as a guide for the cleats as they are moved by the cleat pushing elements V.

As shown in Figures 2 and 6, the energization of solenoid **14** retracts its armature **16** in the direction indicated by arrow K and causes irregularly shaped fingers **22** to assume the position shown by broken lines L, while the deenergization of solenoid **14** permits the finger **22** to be returned to its initial position against a stop block **26** by a tension spring **28**, one end of which is hooked to a stud **30** threaded into the undersurface of rod member **18** and the other end of which is hooked to the upstanding portion of an L-shaped stud **32** threaded into the outer face of support plate **10**.

It will be seen, with further reference to Figures 2 and 6, that the upstanding flange **12** of support plate **10** has fastened to its inner face a plate **34** which serves as one end wall of the cleat hopper. Longitudinal adjustment of the end wall **34**, according to the length of the cleats being dispensed, is obtained by clamping leg **8** of support plate **10** at a suitable location along bracket **2** by means of clamping member **6**.

As may be seen by reference to Figures 1, 2, 3 and 4, the ejected cleat is prevented from "jumping" by hold-down members **36** and **38**. As shown in Figures 3 and 4, hold-down member **38** is yieldingly attached to a safety gate **40** which is hinged at **42** to end wall E of the hopper. An arm **44** projecting rigidly outward from the upper end of safety gate **40** is arranged to actuate an electric switch **46**, as shown by broken lines M in Figure 4, to stop the box parts conveying mechanism in the event of a serious jam of cleats at their point of egress from the cleat dispensing unit. Safety gate **40** is returned to and yieldingly maintained in its initial position by a tension spring **48** the upper end of which is fastened to arm **44** and the lower end of which is fastened to end wall E.

In Figures 2, 5 and 6 is shown a mechanism which will direct cleats that are within tolerances for their specified length, into proper position between the cleat pushing elements V on the moving conveyor bands C. This mechanism includes a gate member **50** pivotally mounted on a stud **52** threaded into a boss **54** on base member H. Gate member **50** is normally positioned at an oblique angle with respect to the direction of cleat movement, which is indicated by arrow N, and its free end is beveled and aligned with the inner face of the elongated outer guide member **64** which, with the aforementioned inner cleat guide J, defines a channel for guiding the cleats. The gate member **50** is urged in a clockwise direction as viewed in Figures 2 and 6, by a coil spring **58** which is tensioned between the hub portion of gate member **50** and the inner face of end wall E, but its movement in this direction is limited by a stop pin **56**.

The gate member **50** cooperates with a ramp block **60** to align cleats of excessive length for continuous movement. The ramp block **60** is secured on the upper surface of base member H adjacent the free end of gate member **50** and is provided with an upwardly inclined bevel **62** at its end facing toward the oncoming cleats. This bevel **62** raises the leading end of a mitered cleat which is too long to enter freely into the spaces between adjacent cleat pushing members V, thereby permitting the spring loaded gate member **50** to swing the leading end of the cleat into proper alignment when it has been elevated to such extent that the miter will permit it to move into the space between the cleat pushing members.

It will be seen with further reference to Figures 2 and 6 that the beveled portion of the free end of gate member **50** overlies the outwardly flared free end of the elongated guide **64**. The elongated guide **64** is pivotally mounted on a stud **66** threaded into the upper surface of base member H and is urged in a counterclockwise direction as viewed in Figures 2 and 6 by a tension spring **70** (Figure 2) which has one of its ends fastened to the hub portion **72** of the guide **64** and its other end hooked about a stud **74** projecting from the upper surface of base member H, with its movement in such direction being limited by an adjustable stop screw **68** engaging a flattened surface on the hub portion **72**. Any yielding movement of gate member **50** will thus be imparted to elongated guide **64**, as indicated for example by broken lines P in Figure 6.

The operation of this mechanism is as follows:

The cleat hopper is filled with a stack of cleats which are supported upon base member H with the bottom cleat in the arcuate path of finger **22** which is actuated by the energization of solenoid **14**. This action is initiated by each of a series of trip members R which are adjustably clamped to conveyor band C, each a predetermined distance ahead of one of the cleat pushing members V.

As may be seen in Figure 2, as each cleat pushing member arrives at a point adjacent the trailing end of the bottom cleat **78** in the stack, one of the trip members R contacts a pivotally mounted spring loaded finger **80** and causes it to actuate an electric switch **82** which is mounted adjacent the path of the conveyor band C on an adjustable bracket **84** secured to the side of angle member A (see also Figure 7). The actuation of electric switch **82** energizes solenoid **14**, retracting its armature **16** and the rod member **18** pivotally attached thereto in the direction indicated by the arrow K. This action rotates finger **22** counterclockwise to its position shown in broken lines in Figures 2 and 6, and the finger pushes the trailing end of the bottom cleat **73** outwardly into contact with vertical flange J and in the path of the outwardly projecting push fin U of the approaching cleat pushing member V. The push fins U of the adjacent cleat pushing elements V are spaced apart a sufficient distance to receive between them cleats of a certain maximum length. If the bottom cleat **78** does not exceed this length, it will be directed into the space between the push fins by contact of its leading end with the obliquely positioned gate member **50**, as shown by broken lines **78***a* and **78***b* in Figure 2.

