June 28, 1932. C. E. STUBBS ET AL 1,864,776

SHOOK ARRANGER

Filed July 16, 1929 4 Sheets-Sheet 1

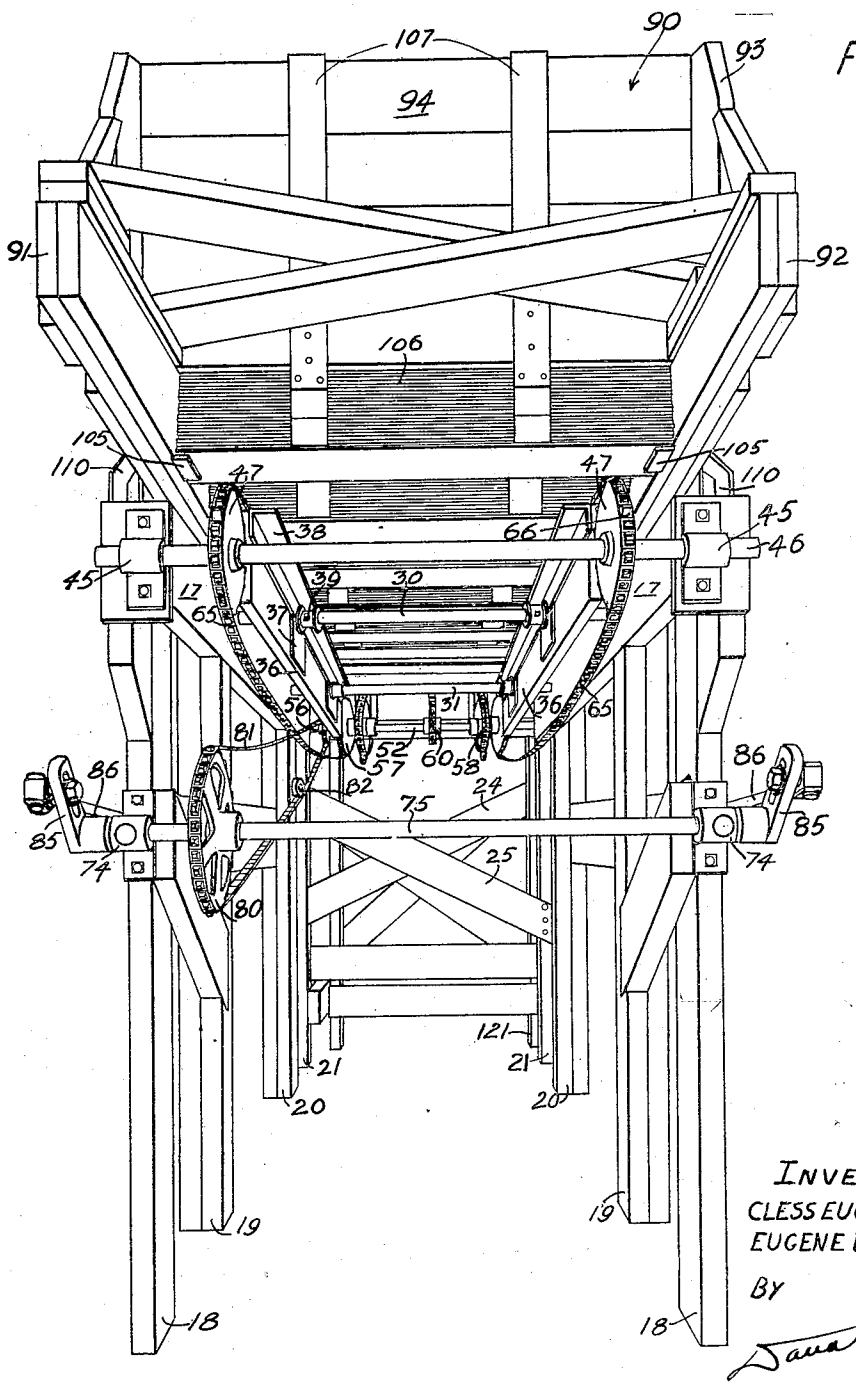


FIG. 1.

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SHOOK ARRANGER

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FIG. 2.

