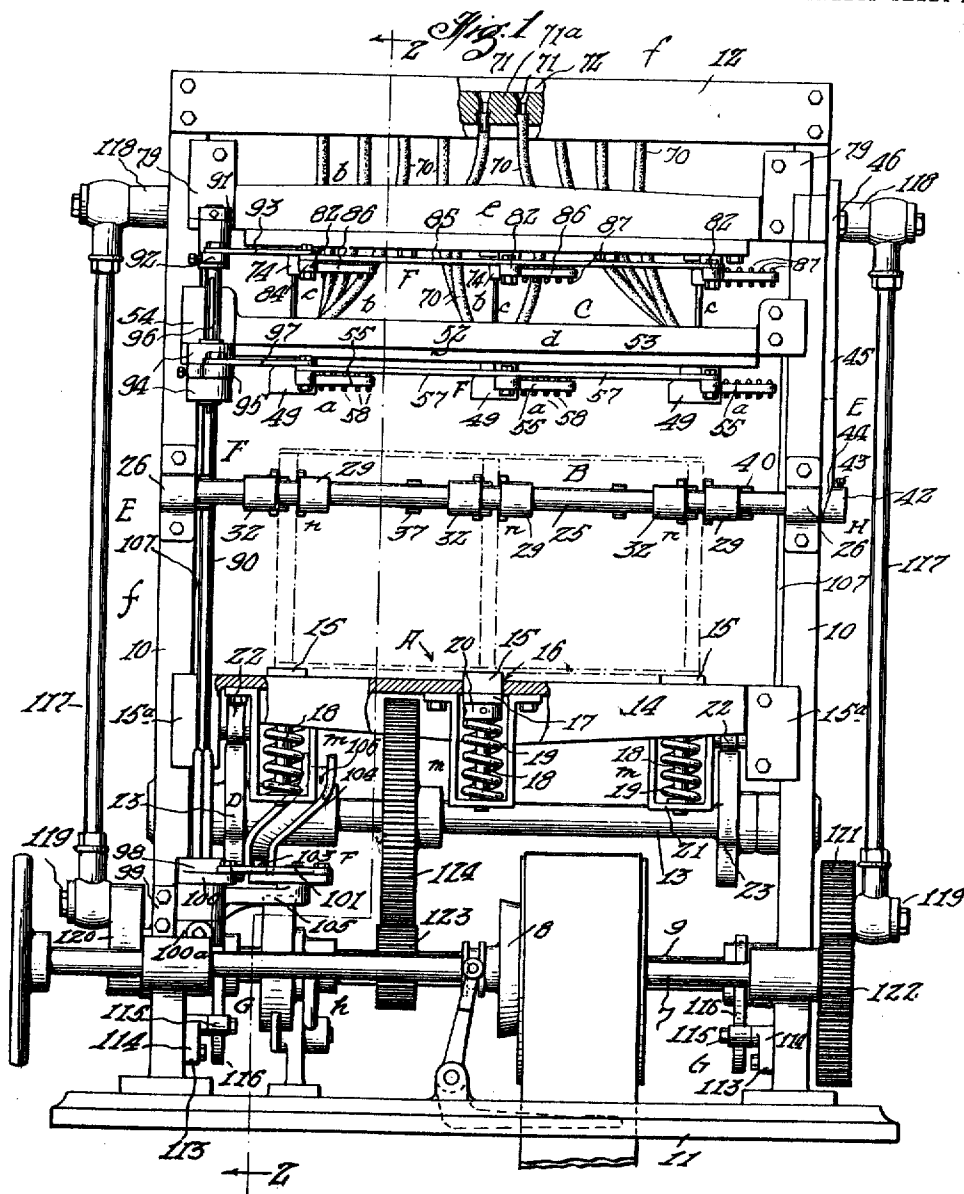


G. D. PARKER.
BOX MAKING MACHINE.
APPLICATION FILED JULY 2, 1908.

1,007,234.

Patented Oct. 31, 1911.