As may be seen in Figures 5 and 6, in the event that the length of cleat **78** exceeds this tolerance, its leading end cannot move into position in this fasion, but, as shown by broken lines **78***c*, will engage the outer end of the preceding fin U and, as it moves further along, will force outwardly the spring loaded gate member **50** and

the spring loaded guide 64, as shown by broken lines 50*a* and 64*a*. At the same time, the leading end of the cleat will climb up the bevel 62 of ramp block 60, as shown by broken lines 78*d*. As will be understood, the raising of the mitered end of cleat 78 produces the effect of foreshortening the length of the cleat and allows the spring loaded gate member 50 and elongated guide 64 to press the leading end of the cleat into proper alignment, with any excess in length of the cleat merely causing the mitered surface at the leading end of cleat 78 to rest upon the top of push fin U, as shown by full lines 78*e* in Figures 5 and 6.

When a cleat being moved as described above is too long even to be handled in this fashion, or if for any other reason the cleat does not move into proper alignment in the space between the push fins U, the elongated guide 64 will be forced to move to an extreme outer position as indicated by broken lines 64*b* in Figure 2, at which it actuates an electric switch 76 to stop the conveyor bands until the defective cleat may be removed, thus preventing possible damage to the apparatus.

Shown in Figures 8, 9, 10 and 11 is an alternative construction of cleat dispensing device which, like the apparatus of Figures 1–7, is particularly useful in combination with another dispensing apparatus, for example an apparatus of the type illustrated in Figures 12–15, to supply two different lengths of cleats to the conveyor bands of the box-making machine, where required by the design of the box being made. In such a combination, the apparatus of Figures 1–7 or 8–11 is used to supply cleats of one length to alternate cleat spaces on the conveyor bands and the device of Figures 12–15 is used to supply cleats of another length to the remaining spaces.

The device of Figures 8–11 is of the gravity-feed type having a hopper for supporting a generally vertical stack of cleats, with a mechanism for raising the stack of cleats sufficiently to permit the oncoming cleat pushing member to move beneath the bottom cleat of the stack to a predetermined point whereupon the elevating means are retracted to allow the stack of cleats to be supported on the push fin of this cleat pushing member, thus causing the push fin to move beneath the hopper without coming into contact with the trailing end of the bottom cleat.

As shown in Figures 8, 9 and 11, this cleat displacing mechanism includes a solenoid 86 suitably mounted on the horizontal shelf portion of a U-shaped hanger member 90 fastened to blocks 92 extending between the vertical flanges of angle members A and B. The armature 88 of solenoid 86 is provided with an enlarged head which projects through an opening 94 in the base member H. When the armature is in its retracted position, as shown in Figure 8, its outer surface is aligned with the upper surface of the base member H.

As may be seen in Figures 10 and 11, the conveyor band C, which moves in the direction indicated by the arrows W, carries cleat spacing members X and Y which are clamped thereon at positions adjustable longitudinally of the conveyor band. Cleat spacing member Y is provided at its outer end with a projecting push fin Y1, while its inner end bears a suitably shaped lug Y2 which, as shown in Figures 10 and 11, is adapted to depress the spring loaded plungers 96 and 100 of a pair of electric switches 98 and 102 which are mounted at spaced positions alongside the path of the conveyor band.

The actuation of switch 98 energizes solenoid 86 through a conventional relay (not shown) and this, as illustrated in Figure 9, causes the armature 88 of solenoid 86 to be projected upwardly against the bottom cleat of the stack and raise the stack sufficiently to remove the bottom cleat from the path of push fin Y1. Solenoid 86 continues to be energized by the relay so that its armature 88 remains elevated to support the stack of cleats until lug Y2 of cleat spacing member Y contacts the plunger 100 of the second electric switch 102. The actuation of switch 102 releases the relay and deenergizes solenoid 86, retracting its armature 88 and allowing the stack of cleats to drop so that the trailing edge of the bottom cleat will be in the path of the push fin of the next oncoming cleat spacing member.