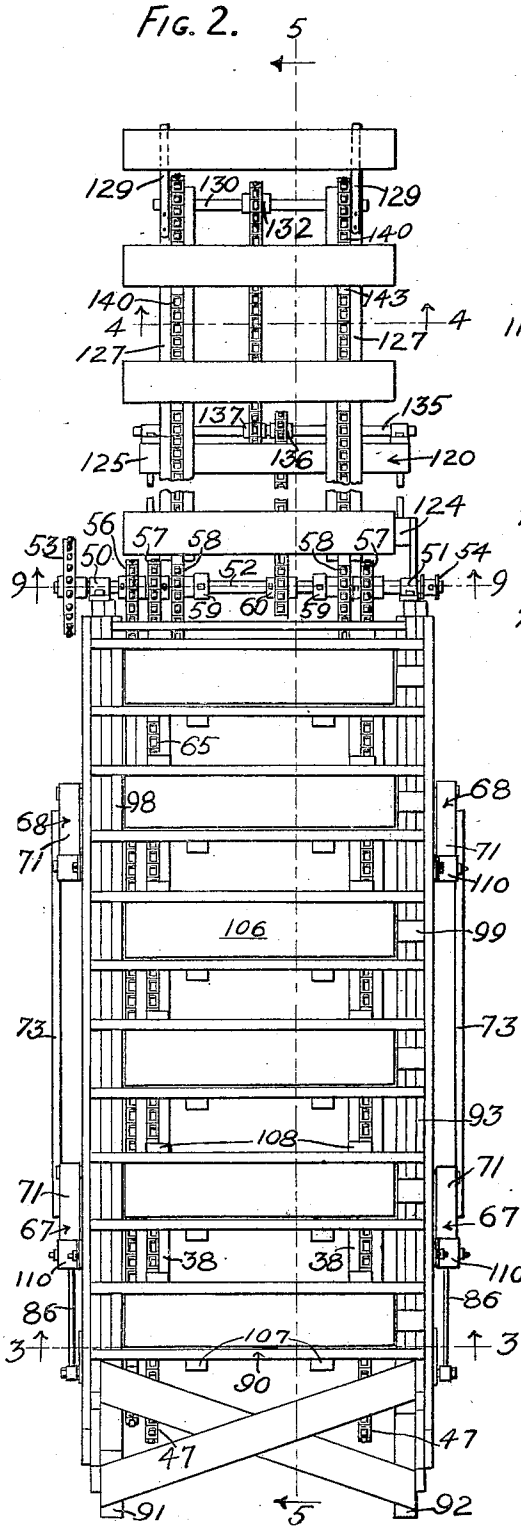


FIG. 3.

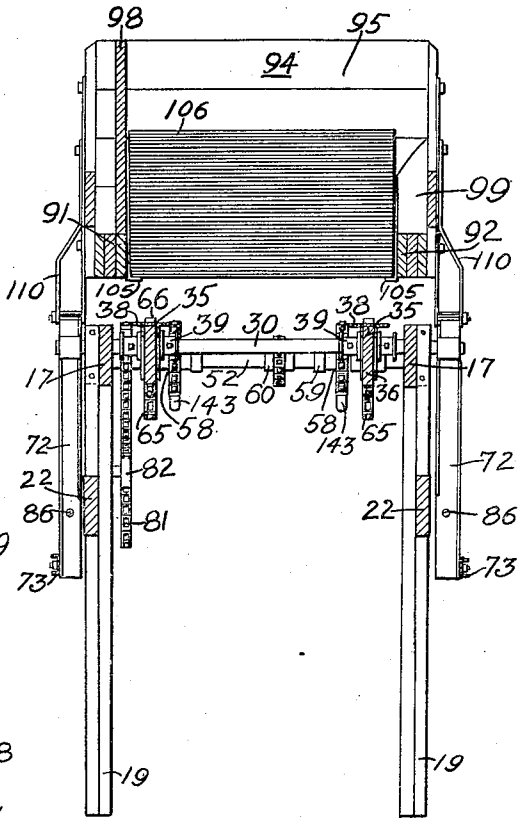
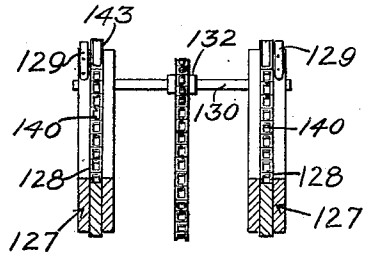


FIG. 4.