4 SHEETS—SHEET 1.



Witnesses:
Mullanpie
John S. Allen

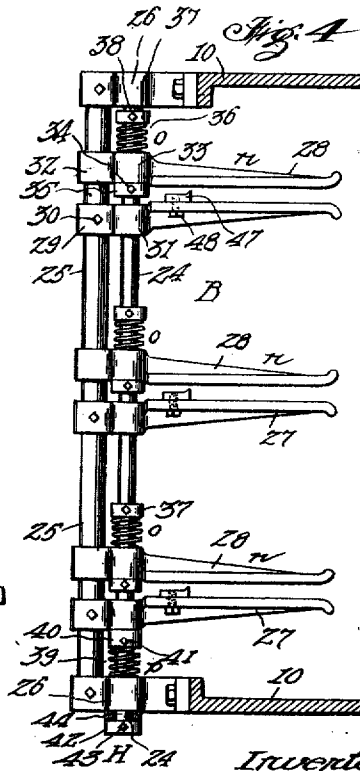
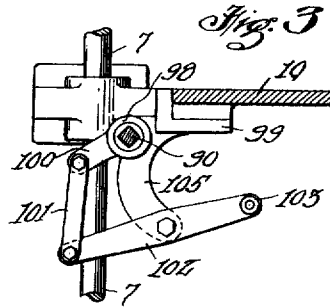
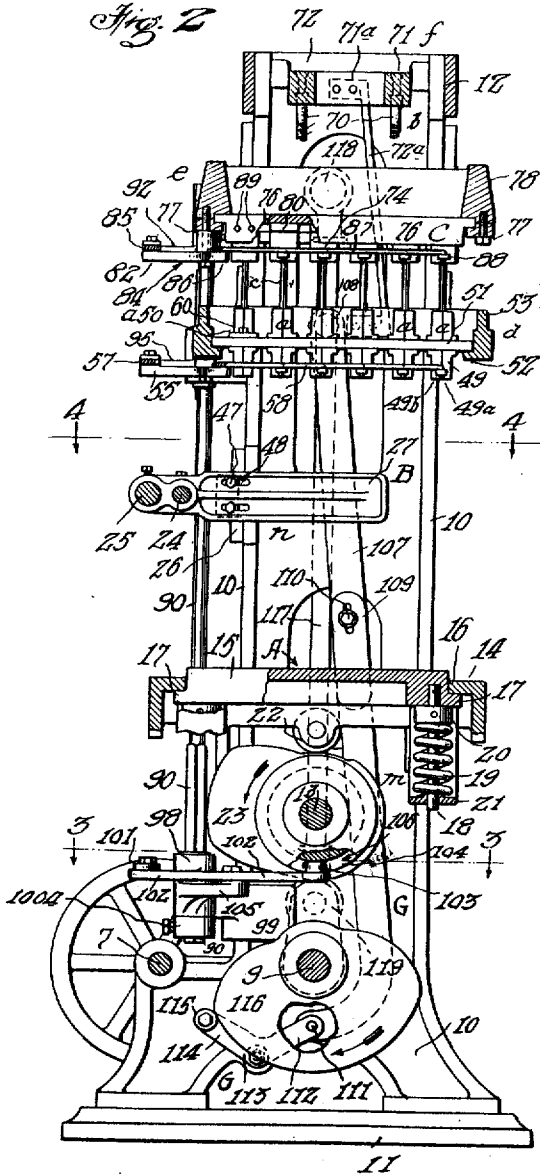
Inventor
George D. Parker
Raymond H. Clatton
his Attorney

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4 SHEETS—SHEET 2.



Witnesses:
William J. Allen
L. D. Allen

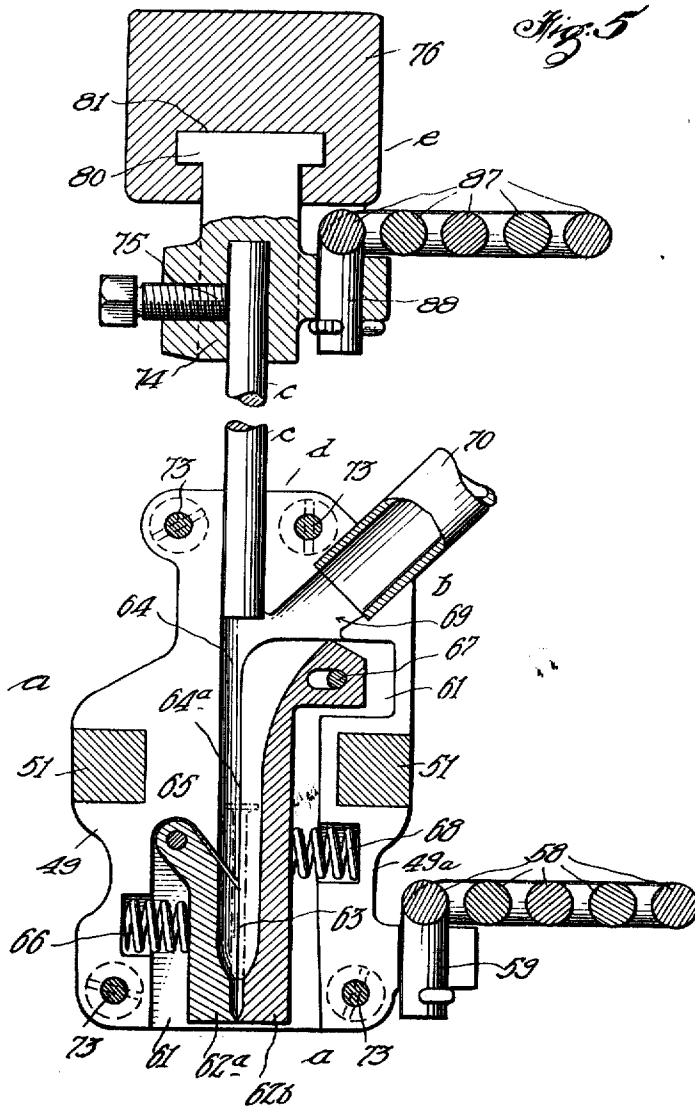
Inventor:
George D. Parker,
by *Raymond S. Chace*
his Attorney.

G. D. PARKER.
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4 SHEETS-SHEET 3.



Witnesses
H. M. A. S. P.
L. S. M.

