May 2, 1933. H. E. TWOMLEY 1,906,289

BOX STRAPPING MACHINE

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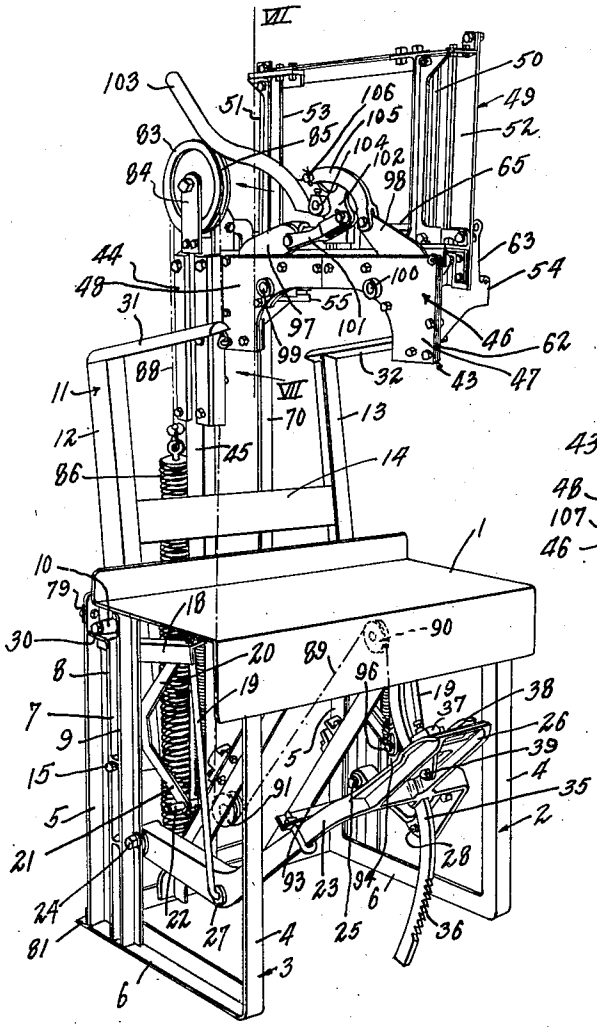


Fig. 1.

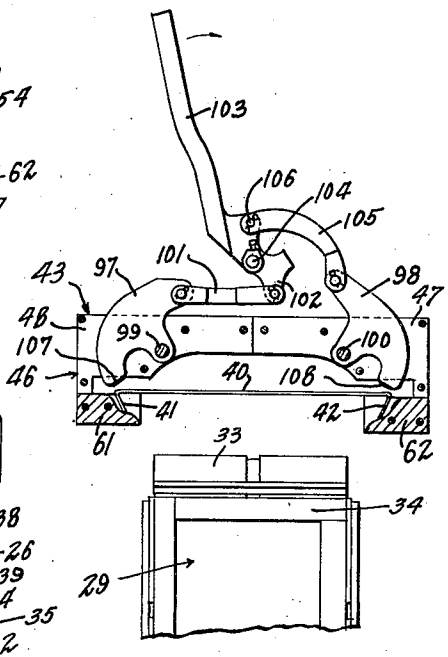


Fig. 4.