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SHOOK ARRANGER

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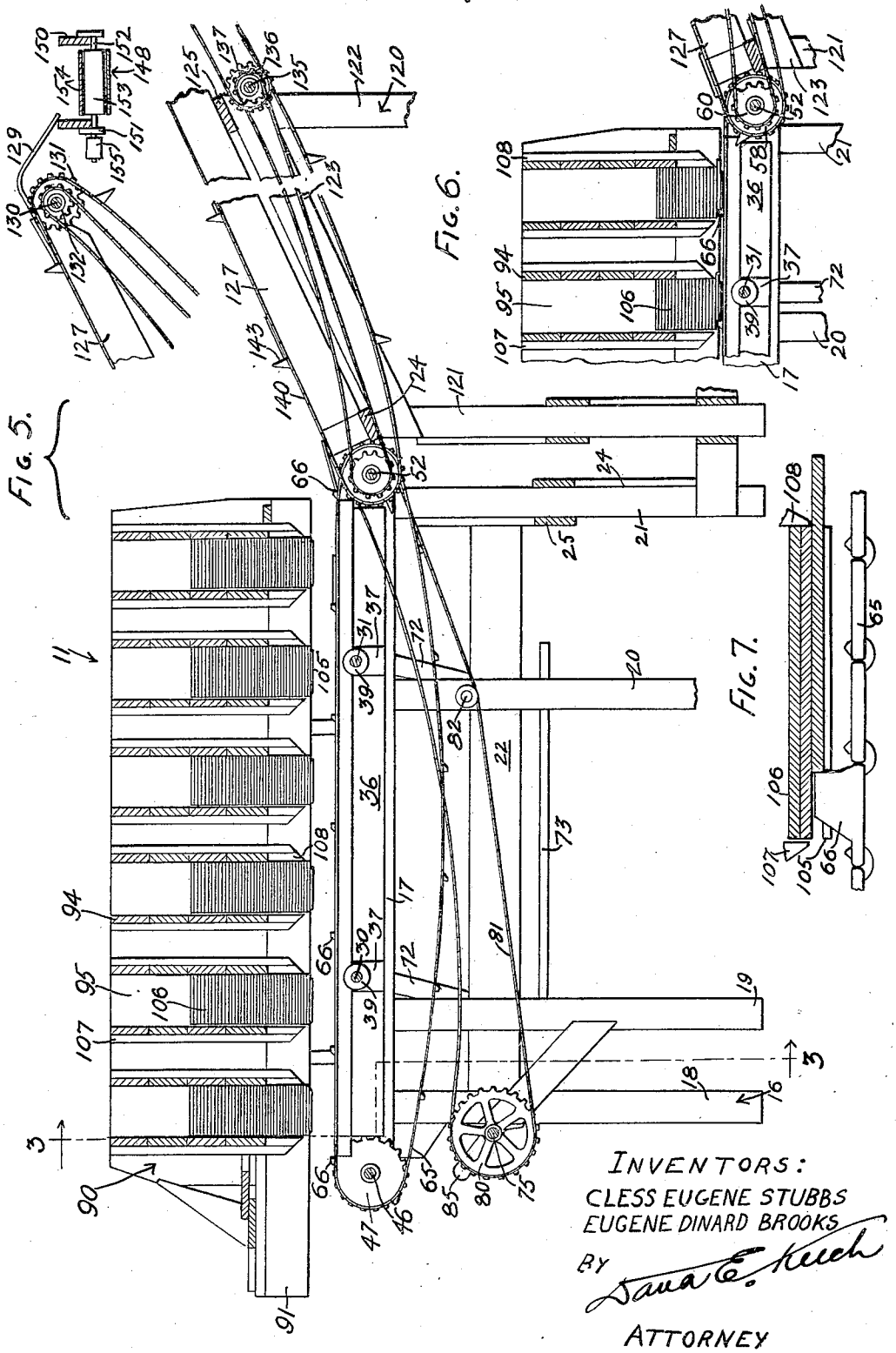


FIG. 5.

FIG. 6.

FIG. 7.