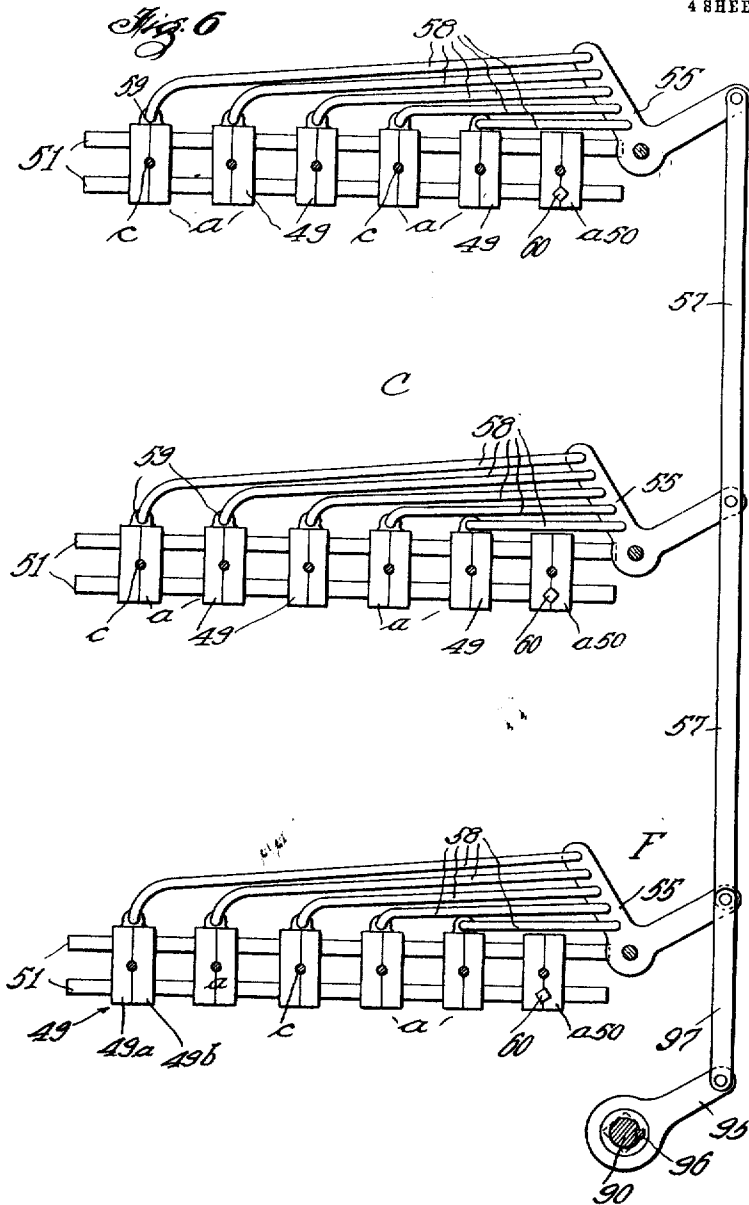
Inventor:
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by
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his Attorney,

G. D. PARKER.
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4 SHEETS-SHEET 4.



Witnesses:
Mullausfeld
Lute J. Allen

Inventor,
George D. Parker
By Raymond J. H. H. H.
his attorney,

UNITED STATES PATENT OFFICE.

GEORGE D. PARKER, OF RIVERSIDE, CALIFORNIA.

BOX-MAKING MACHINE.

1,007,234.

Specification of Letters Patent.

Patented Oct. 31, 1911.

Application filed July 2, 1908. Serial No. 441,673.

To all whom it may concern:

Be it known that I, GEORGE D. PARKER, a citizen of the United States, residing at Riverside, in the county of Riverside and State of California, have invented new and useful Improvements in Box-Making Machines, of which the following is a specification.

This invention relates to box-making machines, and more particularly to machines for making lemon boxes of standard dimensions, as used in the lemon-packing industry, or other boxes with ends of unequal dimensions; and which has for its object to provide an improved box-making machine which will be substantially automatic, speedy and positive in operation, and particularly adapted to performance of the functions concerned.

Certain of the features of the machine hereinafter described and shown in the drawings are claimed in a divisional application for patent filed by me March 3, 1909, Serial Number 487,066 for box-making machines.

The invention consists in the novel provision, construction, combination, association and relative arrangement of parts, members and features hereinafter described, shown in the accompanying drawings, and finally pointed out in claims.

In the drawings:—Figure 1 is a rear elevation, partly broken away and in section for clearness of illustration, of a box-making machine constructed and organized according to the invention; Fig. 2 is a vertical transverse sectional view of the same, taken upon the line 2—2, Fig. 1, and looking in the direction of the appended arrows, parts being likewise broken away for clearness of illustration; Fig. 3 is a detailed fragmentary view partly in section, of elements of the construction; taken upon the line 3—3, Fig. 2, and looking in the direction of the appended arrows; Fig. 4 is a detail horizontal transverse sectional view of the same, taken upon the line 4—4, Fig. 2, and looking in the direction of the appended arrows; Fig. 5 is a detail enlarged fragmentary vertical sectional view of further elements of the construction; and, Fig. 6 is a diagrammatic plan view of certain elements of the construction in detached position, and partly in section, such elements being partly shown in Fig. 5.