Inventor

Herbert E. Twomley

By Lyon & Lyon

Attorneys

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BOX STRAPPING MACHINE

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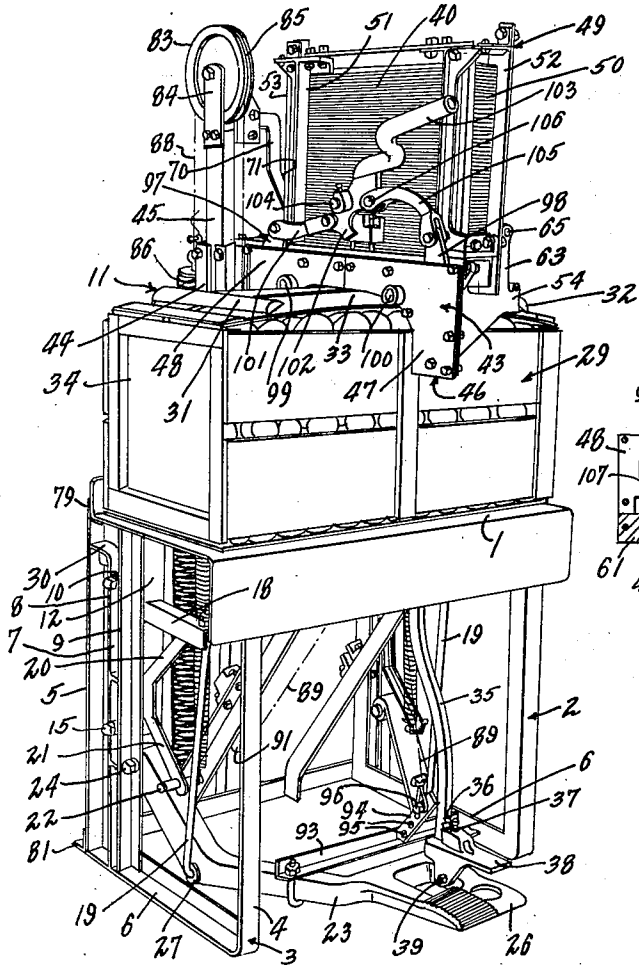
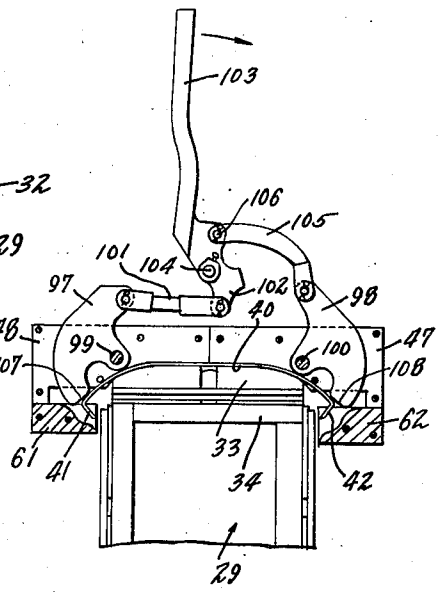


Fig. 2.

Fig. 5.



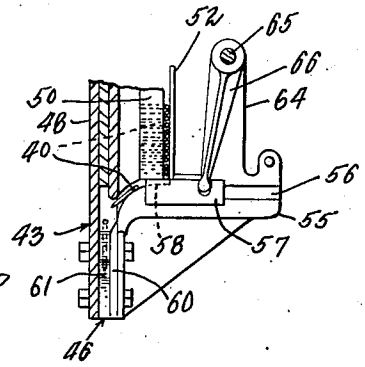


Fig. 7.

Inventor

Herbert E. Twomley

By Lyon & Lyon

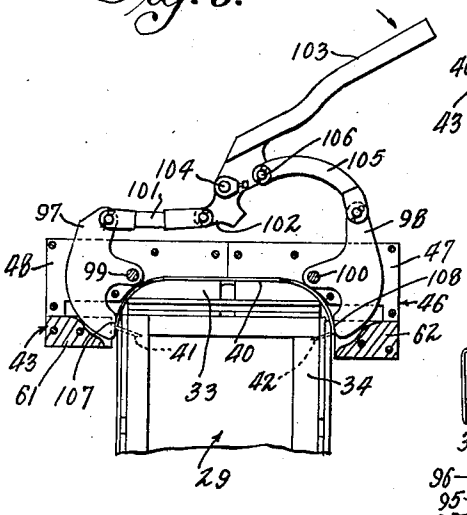
Attorney.

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BOX STRAPPING MACHINE

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Fig. 6.