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SHOOK ARRANGER

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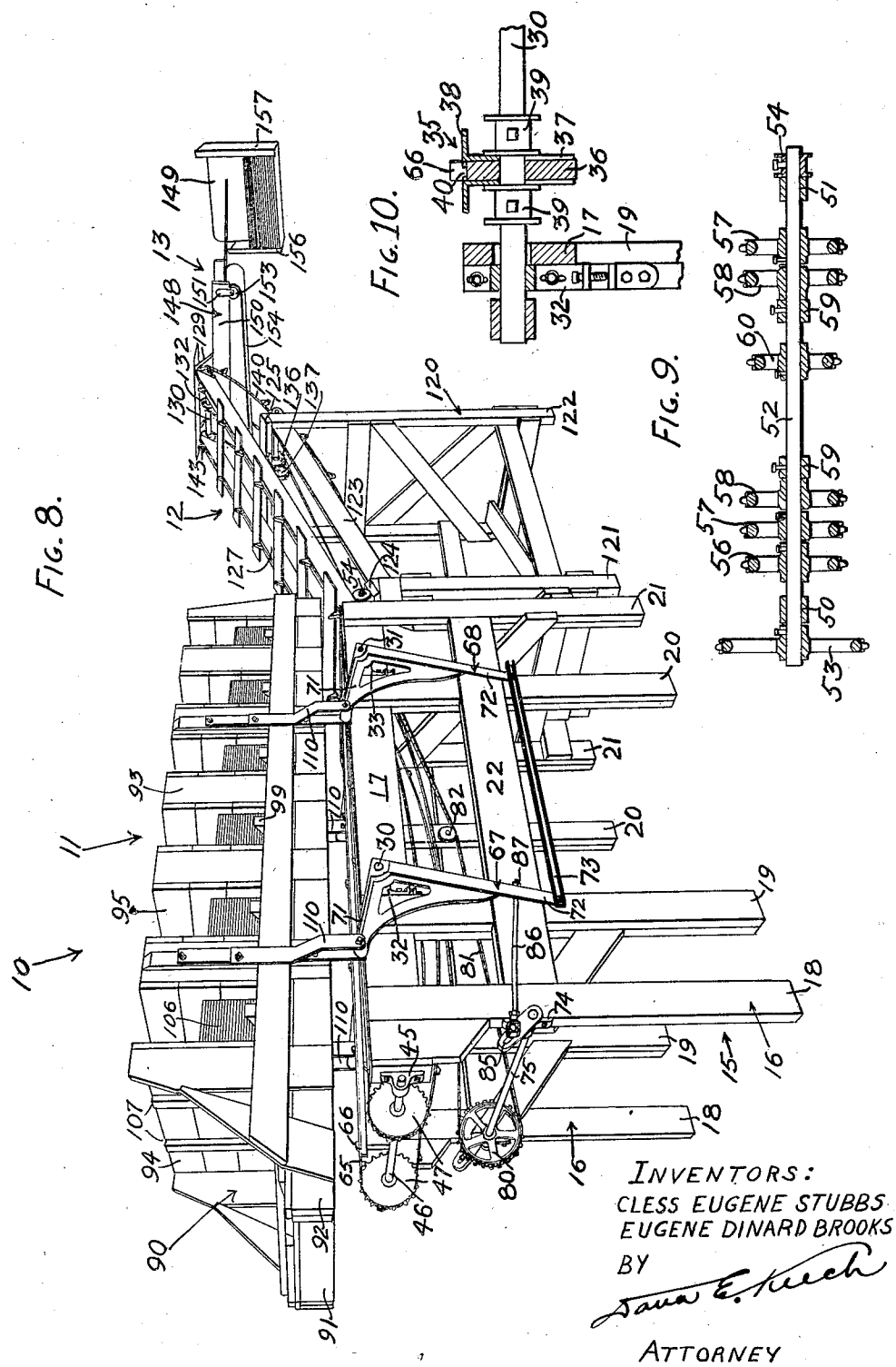


FIG. 8.

FIG. 10.

FIG. 9.

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SHOOK ARRANGER

Application filed July 16, 1929. Serial No. 378,806.

Our invention relates to the art of material handling, and particularly to material arranging devices.

While our invention, with suitable modification, may be used for arranging many different kinds of material, such as cards, stampings, and other objects of a flat nature, it is especially suitable for the arranging of box shook.

In many industries, including that of packing and shipping citrus fruits, large quantities of wooden shipping boxes are required. In the citrus industry these are usually made by an automatic machine. The shook, or individual pieces of wood from which the boxes are made, is placed by an attendant in magazines on the box making machine, the latter automatically taking this shook from the magazines and nailing it together to form boxes.

Each of these citrus shipping boxes have two ends and a middle partition and two sides and a bottom. The bottom, as well as each of the sides of the box, is made from two individual slats nailed to the ends and the partition. By far the greater portion of citrus shipping boxes used in California are standard orange boxes. In these the side and bottom slats are all of the same dimensions and are fed from the same magazine. The box ends and partitions are fed from separate magazines.

Owing to the practice of printing advertising matter upon the side slats used in making citrus shipping boxes it is necessary to arrange the shook in the magazine containing the bottom and side slats so that the unprinted slats will be fed from this magazine for use as bottoms and the printed slats will be fed for use as sides in proper order so that the printed matter will be right side up on opposite sides of the box when the box rests upon its bottom. Heretofore the arranging of the shook in this manner has been accomplished by hand.

It is an object of our invention to provide a shook arranger for mechanically arranging shook in the proper order for use.

The arranging of the side and bottom slats by hand makes it necessary for an automatic box making machine to be attended by two persons, the principal duties of one of which is to feed the shook into the machine.

It is correspondingly another object of our invention to provide a mechanical shook arranger which will make it possible for operating an automatic box making machine under the care of a single attendant.

Further objects and advantages will be made manifest in the following description and in the accompanying drawings, in which:

Fig. 1 is a perspective view from a viewpoint at the rear of the device.

Fig. 2 is the plan view showing a preferred embodiment of our invention.

Fig. 3 is a cross sectional view on the line 3—3 of Figs. 2 and 5.