Corresponding parts in all the figures are designated by the same reference characters.

Referring with particularity to the drawings, the improved box-making machine comprises, in general, a table or support A upon which the box shooks are supported in the operation of nailing the same together; said table or support being movably supported.

B designates holding means for the box, or the shooks or parts of the box, whereby the latter are maintained in position upon the table or support during the nailing operation.

C designates, in general reference, nailing means, which comprise nail chucks *a*, nail feed means *b*, and nail punches or drivers *c*.

D designates means for adjusting the table or support A; E designates means for operating the nail punches or drivers *c*; and F designates means for regulating the nail chucks *a* and nail punches or drivers *c*. The nail chucks *a* are connected with a nail chuck carrier *d*; and the nail punches or drivers *c* are connected with a nail punch carrier *e*; said carriers *d* and *e* being relatively movably mounted.

G designates means for relatively moving the carriers *d* and *e*.

H designates means for regulating the holding means B.

The various adjusting, operating and regulating means above stated are operatively connected with or operated by a main power shaft 7 having a controlling clutch 8, and being geared in connection with a counter-shaft 9, which latter is provided with suitable brake-means *h*. All of the above means and elements, which, in specific organization, comprise a box-making machine embodying the invention, are supported by or connected with an upright frame *f* having upright side members 10, a base or bottom member 11 and a transverse top member 12. The shafts 7 and 9 extend transversely of the machine, between the side members 10, and suitable journals supported thereon. Combined with the shafts 7 and 9 is a supplemental shaft 13 geared in connection with the latter shaft and extending above the same between suitable journals on the side members 10. The nail feed means *b* extend from the transverse top member 12 downwardly to the nail chucks *a*, which with the nail chuck carrier *d* are

arranged beneath the nail punch carrier *e*. Next beneath the nail chuck carrier *d* are arranged the holding means B, and next beneath the latter means is arranged a table or support A; the shafts 7 and 9 and 13 extending beneath the table or support A.

The box shoos or members are fed to the table or support A and the holding means B from the forward side of the machine, manually, and are manipulated in the nailing process, so as to properly present the portions which are to receive the nails, in first adding one side of the box to the ends and center partition, and successively thereafter the bottom and the other side of the box to said first side and ends and transverse partition. As the dimensions of a standard lemon box, for the production of which the machine is particularly adapted, are substantially 27 inches by 14 inches by 10½ inches, the sides of the box being 27 inches by 10½ inches and the bottom of the box being 27 inches by 14 inches, and the ends and transverse partition of the box being 14 inches by 10½ inches, it is necessary to vary the vertical dimensions of the space between the table or support A and the nailing means C, so as to increase or decrease such space, for the accommodation of the box shoos or parts, having unequal dimensions, in connecting the sides and bottom of the box with the ends and transverse partition of the box, by nailing. To these ends the means D for adjusting the table or support are provided; and also the means G for relatively moving the carriers *d* and *e* are provided. Likewise, as the extent of the nailing lines is consequently greater in the operation of connecting the bottom of the box with the ends and partitions of the latter than are the nailing lines when nailing the sides of the box to the ends and partition of the latter, the means F for regulating the nail chucks *a* and the nail punches or drivers *c* are required. The means H for regulating the holding means B operate automatically to terminate the grip of the holding means upon the parts of the box, after one of the nailing operations, so that the box may be manipulated to re-present the same properly for a successive nailing operation.

A particular preferred form of provision, construction, relative arrangement, combination and association of parts, members, features and elements of a box-making machine embodying the invention, such as shown in the drawings, is as follows:—The table or support A comprises a flat plate 14, provided with spaced side cheeks 15^a embracing the side members 10 of the frame *f*, so as to be vertically slidable on said frame; and relatively movable table portions 15, three in number, extending transversely of the plate 14 and projecting normally above the surface of said plate, being

located in openings 16 formed in said plate and having stops 17, limiting the upward movement of said portions 15 by engagement with and beneath a plate 14. From the forward and rearward end portions of each of said table portions 15 extend downwardly projecting rods or bars 18, each of which is encircled by a coil spring 19 bearing at its upper end against an adjustable head 20 upon the respective rod or bar 18, and at its lower end against a stirrup shaped bracket 21, extending downwardly from the plate 14; each of such springs and its associated parts constituting tension means *m* for the respective table portion 15; whereby said table portions 15 may be depressed against tensional resistance. The parts of the box, in the nailing operations, rest directly upon said yieldingly supported movable table portions 15, whereby variation in the box shook dimensions may be accommodated. Said table portions 15 are relatively spaced to correspond with the relative spacing of the ends and transverse partition of the box, into which portions of the box the nails are driven through the sides and bottom of the box. This relative arrangement of parts and location of the box parts upon the table A are clearly shown in Fig. 1, in which the box, ready for the final nailing operation, is shown in dotted lines.

Suitable supporting rollers 22 are provided for the table or support A, being arranged beneath the same adjacent to the side cheeks 15^a; and said rollers 22 rest upon cams 23 fixed to the shaft 13 and embraced within the means D for adjusting the table or support A.