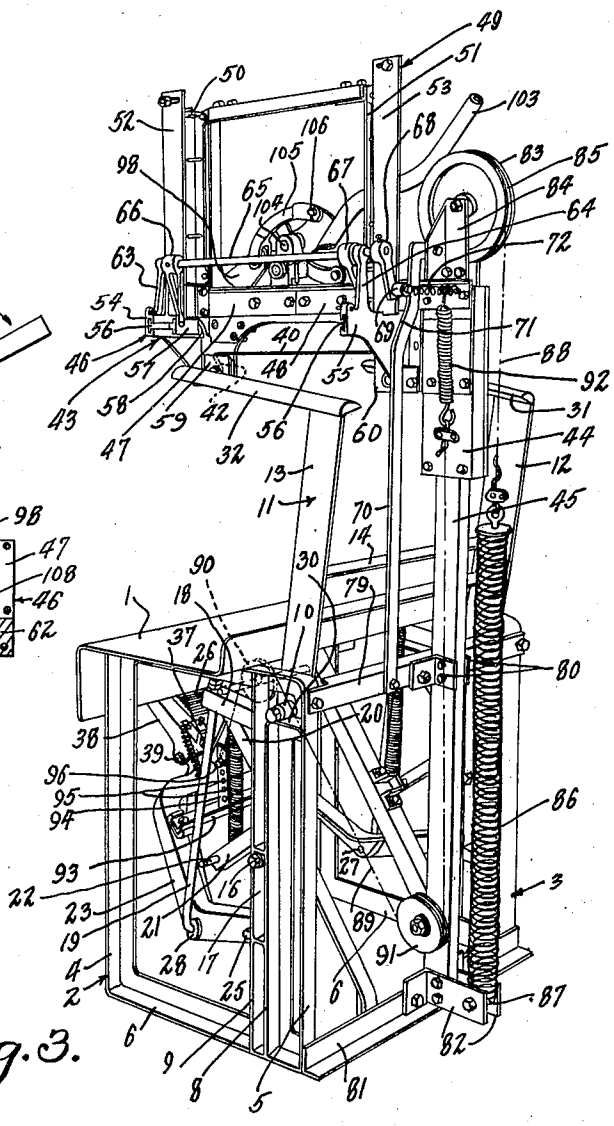


Fig. 3.

Inventor

Herbert E. Twomley

By Lyon & Lyon

Attorneys

Patented May 2, 1933 1,906,289

UNITED STATES PATENT OFFICE

HERBERT E. TWOMLEY, OF RIVERSIDE, CALIFORNIA, ASSIGNOR TO CLARA B. PARKER, OF RIVERSIDE, CALIFORNIA, EXECUTRIX OF THE ESTATE OF GEORGE D. PARKER, DECEASED

BOX STRAPPING MACHINE

Application filed May 13, 1932. Serial No. 611,112.

My invention relates to boxing machines, and has particular reference to a machine for applying retaining straps or bands upon boxes or similar packages.

In the art of boxing various types of articles, it frequently occurs that a binder or band is desired to be placed about the corners of the box or other package, particularly in applying covers to filled boxes or containers in which it is desired to put a tie or retaining strap or band across the cover of such boxes or containers.

Various types of devices for applying straps or bands of this type have been devised, some of which operate to apply tie wires or tie straps in the form of wires cut to a desired length and sharpened so that the ends of the wires may be pressed into the wood or other material of the container to thereby make the ties or straps self-retaining. Such types of straps and strap apparatus is disclosed in the patent to George D. Parker, Serial No. 1,715,780, issued June 4, 1929. However, such earlier devices have been complicated in their construction and costly to manufacture.

It is, therefore, an object of this invention to provide a simple device for applying straps or bands to boxes.

Another object of my invention is to provide a device for applying straps or bands across the covers of boxes, in which the device may be manually operated.

Another object of the invention is to provide a press for applying box straps across the cover of boxes, in which a press frame may be manually pressed down upon the box to place the cover thereof under tension and in which the strap is applied while the tension is manually maintained.

Another object of the invention is to provide an attachment for box presses which may be readily employed to adapt box presses for the application of pre-formed straps.

Another object of the invention is to provide an attachment for box presses of the character employed to secure lids to boxes in which the manual operation of the press also moves a strap press frame into compressing relation with the box cover.

Another object of the invention is to provide a construction as set forth in the preceding paragraph in which a manually operable applicator is provided for pressing a pre-formed strap into engagement with the box, while the press frame holds the cover under compression.

Other objects and advantages will be apparent from a study of the following specifications, read in connection with the accompanying drawings, wherein

Figure 1 is a perspective view of a box press and strap applying device constructed in accordance with my invention;

Figure 2 is a perspective view, similar to Figure 1, showing a press frame in box lid engaging position;

Figure 3 is a perspective view, looking toward the rear of the machine shown in Figure 1;

Figure 4 is a detail, cross sectional view of the strap applicator, used with the machine shown in Figure 1;

Figure 5 is a detail view, similar to Figure 4, showing the strap applicator in position to bend the strap around the box cover;

Figure 6 is a detail view, similar to Figures 4 and 5, showing the applicator pressing the strap into engagement with the box; and

Figure 7 is a detail, sectional view of the strap feeding mechanism employed in my invention.

Referring to the drawings, I have illustrated a box supporting table 1 suitably mounted upon supporting frames 2 and 3 secured respectively at the ends of said table. The supporting frames 2 and 3 are preferably constructed with upright legs 4 and 5 secured to a base plate 6 and may be formed from a continuous length of angle iron or structural iron or steel of any suitable shape.