Fig. 4 is a fragmentary cross sectional view on line 4—4 of Fig. 2.

Fig. 5 is a longitudinal sectional view on the line 5—5 of Fig. 2.

Fig. 6 is a fragmentary view of a portion of Fig. 5 illustrating certain parts thereof in a different position.

Fig. 7 is a fragmentary detail view illustrating removal of a piece of shook from a magazine.

Fig. 8 is a perspective view from a rear quarter of the device.

Fig. 9 is a fragmentary cross sectional view taken on the line 9—9 of Fig. 2.

Fig. 10 is a fragmentary cross sectional view illustrating in detail a portion of Fig. 3.

Referring specifically to the drawings. a shook arranger 10 illustrated herein includes a shook selector 11, a shook elevator 12 and a shook assembler 13.

The shook selector 11 includes a base frame 15 having side frame members 16, each of which includes an upper longitudinal beam 17, legs 18, 19, 20 and 21, the upper ends of which are attached to and support said beam, and a lower longitudinal beam 22 which rigidly connects said legs. The legs 21 of the side frame members 16 are connected by transverse braces 24, 25 and 26. Upper portions of the side frame members 16 are connected by fixed shafts 30 and 31, opposite end portions of which are supported in and extend slightly beyond bearing brackets 32 and 33, which are

mounted upon the upper forward faces of the legs 19 and 20 respectively.

Disposed parallel with and slightly inside of the upper beams 17 are selector chain belt tracks 35. Each of the tracks 35 includes a wooden beam 35 reinforced by plates 37 and angle iron members 38 disposed along the sides thereof and secured rigidly thereto. The beams 36 and plates 37 are provided with suitable apertures which snugly receive the shafts 30 and 31. Fixed to these shafts so as to bear against and rigidly position the tracks 35 are set collars 39. The angle iron members 38 extend slightly above the upper edges of the wooden beams 36 so as to form selector chain belt guideways 40.

Mounted in suitable bearing brackets 45 provided on the rear ends of the upper longitudinal members 17 is a shaft 46 upon which sprockets 47 are mounted to freely rotate, these sprockets having their upper portions in tangential alignment with guideways 40. Rotatably mounted in bearings 50 and 51 provided on forward faces of the frame legs 21 is a drive shaft 52 carrying sprockets as clearly shown in Fig. 9. An outer end of shaft 52 carries a main drive sprocket 53 and the opposite end a collar 54. Rigidly secured to the shaft 52 just within the bearing 50 is a magazine lift drive sprocket 56. Between the sprocket 56 and the bearing 51 is disposed a pair of fixed sprockets 57, the upper portions of which are in tangential alignment with the aforementioned track guideways 40. Rotatably mounted on the shaft 52 just within the sprockets 57 is a pair of sprockets 58 which are held against inward displacement by collars 59. Fixed upon the shaft 51 between the collars 59 is an elevator drive sprocket 60.

The purpose of the main drive sprocket 53 is to rotate the shaft 52. The purposes of the sprockets 56, 58 and 60 will be described later.

Passing around selector chain drive sprockets 57 and the sprockets 47 so that the upper flights lie in the selector chain belt guideways 40 are selector chain belts 65. At regular intervals in the chains 65 links thereof are provided with lugs 66 for a purpose to be described later. The points in the chains 65 at which the lug links 66 are provided are respectively directly opposite each other.

Mounted upon the extending end portions of the shafts 30, and 31 are rockers 67 and 68 respectively, these rockers having short upper arms 71 and long lower arms 72. Connecting the lower ends of the arms 72 are connecting rods 73. Mounted in suitable bearings 74 provided upon the rear faces of the legs 18 is a shaft 75. Rigidly fixed to the shaft 75 so as to be in alignment with the sprocket 56 (on the shaft 52) is a sprocket 80. Extending around the sprockets 56 and 80 is a sprocket chain 81, the lower flight of which is engaged by an idler 82 mounted on an adjacent leg 20, for maintaining this chain relatively taut. Outer ends of the shaft 75 extend beyond the bearing 74 and are provided with short arms 85, each of which is provided with a pitman 86, free ends of which extend through suitable apertures in the arms 72 of the rockers 67 and are provided with abutments 87 which are adapted to engage the arms 72 for actuation thereof in a manner and for a purpose to be described later.