The holding means B comprises relatively movable gripping members *n*, which extend transversely above the table or support A, substantially in a horizontal plane, being connected with and supported by two relatively movable rods or bars, 24 and 25, respectively; of which latter the rod or bar 25 is preferably fixed in connection with the side members 10, of the frame *f*, and the rod or bar 24 is preferably longitudinally movably connected with said side members 10, the end portions thereof being slidably mounted in bearings 26 fixed to said side members 10. Said rods or bars 24 and 25 extend in parallelism, and are slightly spaced apart in the same horizontal plane. The gripping members *n* comprise fixed gripping arms 27 and movable gripping arms 28. The fixed gripping arms are provided each at its inner end with an annular portion 29 encircling and fixed to the fixed rod or bar 25, as at 30; and with an annular portion 31, loosely encircling the movable rod or bar 24. Each of the movable gripping arms is provided at its inner end with an annular portion 32 loosely encircling the fixed rod or bar 25, and with an annular portion 33 loosely en-

circling the movable rod or bar 24. Each of the movable gripping arms 28 is provided with tensional means *o* tending to force the same into engagement with the stop or collar 35 fixed to the movable rod or bar 24, as at 34, and located between the collar 33 of the respective gripping arm 28 and the annular portion 31 of the associated gripping arm 27. Each of said tensional means comprise a coil spring 36 encircling the rod or bar 24 and bearing upon the respective annular portion 33 and a collar 37 spaced therefrom and fixed to the rod or bar 24, as at 38. Supplemental tension means *p* may be employed, acting upon the movable rod or bar 24 and comprising a coil spring 39, encircling said rod or bar 24 at one end of the same, between one of the keepers 26 and a collar 40 fixed upon the rod or bar 24, as at 41. The supplemental tension means *p* will tend to urge the rod or bar 24 transversely of the frame *f*, in longitudinal movement of such rod or bar, to cause the relative separation of the fixed gripping arms 27 and movable gripping arms 28 to a degree, determined by the engagement of the collar 40 with the adjacent collar 31. Said supplemental tension means *p* are comprised within the regulating means *H* for the holding means *B*; said regulating means further comprising a bevel head 42 fixed to the outer end of the movable rod or bar 24, as at 43, and a complementarily bevel head 44 fitting between said head 42 and the adjacent keeper 26; outwardly of said keeper; said head 44 being fixed to or formed upon the lower end portion of an arm 45 extending adjacent to and outwardly of the adjacent side frame member 10. Said arm 45 is movable vertically and is operatively connected with the nail punch carrier *c*, as at 46; whereby, in the descent of said nail punch carrier the co-operation of said bevel heads 42 and 44 will cause the endwise movement of the rod or bar 24, against the tension of the tension means *p*, causing the gripping arms 27 and 28 to relatively approach in increased gripping effect, which gripping effect is of a yielding quality, because of the tension means *o* bearing with relation to the movable gripping arms 28. One of the gripping arms, as 27, of each pair of gripping arms 27 and 28, is provided with an adjustable and detachable stop 47, suitably connected with the respective gripping arm 27, as at 48.

The nail chucks *a* consist each of a chuck body 49, said chuck bodies, six of which are shown in each group in the drawing, being slidably mounted, so as to move forwardly and rearwardly of the machine, with the exception of one of the same, namely, *a*⁵⁰; and said chuck bodies are so slidably mounted upon spaced bars 51 ranging forwardly and

rearwardly of the machine, and supported upon inwardly directed flanges 52 of the nail chuck carrier *d*, which consists of an open frame work 53 having side cheeks 54, slidably embracing the side members 10 of the frame *f*. There are three of such sets of chuck bodies 49 and spaced bars 51; whereby said series are properly relatively separated in accordance with the relative spacing of the lines of nailing operation above referred to. Comprised within the means *F* for regulating the nail chucks *a*, are bell crank levers 55, one for each of the sets of six chuck bodies 40; and each of said bell crank levers 55 is supported on the under side of the chuck carrier *d* of the frame 53, said bars 51 and their respective bell crank levers being relatively separated in accordance with the relative spacing of the three sets of nail punches or drivers *c*, as hereinafter recited. One arm of each of the bell crank levers 55 is connected with an extended connecting rod 57, which extends transversely of the machine and is likewise comprised within the regulating means *F*. With the other arm of each of the bell cranks 55 is pivotally connected the inner end of each of five link arms 58, each of which is pivotally connected, as at 59, at its outer end, with one of the chuck bodies 49. The innermost chuck body, namely *a*⁵⁰, is fixed with relation to the bars 51, by a set screw 60. The reciprocation of the connecting rod 57 causes relative movement of all of the chuck bodies, either extending or contracting the line of nailing operation above referred to.