In Figures 12, 13, 14 and 15 is shown an alternative construction of gravity-feed cleat dispensing apparatus also embodying features of the present invention. This mechanism may be used in combination with either the apparatus of Figures 1–7 or that of Figures 8–11 to dispense cleats of a different size into the remaining cleat spaces on the conveyer bands. The apparatus of Figures 12–15 includes mechanism for correctly positioning any cleats which are tilted so that their leading ends rest atop the push fin of one of the cleat spacing members. As may be seen in Figures 12 and 13, this mechanism includes an angular-shaped presser foot 104 pivotally mounted at its upper end on the outwardly projecting end of a bar 106. The opposite end of this bar 106 is pivotally attached at 107 to an inverted L-shaped bracket 108 (Figure 15) which is adjustably secured to the cross brace 110 of the cleat dispensing device by a clamp member 112. The horizontal lower portion of the angular-shaped presser foot 104 is urged downwardly by a compression spring 114 interposed between it and the underside of bar 106 and guided on studs 116. The overhanging portion of the inverted L-shaped bracket 108 supports therein two spaced adjustable screws 118 and 120. The screw 118, which is positioned directly above compression spring 114, extends downwardly into the upper end of a compression spring 122 which is interposed between the overhanging portion of bracket 108 and the aforementioned bar 106, yielding to allow the free end of bar 106 to move upward when necessary. The bar 106 is normally held in a horizontal position against the force of spring 122 by the screw 120 which engages the upper surface of the bar 106 on the opposite side of its pivot 107 from the spring 122.

As is shown in Figure 13 by broken lines 124, a cleat in tilted position with its leading end at such height as to engage the undersurface of presser foot 104 is subjected to a frictional drag, tending to retard its forward movement in the direction indicated by the arrow X and cause it to drop into proper position as shown by full lines 126.

This embodiment of the invention is provided with an alternative type of means for supplying into proper spaces on the moving conveyor bands, cleats of two different lengths where required by the design of the box being made. As may be seen in Figure 12, there is mounted on the base member H, in the path of cleat movement, a cleat step member 128 which is adjustable longitudinally of the base member. The end of the step member 128 facing in the direction of the oncoming cleats is formed with an upwardly inclined bevel 130, which is positioned a short distance forward of the trailing end of the bottom cleat 132 in the hopper. As shown by full lines in Figures 12 and 13, the bottom cleat 132 is about to be moved out of the hopper in the direction indicated by the arrow X by push fin 134 of a cleat spacing member, followed by the cleat 136 from another cleat dispensing device located ahead of the device in the direction of movement of the conveyor bands.

The outgoing cleat 132 rests upon the step member 128 and supports the next-to-bottom cleat 140 and the other cleats above it in the stack. The position of the end 130 of the step member 128 is such that the leading end of the cleat 136 from the first cleat dispensing device does not reach the step member until after it has passed beneath the trailing end of the next-to-bottom cleat 140 in the stack. This allows the cleat 136 to pass freely beneath the cleat 140 without engaging its trailing end. When the leading end of the cleat 136 does reach the step member 128, it climbs up its beveled end 130, as illustrated in broken lines in Figure 12, in position to support the stack of cleats as the preceding cleat 132 moves

out of the hopper. By the time the push fin **138** reaches the trailing end of the next-to-bottom cleat **140**, the cleat **136** will have dropped to a horizontal position on the step member **128** (in the same position as is occupied by the cleat **132** in Figure 13) with the trailing end of the cleat **136** above the top of the push fin **138** so that the push fin **138** cannot engage the trailing end of the next-to-bottom cleat **140**. The cleat **140** will thus remain in the hopper until the arrival of its proper cleat space between the push elements on the conveyor bands.

Also shown in Figures 12 and 13 is a dual safety gate which embodies features of this invention, and which functions to clear minor cleat jams and to prevent damage of the apparatus as a result of more serious cleat jams.

Generally, this gate mechanism comprises two gate members which may be moved independently of each other in a counterclockwise direction as viewed in Figures 12 and 13. The outer gate **142** is pivotally mounted at its upper end on a stud **144** threaded into one flange **146** of an upstanding angle **148** and is supported in a plate **150** attached to a bracket **152** extending outwardly from flange **146**.

Gate **142** is normally in vertical position, as illustrated in Figure 12, and extends downwardly to such a point as to permit unrestricted passage beneath it of individual, normally positioned cleats. The upper portion of the left-hand side of gate **142**, as viewed in Figures 12 and 13, is cut away to provide a notch **154** of suitable depth to receive therein the lower portion of the end wall member **156** of the cleat dispensing device, thereby establishing a continuous guiding surface for the ends of the cleats as they move downwardly in the hopper and providing a positioning stop for gate **142**.

As may be seen with reference to Figure 12, from the right-hand side of and adjacent the pivotal end of gate **142** there projects upwardly at an oblique angle an arm **158** having at its upper end a mallet-shaped head **160** (see Figure 14) which serves as a weight.