Disposed above the base frame 15 is a magazine 90 having longitudinal members 91 and 92 which are provided with vertical studs 93 connected by transverse walls 94 so as to form a plurality of magazine cavities 95. Each of the magazine cavities 95 has a vertical back wall 98 and the front end has a short vertical guide member 99, inner faces of said back wall and said guide member being flush with inner faces of the longitudinal frame members 91 and 92. Set into the lower portions of the inner faces of the longitudinal members 91 and 92 at each of the magazine cavities 95 is a pair of shook stack supports 105 which are adapted to support a stack of shook 106 disposed in such cavity. Provided on the outer surfaces of the transverse cavity walls 94 are pairs of shook guides 107 and 108, having inner faces which lie in the same planes as inner surfaces of these cavity walls. The lower edges of the shook guides are bevelled as shown and are located respectively just above the upper surface of the lowest piece of shook in the adjacent shook stack 106, as shown in Fig. 7.

The magazine 90 is supported, with the stacks of shook 106 disposed therein, upon the arms 71 of the rockers 67 and 68 by brackets 110 suitably mounted upon sides of the magazine 90.

The magazine 90 is so constructed that the longitudinal distances between adjacent stacks of shook 106 are uniform and are slightly greater than the width of one of the pieces of shook in these stacks. It also might be mentioned here that the chain dogs 66 are uniformly spaced on the chain belts 65, distances equal to that between rear edges of adjacent stacks of shook 106.

The shook elevator 12 includes a frame 120 having rear legs 121 and front legs 122 connected, by suitable bracing, to each other and to the legs 21 of the selector frame 15. Upper ends of the legs 121 and 122 are connected by inclined braces 123. Resting upon and connecting the respective upper ends of the pairs of legs 121 and 122 are transverse bars 124 and 125. Resting upon the transverse bars 124 and 125 is a pair of elevator tracks 127 each of which is provided with an elevator chain belt guideway 128 on its upper surface, the guideways 128 being tangential with upper portions of aforementioned idle

sprockets 58 disposed on the shaft 52. Upper ends of the tracks 127 are provided with metal delivery skids 129 as shown.

Rotatably mounted in suitable bearings disposed on the ends of the elevator tracks 127 is a shaft 130 having a pair of drive sprockets 131 upper portions of which are in tangential alignment with the guideways 128, and a middle driven sprocket 132. Mounted in suitable bearings provided on forward faces of the frame legs 120 is a counter shaft 135 having fixed thereto a sprocket 136 which is aligned with the sprocket 60 and a sprocket 137 which is aligned with the driven sprocket 132. The pairs of sprockets thus aligned are connected by suitable sprocket chains so that through these chains and aligned pairs of sprockets the shaft 130 is driven by the rotation of the shaft 52.

Extending about the pairs of sprockets 58 and 131 respectively are elevator sprocket chains 140, the upper flights of which are disposed on the runways 128. At opposite points in these respective chains, and at regularly spaced intervals, links are provided which have outwardly extending shook carrying dogs 143.

The shook asembler 13 is disposed directly under the skids 129 and includes a transfer belt 148 and an assembler magazine 149, there being suitable means (not shown) for supporting these. The transfer belt 148 includes frame members 150 which support suitable bearings in which are journalled shafts 152 having pulleys 153. Passing around the pulleys 153 is a belt 154 the upper flight of which is substantially horizontally disposed between lower portions of the side members 150. One of the shafts 152 is provided with a suitable pulley 155 for the purpose of driving the belt 154 at a fairly high rate of speed.

The assembler magazine 149 is of any suitable type having a low left side wall 156 and a high right side wall 157. In the installations of the shook arranger 10 for use with the automatic orange box making machine in common use in California the magazine 149 would be the bottom and side slat magazine on the machine.

The operation of our invention is as follows:

The principal use of the shook arranger 10 at present contemplated is when associated with the side and bottom slat magazine 149 of an orange box making machine so that successive groups of slats, each six in number, shall be fed into this magazine with the slats in each group arranged in a certain definite order so that when utilized by the mechanism of the box making machine to make up orange boxes, one of these groups will be used in making each box and will present the side and bottom slats for use in such order that advertising matter appearing on the side slats will be disposed right side up when the box rests upon its bottom. In order to accomplish this the stacks of slats 106 are placed in the magazine cavities 95 in definite positions therein so that when a slat is selected from each of these stacks and placed in a group in the same order as the stacks from which they are taken the slats in this group will be in proper order for the formation of a box in said box machine.

To operate the shook arranger 10, a suitable source of power may be connected through a sprocket chain (not shown) with the main drive sprocket 53 so as to rotate the shaft 52 in a clockwise direction, as this appears in Fig. 5. This rotates the sprocket 56 which through the chain 81 and sprocket 80 rotates the shaft 75 and causes the rockers 67 and 68 to be rocked and the selector magazine 90 to be periodically lowered from and raised to the position in which it is shown in Figs. 4 and 8. Rotation of the shaft 52 also rotates the sprockets 57 and draws the upper flights of the chains 65 forwardly along the tracks 40.