Each of the chuck bodies 49, is cored out or chambered vertically, as at 61, for the operation therein and therethrough of the nail punches *c*; and for the admission to and transversely through said chuck body of the nails, one of which latter is shown in dotted lines in Fig. 5 in position to be forced from the chuck body by the respective nail punch *c* which is associated with such chuck body. Within the cored or chamber portion 61 of the chuck body 49 is arranged a nail chuck, comprising two portions, 62^a and 62^b, which are relatively movable and under spring tension, said two portions being of tubular form and mutilated or cut away longitudinally, as at 63, to constitute with a vertical bore 64 in the chuck body a continuous passage 64^a for the nails and for the nail punch *c*. The nail chuck portion 62^a is pivotally connected at its upper portion, as at 65, within the chamber 61, and against the same, tending to force the same inwardly of the chamber 61, bears a coil spring 66. The nail chuck portion 62^b extends above the nail chuck portion 62^a within the chamber 61, being loosely pivotally connected with the chuck body at its upper portion, as at 67. Bearing against the nail chuck portion 62^b and tending to force the same

inwardly of the chamber 61, is a coil spring 68. Communicating with the nail and punch passage 64^a, at the upper portion of the chamber 61 and of the chuck portion 62^b, a nail feed passage 69 is formed at one side of the chuck body. Connected with said chuck body 49 and communicating with its nail feed passage 69 is a flexible nail feed tube 70; and the said tubes 70, one for each of the six nail chucks *a*, of each of the three sets of the latter, all extend upwardly into connection with a movable header 71^a in the top frame member 12 of the machine, as at 71. The nails are suitably fed to the nail tubes 70; and the header 71^a is connected with and moves with the nail chuck carrier *d*, as by a prop or support 72^a. Each of the chuck bodies 49 consists of two halves or members, 49^a and 49^b, respectively, which said halves or members are securely bolted together, as shown at 73, in Fig. 5. This two-part construction permits of installation and repair of the internal parts of the nail chuck *a*, comprising the nail chuck and associated features.

The nail punches or drivers *c* of which there are three sets of six each, one such nail punch for each nail chuck of each of the three sets of six of the latter, are carried each by a punch head 74; being detachably connected therewith, as at 75; and the punch heads 74 of each set of six of the same, are with one exception, slidably supported by a fixed bar or rod 76 extending forwardly and rearwardly of the machine and supported upon bottom flanges 77 of an open frame work 78 constituting the nail punch carrier *e* and provided with side checks 79 slidably embracing the side members 10 of the frame *f*. Said bars or rods 76 one for each of the sets of six punch heads 74, are spaced apart in the frame work 78 in correspondence with the relative spacing of the bars or rods 51, which support the sets of chuck bodies 49. Each of the punch heads 74 is suspended slidably from its bar or rod 76 by means of a flanged tongue 80, working in a corresponding groove 81 in such bar or rod. Each of the nail punches *c* is of elongated form, extending downwardly and fitting the nail punch and passage 64^a in one of the chuck bodies 49 arranged directly beneath the same.

Comprised within the means F for regulating the nail chucks *a* and the nail punches *c*, are a plurality of bell crank levers 82, one for each set of the nail punches *c*. Each of said bell crank levers being pivotally supported from the frame work 78; and all of said bell crank levers are connected, by one arm 84 of each with an extended connecting rod 85. Pivotally connected at the inner end of each with the other arm 86 of each of the bell crank levers 82 are a plurality of link arms 87, the outer end of each of which

is pivotally connected, as at 88, with one of the punch heads 74. The innermost of each of the sets of the punch heads 74, with respect to the bell crank levers 82 with which the other punch heads of the set are pivotally connected, is fixed with relation to the bar or rod 76, by set screws or equivalents, 89, corresponding to the locked condition of the corresponding nail chuck *a* with which its punch *c* is associated. Reciprocation of the connecting rod 85 will cause oscillation of the bell crank levers 82 to slide the punch heads 74 along their bars or rods 76, extending or contracting the lines of punching operation in correspondence with the extension or contraction of the lines of nailing operation established by the relative arrangement of the nail chucks of the several sets of the latter.

The operation of the bell crank levers 82 and of the bell crank levers 55 is joint, through the instrumentality of the means *f* for regulating the nail chucks *a* and nail punches *c*; and the organization of such means *f* is as follows:—A vertical rock shaft 90 is arranged at one side of the machine, adjacent to the respective side members 10, being journaled upon one of the side cheeks 79 of the frame work 78 of the nail punch carrier, as at 91, at its upper end, and provided adjacent to its upper end with an arm 92. Between it and the arm 84 of the adjacent bell crank 82 extends a connecting rod 93 whereby all of said bell cranks 82 and the connecting rod 85 are operated. Said rock shaft 90 extends downwardly through spaced bearings 94 formed on one of the side cheeks 54 of the frame work 53 of the nail chuck carrier *d*. A crank arm 95 is accommodated between spaced bearings 94, and connected with the rock shaft 90 by a spline 96. Connected with the crank arm 95 is a connecting rod 97, which connects with one arm of the adjacent bell crank 55, whereby all of the bell cranks 55 and their connecting rods 57 are actuated in the rocking movement of the shaft 90. The rock shaft 90 has vertical play through the bearings 94, and the inner end of the crank arm 95. The lower end of the rock shaft 90 is squared and passes slidably through the body of a crank arm 100, which is revolvably mounted in a bracket 105 supported at 99 by the side frame member 10. Beneath the bracket 105 a collar 100^a is fixed to the shaft 90. The collar 98 is provided with a crank arm 100 pivotally connected by a link arm 101 with a central pivot-lever-arm 102, carrying at its outer end a roller 103, which operates in connection with a cam 104 fixed to the shaft 13; said lever arm 102 is supported by a bracket 105 connected with the bracket 99. The cam 104 is provided with a curved face groove or way 106, whereby the lever arm 102 is oscillated, in the rotation of the

shaft 13, to rock the vertical shaft 90 by means of the crank arm 100, and thereby oscillate the crank arm 95 and the crank arm 92, controlling and regulating in operation, the nail chucks *a* and the nail punches *c*.