The weight **160** urges the gate **142** in a clockwise direction, as viewed in Figures 12 and 13, to its normal closing position in which it is shown in Figure 12. The angle of the arm **158** is such that the force imposed on the gate **142** by the weight **160** is at its maximum when the gate is in closed position and decreases as the gate is opened in a counterclockwise direction as illustrated in Figure 13. The gate **142**, once opened, thus imposes little drag on the cleats passing beneath it.

The effect of the weight **160** in keeping the gate **142** closed is augmented by the force of a light tension spring **162** which extends between a stud **180** at the upper end of the arm **158** and another stud **182** projecting from the lower portion of the plate **150**.

In its normal, closed position, as shown in full lines in Figure 12, the gate **42** prevents movement from the hopper of all but the bottom cleat. The gate **142** may be swung open against the resistance of the weight **160** and spring **162** to permit an improperly positioned cleat to pass out of the hopper, or to permit the two bottom cleats in the hopper to pass out of the hopper simultaneously, as illustrated in Figure 13, where these two cleats are adhering to each other, for example due to roughness of their interfaces. The opening of gate **142** thus prevents possible damage to the apparatus while avoiding the necessity of stopping the conveyor bands to clear up minor malfunctions which can be corrected merely by manually repositioning a misplaced cleat or removing a surplus cleat.

As may be seen particularly in Figure 14, the upper gate **164** is positioned adjacent the inner face of gate **142** with suitable clearance provided therebetween to permit each gate to move independently of the other. Gate **164** is also pivotally mounted on stud **144**, and is provided with an integral arm **166** projecting horizontally outward. In the rear face of arm **166** there is threaded a headed screw **168** which has hooked on it the upper end of a comparatively stiff tension spring **170** whose other end is anchored to a stud **172** threaded into the upper surface of angle member B.

An electric switch **174** attached to upstanding angle member **148** is arranged to be actuated by arm **166** in the event of a serious jam of cleats. As indicated by broken lines **176** in Figure 12, the inner face of the lower portion of gate **164** adjacent the ends of the cleats in the stack is inclined downwardly and outwardly to prevent the leading ends of cleats which, for one reason or another, have been tilted upwardly from climbing the inner face of gate **164**, as they are urged to do by frictional contact with lower cleats which are moving out of the hopper.

However, should the leading ends of the cleats become tilted downwardly, there is danger of a serious jam of cleats, as indicated by the fragmentary portion of cleat **178** shown in broken lines in Figure **13**. When such a jam of cleats occurs, gate **164** and its arm **166** will be caused to move in a counterclockwise direction, actuating switch **174** and causing the conveyor bands to stop, preventing damage to the apparatus and permitting manual clearing of the cleats involved.

It will be seen that the apparatus disclosed is capable of reliably dispensing cleats into their proper respective positions on the continuously moving conveyor bands of a box-making machine, such apparatus being relatively fool proof in operation and providing substantial safeguards against damage to the apparatus due to any anticipated type of malfunction. It will therefore be appreciated that the aforementioned and other desirable objectives have been achieved. However, it should be emphasized that the embodiments of the invention shown and described herein are intended as merely illustrative and not as restrictive of the invention.

I claim:

1. Apparatus for dispensing cleats of two different lengths into proper respective spaces between push elements secured to the moving conveyor bands of a box-making machine, said apparatus comprising a pair of hoppers spaced apart longitudinally of said conveyor bands, the first of said hoppers being adapted to support a stack of cleats of one length and the second of said hoppers being adapted to support a stack of cleats of another length, said first hopper having a movable cleat feeding element positioned to engage the bottom cleat in the stack therein, motive means for driving said cleat feeding element, actuating elements positioned on said conveyor bands in predetermined spaced relation to the push elements at the trailing ends of selected spaces on said conveyor bands, said actuating elements being arranged to actuate said motive means for driving said cleat feeding elements to eject cleats into said selected spaces, said second hopper being arranged to support the stack of cleats therein in a generally vertical column with the bottom cleat in said column in the path of said push elements whereby said cleats will drop individually and successively into the remaining spaces on said conveyor bands.

2. In apparatus for dispensing cleats of two different lengths into alternate spaces between the push elements secured to the moving conveyor bands of a box-mailing machine, said apparatus being of the type including two cleat hoppers spaced longitudinally of said conveyor bands, the first of said hoppers dispensing cleats of one of said lengths into alternate spaces and the second of said hoppers dispensing cleats of the other length into the remaining spaces, with a cleat supporting surface for supporting said cleats as they are transported through said machine by said push elements, the combination of a cleat elevating step arranged to raise said cleats above said cleat supporting surface, the end of said cleat elevating step which faces in the direction of the oncoming cleats being positioned beneath the trailing half of the

stack of cleats in said second hopper, whereby the cleats from said first hopper will enter said second hopper at a level low enough to clear the trailing end of the next-to-bottom cleat in said second hopper.

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