In its lowermost position the magazine 90 rests upon the upper longitudinal frame members 17. With the magazine in this position the lowermost pieces of shook in each of the stacks 106 are disposed in the path of chain dogs 66.

The magazine reciprocating mechanism, and particularly the cranks 85 and pitmen 86 are so proportioned and timed that the magazine 90 comes to rest upon the frame members 17 prior to the completion of the movement of the pitmen 86 toward the rocker arms 72. Owing to the position of rest thus assumed by the magazine 90 the arms 72 also come to rest and the pitmen 86 continue on moving a slight distance through the apertures in the arms 72 through which these pitmen extend.

The magazine 90 is thus permitted to remain at rest on the frame members 17 during a certain portion of each revolution of the arms 85. The mechanism is so coordinated that this period of rest for the magazine 90 begins when a pair of dogs 66 is just coming into contact with the lowermost piece of shook in each of the stacks 106 and the magazine rest period continues until after movement of the chain 65 has caused these dogs 66 to slide said lowermost pieces of shook out of their positions in which they are supported by the stack supports 105 and onto the chains 65 just in advance of the respective pairs of dogs which moved them from their respective stacks of shook. The manner in which these lowermost slats are removed is illustrated in Fig. 6. The pairs of guides 108 disposed just forward of the stacks of shook 106 prevent the dogs 66 removing more than one piece of shook at a time.

The magazine reciprocating mechanism is so adjusted that the period of rest of the magazine in its downward position terminates just after the lowermost pieces of shook are removed from the respective stacks 106, the upward movement of the magazine 90 being started quickly enough by contact of the abutments 87 with the arms 72 so as to prevent pieces of shook just removed from the stacks 106 and traveling upon the chains 65 in advance of the respective pairs of lugs 66 thereof from engaging the next higher pieces of shook in the stacks 106 which have now dropped down into contact with the stack supports 105.

Rotation of the shaft 52 to operate the selector 11 also operates the elevator 12 through the aligned pairs of sprockets 60, 132, 136 and 137 which are connected by chains as heretofore described. The proportionate diameters of these sprockets is so determined that the elevator chain belts 140 travel with a greater speed than the selector chain belts 65. This permits the dogs 143 to be spaced greater distances apart on the chain belts 140 than the dogs 66 are spaced on the chain belt 65. The ratio between the speeds of the elevator chain belts 140 and the selector chain belts 65 is equal to the ratio between the distances spacing the dogs 143 and the distances spacing the dogs 66. The equality of these ratios causes one pair of dogs 143 to come up around the sprockets 58 for each pair of dogs 66 which passes downward around the sprockets 57. For a reason to be explained later the chain belts 140 are so placed on the sprockets 58 and 131 that each pair of dogs 143 comes up just far enough behind an adjacent pair of dogs 66 so as not to interfere with a slat, should such be carried by the chains 65 just in advance of the next approaching pair of dogs 66.

The normal transfer of the shook from the chain belts 65 to the chain belts 140 is accomplished easily on account of the greater speed of the latter. Upon first contacting the chain belts 140, the shook is drawn away from the chain belts 65 and out of reach of the pair of lugs 66 immediately following it. Were this not so there might be a tendency for these lugs 66 to catch on and flip the shook being transferred as these lugs change direction around the sprockets 57.

After the transfer of each piece of shook to the sloping elevator chain belts 140, it slips backward into contact with the next advancing pair of dogs 143 and is carried on up the elevator.

Occasionally some unusual condition, such as a warped piece of shook, or an abnormal dimension in a piece of shook, causes such a piece to arrive at the point of transfer resting on top of one or both of the pair of dogs 66 supposed to be immediately following it. In such a case the distance which the pair of lugs 143, coming up next into active position, is disposed behind these lugs 66 is usually sufficient to permit these lugs 143 to catch this piece of shook and straighten it out as it is transferred to the elevator chain belts 140.

The rate of reciprocation of the magazine 90 is so fixed that just sufficient time is provided while the magazine is being raised and lowered again for chain belts 65 to feed onto the elevator chains 140 all of the pieces of shook stripped from the lower ends of the shook stacks 106 during the last previous rest period of the magazine 90 in its downwardmost position. This results in the upper flight of the chain belts 65 being entirely clear each time that the magazine 90 goes downward into position for further stripping of pieces of shook from the lower ends of the stacks 106 by the dogs 66.

In fact, it is deemed preferable to time the reciprocation of the magazine 90 so that between each adjacent pair of groups of shook stripped from the magazine 90 and delivered to the elevator 140, one pair of dogs 143 is permitted to travel empty up the elevator 12. This serves to indicate where one group ends and another begins.