The means *G* for relatively moving the nail chuck carrier *d* and the nail punch carrier *e* comprises two connecting rods 107, one arranged at each side of the machine inwardly of the respective frame member 10, extending vertically and each connected at its upper end, as at 108, with the frame work 53 of the nail chuck carrier *d*. Each of the connecting rods 107 is divided centrally, as at 109, forming two overlapping portions adjustably connected, as at 110, whereby the length of each connecting rod 107 may be varied, thus varying the path of play of the nail chuck carrier *d*. Each of the connecting rods 107 is pivotally connected at its lower end, as at 111, with one arm 112 of a bell crank lever 113 supported by the respective frame member 10. The other arm 114 of each bell crank lever 113 is provided with a roller 115 playing upon a disk-cam 116. Each of the cams 116 is fixed to the shaft 9 adjacent to one end of the same. Said cams 116 are so formed that the bell cranks 113 are properly operated to move the nail chuck carrier *d* in proper relation to the nail punch carrier *e*, as hereinafter set forth.

The means *E* for operating the nail punches *c* comprise two connecting rods 117, each of which extends vertically of the machine and is arranged outwardly of one side frame member 10 of the same. Each of said connecting rods 117 is operatively connected at its upper end with a bearing 118, which bearings project laterally from the frame work 78 of the nail punch carrier *e*, through suitable openings in the side frame members 10. Each of said connecting rods 117 is operatively connected at its lower end with a wrist-pin 119, one of which is operatively connected with a crank arm 120 fixed to one end of the shaft 9, and the other of which is fixed to the outer face of a gear 121. The other end of the shaft 9 is fixed to the gear 121 which meshes with a smaller gear 122 on the main shaft 7. A smaller gear 123 upon the shaft 9 meshes with a larger gear 124 on the shaft 13.

The operation, method of use and advantages of the improved box-making machine constituting the invention will be readily understood from the foregoing description, taken in connection with the accompanying drawings and the following statement:—As set forth in the first part of the description, the box is assembled by first nailing onto the ends and the transverse partition one of the box sides, by then nailing on the box bottom, and by finally nailing on the second box side. The parts are shown in the drawings in proper relative positions for adding

the final box side. Commencing with the first step in the assembling operation, the box ends and the transverse partition are placed upon the table or support *A*, where they are held in proper upright positions by the holding means *B*, comprising the relatively movable gripping members *n*. Adjustable stops 47 are properly located with relation to the dimensions of the box parts or shooks which the gripping members are to receive. The operator then places, manually, the first box side upon the box ends and transverse partition, said ends and partition extending through a greater space vertically than horizontally, because of their irregular dimensions, and the adjusting means *D* are in such operative positions as to sustain the table or support *A* in its lowermost position. As the lines of nailing operation are to only extend across the side of the box, the means *F* for regulating the nail chucks *a* and nail punches *c* are in position to cause the close relation or least relative space of the nail chucks *a* and nail punches *c*. The nail punch carrier *e* and the nail chuck carrier *d* are in their elevated positions, as shown in the drawings; and the means *H* for regulating the holding means *B* are in such position as to cause the gripping members *n* to merely sustain the box shooks in upright position without any grip upon the same. Operation of the actuating elements of the machine in the directions indicated by the arrows, will now cause the nail punch carrier *e* and the nail chuck carrier *d* to descend, respectively, through the agency of the means *E*, and the means *G*, nails having been fed to the chuck portions 62^a and 62^b of the chuck bodies 49 through the nail feed tubes 70. The punches *c* now descend through the punch passages 64^a in the punch bodies and engage with the heads of the nails which are held in the chuck portions under tension of the springs 66 and 68; and the nails are positively driven from said chuck portions, which relatively separate, and into the ends and partition of the box through the first side of the box. Simultaneously with this operation, the means *H* for regulating the holding means *B* cause the endwise movement of the rod or bar 24 in the bearings 26, against the tension of the springs constitute the tension means *o* and *p*, causing the gripping members *n* to firmly engage with and hold the box shooks during the reception of the nails therein. Immediately upon the completion of the aforesaid nailing operation, the means *E* for operating the nail punches initiate the elevation of the nail punch carrier *e* with its punches *c*. Before this elevation is completed, the means *G* commence the elevation of the nail chuck carrier *d*, freeing the nail chucks from contact with the nailed side of the box, and permitting the operation of

the means F for regulating the nail chucks *a* and nail punches *c* with respect to the lines of nailing operation, to extend the latter for the nailing of the bottom of the box to the other parts.