Each of the end frames is provided between the legs 4 and 5 thereof with a slot 7, preferably formed of two upright members 8 and 9 secured to the end frame in spaced relation to form a slideway in which a guide roller 10, secured to a box press 11, may

operate. The box or cover press 11 is illustrated as being formed of a pair of upright members 12 and 13, one near each end of the table 1, the uprights 12 and 13 being rigidly connected in spaced relation by means of a cross bar or brace 14 between the ends of the uprights. Also the lower end of the upright 12 is illustrated as having a pin 15 extending laterally therefrom into the space or slideway between the members 8 and 9 so as to form substantially a pivotal connection between the upright 12 of the press and the table support. The upright 13 is similarly provided with a pin 16 which extends through a slot 17 formed similarly upon the opposite supporting frame 2. Each of the uprights 12 and 13 is preferably provided with a forwardly extending bracket 18 which is rigidly secured to the associated upright and provides a connection for a connecting rod 19 by which the press 11 may be moved upwardly and downwardly. The bracket 18 is illustrated as being formed from a section of angle iron extending at right angles to the upright 12, with which it is associated, while a suitable angle brace 20 extends between the upright 12 to the outer end of the angle iron, the lower end 21 of the brace 20 being illustrated as bent toward the front of the table, and provided with a laterally extending pin 22 engaged by the side of the connecting rod 19, as will be hereinafter more fully described.

An operating lever 23 for the press is illustrated as comprising a substantially U-shaped member pivoted at the ends of the U to the guide member 9, as is indicated at 24 and 25, respectively, so that the base of the U extends outwardly toward the front of the table where it terminates in a relatively broad pedal 26 for operation by the foot of an operator. Intermediate the ends of the legs of the U, a pair of bearing members 27 and 28 are provided to respectively receive the lower ends of the connecting rods 19 on opposite sides of the machine so that by depression of the pedal 26, the connecting rods are drawn downwardly to draw the press 11 downwardly into engagement with a box 29 which may be placed upon the table 1. The initial movement of the connecting rods 19 will not only pull the bracket 18 downwardly, but will also tend to rotate the same so as to draw the apparatus 12 and 13 slightly forward toward the table. In order to insure this forward movement of the press 11, the pin 22 extends into a position where it will contact the side of the connecting rod 19 upon the initial downward movement of the rod, thus effectively tilting the press 11 forwardly.

It will be observed that the upright guide member 8 is bent rearwardly at its upper end, as is indicated at 30, so that when the press is in its upper position the roller 10 may slide somewhat rearwardly out of alignment with the guide slot 7, but when the connecting rod is pulled downwardly and the press tilted forward, the roller 10 is brought into direct vertical alignment with the slot 7.

The foregoing apparatus is that usually found upon a manually actuated nailing or lidding press employed in the placing of lids on crates or boxes particularly used in connection with the citrus industry.

By referring particularly to Figure 2, it will be observed that when the press frame 11 is drawn downwardly, the pressing members 31 and 32 which extend forwardly from the uprights 12 and 13, respectively, will engage the top or cover 33 of a box 29 near the ends thereof and will press the same downwardly into tight engagement with the end members 34 of the box for nailing to the end frames of the box. It is usual, in this type of boxing, to secure the cover 33 to the box by driving a plurality of nails into the end frames through the end edges of the box cover.

It will also be observed that while the nailing operation is to occur, it is necessary that the press frame 11 be held in the downward position, and for this purpose it is usual to provide a pawl and ratchet mechanism to retain the pedal 26 in its depressed position. This construction is illustrated as comprising a bar 35 extending from beneath the table 1 in alignment with the movement of the U-shaped lever 23 and having its lower end provided with a plurality of ratchet teeth 36 to be engaged by a pawl 37 secured to a pawl lever 38 pivotally mounted at 39 upon the pedal portion 26 of the lever 23. Thus when the pedal is moved to its downward position, the pawl 37 will engage the ratchet teeth and hold the lever in the downward position until the pawl is released by moving the pawl lever 38.