After each piece of shook carried by a pair of dogs 143 reaches the upper end of the elevator 12 it slides down the skids 129 onto the belt 154 and owing to the rapid motion of the belt, with the upper flight thereof moving toward the magazine 149, this piece of shook is shot into the magazine 149 as indicated in Fig. 8 and falls into the magazine on any shook already disposed therein. Thus each group of pieces of shook stripped from the magazine 90 is delivered to the magazine 149 in the same sequence in which these pieces of shook were removed from the magazine 90. In the usual situation where the magazine 149 is the slat holding magazine of an automatic orange box making machine the speed of operation of the shook arranger 10 is so fixed that shook will be arranged and fed into the magazine 149 at such speed that it will just keep a uniform reserve of slats in the magazine 149 when the box making machine is operated at its normal capacity.

The magazine 149 in the usual automatic orange box making machine will hold a sufficient number of slats to make up ten boxes, while the shook arranger illustrated may be charged with sufficient shook to make up one hundred boxes. In the use of the shook arranger an operator alone can make almost as many boxes with a single box machine as was formerly possible with an operator and an assistant. This is accomplished by the operator stopping his machine after making each one hundred boxes and recharging the shook arranger 10 with shook. The only care which is necessary for him to exercise is to see that the shook which he removes from the bundles is placed into the maga-

zine cavities 95 in its proper position. As the cavity of the automatic orange box making machine in general use is three hundred to four hundred boxes an hour, it will be seen that the attention of the operator to the shook arranger 10 would only be given every fifteen or twenty minutes and only one or two minutes is required for recharging the magazine 90.

While but a single embodiment of our invention is illustrated, various modifications may be made in this embodiment without departing from the spirit of the invention or the scope of the appended claims.

We claim as our invention:

1. In combination: a plurality of magazines arranged in a row for holding box shook in stacks; endless belt conveying means disposed below said magazines; means for moving said belt means and periodically lowering said magazines toward said belt means; and means carried by said belt means for removing pieces of shook from said magazines when the latter are so lowered.

2. In combination: a plurality of magazines arranged in a row for holding box shook in stacks; endless belt means disposed below said magazines; dogs on said belt means; and means for moving said belt means and raising and lowering said magazines so that one of said dogs removes a piece of shook from each magazine when it is in a lowered position.

3. In combination: a plurality of magazines arranged in a row for holding box shook in stacks; endless belt means disposed below said magazines; dogs on said belt means; and means for moving said belt means and raising and lowering said magazines in unison so that said dogs remove pieces of shook from all of said magazines simultaneously when the latter are in a lowered position.

4. In combination: a plurality of magazines arranged in a row for holding stacks of box parts; endless belt means disposed lengthwise beneath said magazines; and means carried by said belt means for simultaneously stripping a group of said box parts from the bottoms of all of said magazines; and means for assembling each of said groups in another stack.

5. In combination: a plurality of magazines arranged in a row for holding stacks of box parts; endless belt means for stripping groups of said box parts from said stacks; a second endless belt means for taking away said stripped box parts, as delivered from the said first belt means, at a faster rate of speed than the said first belt means travels; a transverse belt means running at a still faster rate than the second and receiving box parts from said second belt means; and a magazine adapted to receive said box parts from said transverse belt means.

6. In combination: a plurality of magazines, each holding box parts of a particular kind; power-driven stripper means disposed at the discharge ends of said magazines for stripping said parts from the aforesaid magazines in groups, each part coming from a different one of said magazines; a continuously moving endless-belt conveyer means onto which said stripper means discharges each of said groups in spaced relation; and a magazine means to which said conveyer means delivers said parts in said spaced relation so that said parts pile up in superimposed relation.

7. A combination as in claim 6 in which the said conveyer means carries away said parts at a greater speed than that at which they are delivered thereto by said stripper.

8. A combination as in claim 6 in which the said conveyer means carries away the said parts at a greater speed than that at which they are delivered thereto by said stripper; and lugs provided on said conveyer means for straightening any parts delivered crookedly to said conveyer means.

9. In combination: a plurality of magazines, each holding box parts of a particular kind; endless belt stripper means disposed at the discharge ends of said magazines for stripping the said parts from each of said magazines one at a time; power conveyer transfer means adapted to receive said box parts in spaced relation from said stripper means and take them away therefrom at a greater speed than delivered thereto; and means for receiving said shook parts one at a time from said transfer means and assembling these in superimposed relation in a predetermined order.

In testimony whereof I, CLESS EUGENE STUBBS, have hereunto set my hand at Riverside, California, this 28 day of June, 1929.

CLESS EUGENE STUBBS.

In testimony whereof I, EUGENE DINARD BROOKS, have hereunto set my hand at Riverside, California, this 28 day of June, 1929.

EUGENE DINARD BROOKS.