The nail punch carrier *e* is elevated through a path greater in extent than that taken in elevation of the nail chuck carrier *d* to the end that the nail punches *c* may clear the points of communication of the nail feed tubes and the nail and punch passages 64^a, so that other nails may enter the chuck bodies and be temporarily sustained by the chuck portions 62^a and 62^b. Simultaneous with the elevation of the nail punch carrier *e* the means H for regulating the holding means B operate to permit relative separation of the gripping members *n*, to the end that the box in its present stage of assemblage may be given a quarter turn upon the table A. The bottom of the box is now placed upon the long edges of the ends and partition, and the table or support is raised by the adjusting means D to compensate for the decrease in the vertical dimensions of the box structure. The nail punch carrier *e* and the nail chuck carrier *d* are now lowered by the means E and the means G, bringing the nail chucks down upon the bottom of the box, with the chuck bodies in extended arrangement for the long lines of nailing operation, and the punches *c*, following through the nail chucks, force the nails from the chuck bodies into the box shooks and through the bottom of the box. The same sequence of operation that followed the connection of the first side of the box with the box shooks now occurs, permitting a quarter turn of the box structure upon the table A, the means H for regulating the holding means B, which caused the grip of the members *n* upon the box shooks in nailing the bottom to the latter now operating to free the box shooks from said gripping members. But the means F for regulating the nail chucks and nail punches now operate in their automatic manner to cause the bunching of the nail chucks and nail punches of each set of the same, in order to obtain contracted or shortened lines of nailing operation, the ends and partition of the box resting upon their shortened edges for the final nailing operation. The box structure having been turned upon the table in position to receive the second side and the table lowered by the adjusting means D, the means E and G cause the descent of the nail punch carrier *e* with its punches *c* and the nail chuck carrier *d* with its chucks *a*, as before, bringing the chucks down upon the final box side, and nails are driven through the second side of the box and into the ends and partition of the latter; the box structure being firmly held in position by the holding means B under the actua-

tion of the regulating means, which cause a firm engagement of the gripping member *n* with the box structure. Immediately upon the subsequent elevation of the nail punch carrier *e* and nail chuck carrier *d*, the means H permitting the release of the completed box from the holding means B, and the box is removed to make place for a fresh set of shooks.

The operation is thus continuous, each lowering of the nail chuck carrier and nail punch carrier, together with each adjustment of the table being accompanied by the addition of one side or the bottom of the box to the other parts. Through the agency of the means F the nail chucks and nail punches are alternately contracted for the production of shortened lines of nailing operation for the successive additions of the sides to the box shooks and expanded for the addition of the bottom to the box shooks. With each descent of the nail punch carrier the means H actuate the means B to cause the latter to firmly grip the developing box structure; each elevation of the nail punch carrier throwing the holding means out of operation.

It is of importance to provide the relatively movable portions 15 of the table, so that variations in the dimensions of the box shooks may be compensated for, the play of the table A under actuation of the means D having fixed limits.

I do not desire to be understood as limiting myself to the specific construction, provision, combination, relative arrangement and association of parts, members and features shown and described; but reserve the right to vary the same, in adapting the improvements to varying conditions of use, without departing from the spirit of the invention and the terms of the following claims:—

Having thus described my invention, I claim and desire to secure by Letters Patent:—

1. In an improved box-making machine, plural-membered nailing means, and means for automatically and to predetermined degree varying the extent of the line of operation of the nailing means.

2. In an improved machine of the character described, nail chucks, nail feed means, nail punches, and means for regulating the nail chucks and the nail punches to automatically and to predetermined extent vary the line of nailing operation.

3. In an improved machine of the character described, the combination, with a plurality of relatively movable nail chucks; of a plurality of relatively movable nail punches associated therewith, means for regulating the nail chucks and nail punches to automatically vary the line of nailing operation, and means for operating the nail punches.

4. In an improved machine of the character described, the combination, with a plurality of relatively movable nail chucks and a plurality of relatively movable nail punches; of means for operating the nail punches, independent means for moving the nail chucks with relation to the nail punches, and means for regulating the nail chucks and nail punches to automatically vary the line of nailing operation.

5. In an improved machine of the character described, the combination, with a plurality of series of nail chucks, the nail chucks of each of said series being relatively movable; of a plurality of series of nail punches, the nail punches of each of said series being relatively movable; and means for relatively moving said nail chucks and said nail punches to vary the lines of nailing operation.

6. In an improved machine of the character described, the combination, with a nail chuck; of a nail punch, means for relatively moving the nail chuck and nail punch, and means for jointly operating the nail chuck and the nail punch.

7. In an improved box-making machine, a plurality of nail chucks, spaced bars upon which said nail chucks are movably mounted, and means for automatically relatively

moving said nail chucks to predetermined extent.

8. In an improved box-making machine, a plurality of nail punches, a bar upon which said nail punches are movably supported, and means for automatically relatively moving said nail punches to predetermined extent.

9. In an improved box-making machine, a plurality of movably mounted nail chucks, and means for automatically relatively moving the same to predetermined extent.

10. In an improved box-making machine, a plurality of movably mounted nail punches, and means for automatically relatively moving the same to predetermined extent.

11. In an improved machine of the character described, nailing means, and means operating independently of the work for automatically varying the extent of the line of operation of the nailing means.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE D. PARKER.

Witnesses:

RAYMOND J. BLAKESLEE,
CAL. F. HUNTER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."