In applying lids to boxes of the character used in the citrus industry, it is common to fill the boxes to a level slightly above the level of the top of the boxes so that when the lid is in place it presses the contents downwardly into the interior of the box. However, in view of the fact that the lid is usually constructed of rather thin material, the central portion of such lid is bowed upwardly by contact with the fruit or other contents of the box. It is desirable that an additional securing device be placed across the center of the lid in order to properly retain the lid upon the box, and also to prevent undue strains being placed upon the material of which the cover is constructed.

The intermediate securing devices may comprise a band or strap of suitable material placed across the cover of the box and secured to the sides of the box while under

tension or while the lid of the box is compressed by some exterior means. One common form of securing device is illustrated as comprising a pre-formed box strap 40 which is formed as a length of relatively heavy wire, the ends 41 and 42 thereof being preferably bent at substantially less than right angles to the major portion of the wire and the ends sharpened so as to permit ready driving thereof into the material of the sides of the boxes, thus making the strap 40 self-securing. Such straps and their method of manufacture and use is well known in the art, and is illustrated in the patent to George D. Parker, mentioned hereinabove.

I utilize the box table and cover press hereinbefore described as a ready means for permitting the attachment of box straps of this character by employing a strap press 43, mounted upon a slide 44, which is in turn reciprocably mounted upon an upright guide 45 secured to the table construction. The strap press 43 is illustrated as comprising a cover press arm 46 extending forwardly from the slide 44 and having a length considerably in excess of the width of a box 29.

A pair of cover forming plates 47 and 48 are secured to one side of the arm 46, the plates together forming a substantially U-shaped box cover engaging device which presses the box cover downwardly toward the box and at the same time bends the sides of the cover slightly toward the box to present a substantially rounded appearance to the contiguous edges of the box sides and cover. The arm 46 also constitutes a mounting device for a strap feed mechanism 49 which includes a pair of upstanding brackets 50 and 51, respectively, spaced from a pair of strap guides 52 and 53 by an amount equal to the thickness of the wire material from which the strap is formed, so that the assembled mechanism constitutes a magazine in which a number of straps may lie, one upon the other ready to be fed to a position upon the box cover.

By referring particularly to Figures 3 and 7, it will be observed that the lower ends of the brackets 50 and 51 are formed with outwardly extending portions 54 and 55, respectively, each of which is formed with a laterally extending slot 56 in which operates a strap pick slide 57.

By referring particularly to Figure 7, it will be observed that the normal position of the pick slide 57 is immediately below the stack of straps 40 in the strap feeding magazine, but when the pick slide 57 is moved rearwardly in its slot 56 it permits the straps 40 to descend until the lowermost strap comes to rest upon a shoulder 58 formed upon the outwardly extending portions 54 and 55 of the brackets 52 and 53. Preferably, the distance between the upper edge of the pick slide 57 and the shoulder 58 is just sufficient to accommodate the thickness of one of the straps so that upon reverse movement of the pick slide 57 it will engage the lowermost strap to press the same forward, as is indicated in Figure 7, while the slide 57 will hold the remainder of the straps in the magazine.

It will also be observed from an inspection of Figure 7, that the shoulder 58 is curved outwardly and downwardly to form a slide upon which the strap 40, so picked off, may move downwardly toward the lower ends of the plates 47 and 48 and in so doing will be turned through an angle of 90°. The purpose of this construction is that in order to best store the straps 40 in the magazine construction, the outwardly bent ends of the straps 40 should extend horizontally while, when the strap is in position to be applied to the box, the points should be directed downwardly, ready to be bent toward the box sides with the points of the strap directed at right angles to the sides of the box.

From an inspection of Figures 3, 4 and 7, it will be observed that a pair of strap supporting blocks 59 and 60 are secured to the rear faces of the plates 47 and 48 and are spaced therefrom, respectively, by fillers 61 and 62, the inner edges of the fillers being formed with shoulders to catch the ends of the strap and support the same above a box positioned upon the table so that when a strap 40 is fed from the magazine it falls between the plates 47—48 and the blocks 59—60 and comes to rest with the ends 41 and 42 of the strap in engagement with the shoulders of the fillers 61 and 62. Thus the strap is moved into position immediately above the box, with the ends 41 and 42 of the strap lying in a vertical plane transversely of the box 29.

By referring particularly to Figures 3 and 7, it will be observed that the outwardly extending members 54 and 55 are provided with upstanding brackets 63 and 64 constituting bearings in which a shaft 65 is journaled. A crankarm 66 is illustrated as being rigidly secured to the shaft 65 for movement therewith, the lower end of the crankarm being engaged with the pick slide 57 so that oscillation of the shaft 65 will cause the pick slide 57 to be reciprocated in its guide slot 56. Similarly, a crankarm 67, provided near the other end of the shaft 65 operates the pick slide upon that end of the strap magazine.

The outer end of the shaft 65, is illustrated as having a third crankarm 68 rigidly secured thereto, the outer end of the crankarm 68 being provided with a rearwardly extending roller 69 to engage a cam track 70 extending vertically alongside the strap press guide 45, so that as the strap press 43 is moved downwardly along its guide 45

the cammed surface 71 of the track 70 will cause the crankarm 68 to move outwardly, thereby partially rotating the shaft 65 to draw the pick slides 57 to their rearward position, while, upon return of the strap press to its upper position, a reverse movement of the shaft 65 is accomplished by means of a tension spring 72 to move the pick slides to their normal position, pressing the lowermost strap from the magazine into a position ready to be applied to the box.

By referring particularly to Figures 1, 2 and 3, it will be observed that the strap press guide 45 is secured rigidly to the rear of the press table 1 by means of a suitable cross bar 79 extending between the table supporting frames 2 and 3 to which the guide 45 will be secured by suitable angle brackets 80. The lower end of the guide 45 is likewise secured to the table construction by means of a cross bar 81 extending between the frames 2 and 3 to which the lower end of the guide 45 may be secured by means of angle brackets 82.

It will also be observed that a pulley 83 is provided upon the upper end of the guide 45, the same being mounted upon the guide by means of a pair of bearing brackets 84 so that the groove 85 of the pulley is in substantially direct vertical alignment with the center of the guide 45. The strap press 43 is preferably maintained in its uppermost position by means of a suitable tension spring 86 connected at one of its ends 87 to the lower angle bracket 82, while the upper end of the spring is connected to a suitable cable 88 to one of the plates 48, comprising a part of the strap press.

The press 43 is arranged to be drawn downwardly by the same operation which draws the cover press 11 downwardly by interconnecting the operating lever 23 for the cover press 11 with the strap press 43 as by means of a cable 89 extending from the lever 23 over a pulley 90 secured immediately beneath the table 1 and then passing the cable over a second pulley 91 rotatably secured near the lower end of the guide 45, after which the cable extends upwardly to be secured to the slide 44. If desired, a spring 92 may be interposed between the cable and the slide 44 so as to limit the compression which may be placed upon the cover to a desired value and thus compensate to some extent for differences in the amount of movement permitted the lever 23 by engagement of the cover press 11 with different heights of boxes.

Attachment of the cable 89 to the lever 23 may be readily accomplished by connecting a cross bar 93 across the base of the U and providing an upstanding arm 94 thereon having a plurality of openings 95 through which a pawl 96 may be inserted to secure the end of the cable in any one of a number of positions along the arm 94.

It will thus be observed that upon placing a box 29 upon the table 1 and operating the lever 23 to move the press frame 11 down upon the cover 33, pressing the cover into nailing position upon the box, is simultaneously accompanied by a descent of the strap press 43 until the press 43 engages the lid of the box and presses the same downwardly at the center thereof into close relation with the box.

Assuming that a strap 40 has been fed from the magazine into the position shown in Figure 4 prior to the descent of the strap press 43, this strap will be contacted with the top of the box cover 33.

By referring particularly to Figures 4, 5, 6, and 7, it will be observed that the strap press 43 is provided with a pair of strap driving members 97 and 98, each of which is pivotally mounted upon bearings 99 and 100, respectively, near opposite ends of the plates 47 and 48. The upper end of the strap driving member 97 is illustrated as being connected through a link 101 to one end 102 of a lever 103 pivoted at 104 upon the strap press 43.

The upper end of the strap driving member 98 is connected through a link 105 to the lever 103 at a point 106 lying on the opposite side of the pivot 104 to that at which the link 101 is connected. When the strap press 43 is in its elevated position and the lever 103 is in its normal position, as is illustrated in Figures 1 and 3, the driving members 97 and 98 are in the positions substantially as shown in Figure 4, the contact ends 107 and 108 of these driving members being spaced considerably above the level of the strap supporting fillers 61 and 62 so that they present no interference to the feeding of the strap 40 into position above the box 29.

However, when the strap press 43 is drawn downwardly into engagement with the cover 33 of the box, the overhanging ends of the plates 47 and 48 will descend beyond the upper level of the cover 33 and the strap 40 will be engaged by the top of the cover 33 and be pressed upwardly toward the plates 47 and 48 and thus toward the driving ends of the driving members 97 and 98.

It will be observed that this operation will cause the strap 40 to be bent slightly around the cover, while, at the same time, the strap ends will be lifted out of contact with the supporting fillers 61 and 62. Thus, upon the swinging of the lever 103 around the pivot 104 by the operator, the strap driving members 97 and 98 will press the adjacent ends 41 and 42 of the strap 40 around the sides of the cover until the points of the ends 41 and 42 of the strap engage the sides of the box, as shown in

Figure 5. Further manipulation of the lever 103 will cause the driving ends 107—108 to press the pointed ends of the straps directly into the sides of the box 29 and thus secure the strap to the box.

Thus by two simple manual operations, one the pressing of the lever 23 downwardly to draw the cover press and strap press into engagement with the box, and the other the operation by hand of the lever 103, the straps are automatically fed from the magazine and are placed over the cover of the box, bent therearound, and the ends of the straps driven into the sides of the box. It will, therefore, be observed that I have provided a simple strap applying mechanism which may be readily attached to existing box cover press machines which in no wise interferes with the normal operation of such machines, but which permits the same machine to be utilized both as a cover press, assisting in the nailing of the covers to the box, and, also, as a machine for quickly and readily applying a center strap across the cover of the box.

It will also be observed that the strapping device is simple in its operations of feeding the straps from a suitable magazine into a position ready to be applied to the box, and by a simple manual operation the straps may be attached to the box.

While I have shown and described the preferred embodiment of my invention, it is to be understood that I do not wish to be limited to any of the details of construction shown or described herein, except as defined in the appended claims.

I claim:

1. In a device for applying pre-formed straps to boxes, a box supporting table, a vertical guide mounted upon the rear of said table, a strap press slidably mounted upon said guide and extending transversely of said table across a box placed thereon, manually operable means for moving said strap press downwardly into pressing engagement with a box on said table, a strap magazine associated with said press for holding a supply of straps, strap feeding mechanism for feeding said straps one at a time from said magazine to said press, a stationary cam mounted adjacent said guide, operating means for said feeding means carried by said press and engageable with said cam to operate said feeding means upon each reciprocation of said press upon its guide, and means on said press for applying the strap so fed to said box.

2. In combination with a box press table having a cover press and a manually operable lever for actuating said cover press, an attachment for applying straps to boxes including a vertical guide to be mounted upon the rear of said box press table, a strap press slidably mounted upon said guide and extending transversely of said table across the box placed thereon, means interconnecting said cover press lever with said strap press for moving said press downwardly into pressing engagement with a box when said lever is operated, and means on said strap press for applying a strap to said box.

3. In combination with a box press table having a cover press and a manually operable lever for actuating said cover press, an attachment for applying straps to boxes including a vertical guide to be mounted upon the rear of said box press table, a strap press slidably mounted upon said guide and extending transversely of said table across the box placed thereon, means interconnecting said cover press lever with said strap press for moving said strap press downwardly into pressing engagement with a box when said lever is operated, means on said strap press for applying a strap to said box, and means normally urging said strap press upwardly out of engagement with said box.

4. In an attachment for box cover presses having a box supporting table, a cover press and a lever for actuating said cover press, said attachment including a vertical guide to be secured to the rear of said box press table, a strap press slidably mounted upon said guide and extending transversely of said table across a box placed thereon, a strap magazine for holding a number of straps associated with said strap press, feeding mechanism for feeding said straps from said magazine to said press one at a time, a cam secured to said guide, operating means for said strap feeding means movable with said strap press and engaging said cam for operating said feeding mechanism upon each reciprocation of said strap press upon its guide, and means interconnecting said cover press lever with said strap press for moving said strap press downwardly into pressing engagement with a box on said table when said cover press lever is actuated.

5. In a device for applying straps to boxes, a box supporting table, a vertical guide secured to the rear of said table, a strap press slidably mounted upon said guide and extending transversely of said table across the box positioned thereon, a foot lever on said table, means connecting said foot lever with said strap press to move said press downwardly into pressing engagement with a box on said table when said foot lever is depressed, means for drawing said press upwardly out of engagement with said box when said foot lever is released, and independently operable means on said strap press for applying a strap to said box.

Signed at Riverside, California, this 22d day of April, 1932.

HERBERT E. TWOMLEY.