C. BURNHAM.

BOX MAKING MACHINE.

APPLICATION FILED MAY 14, 1914.

1,154,969.

Patented Sept. 28, 1915.

3 SHEETS—SHEET 1.

Fig. 2

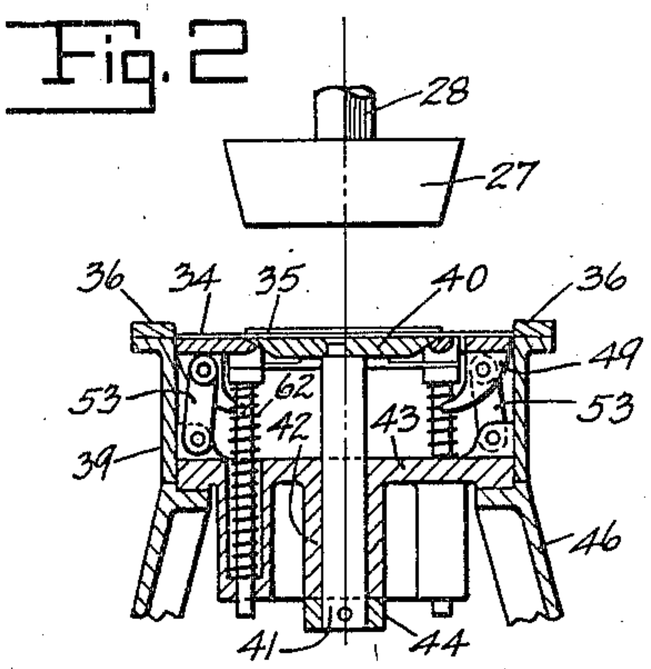


Fig. 3

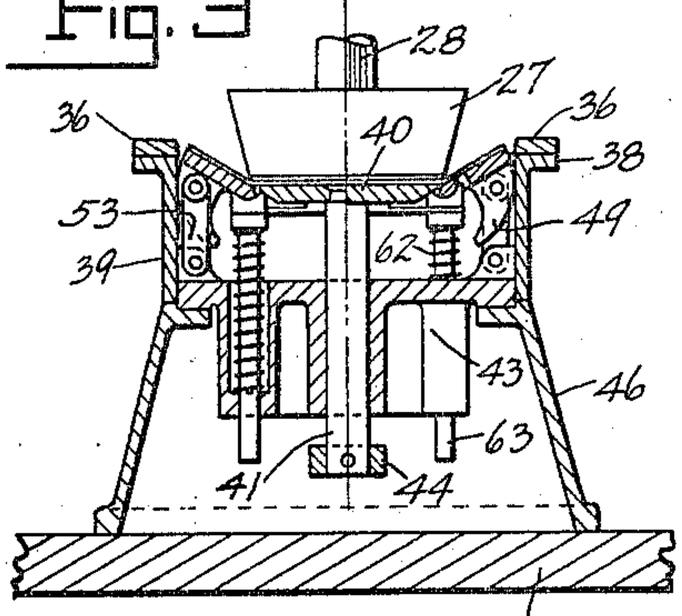


Fig. 4

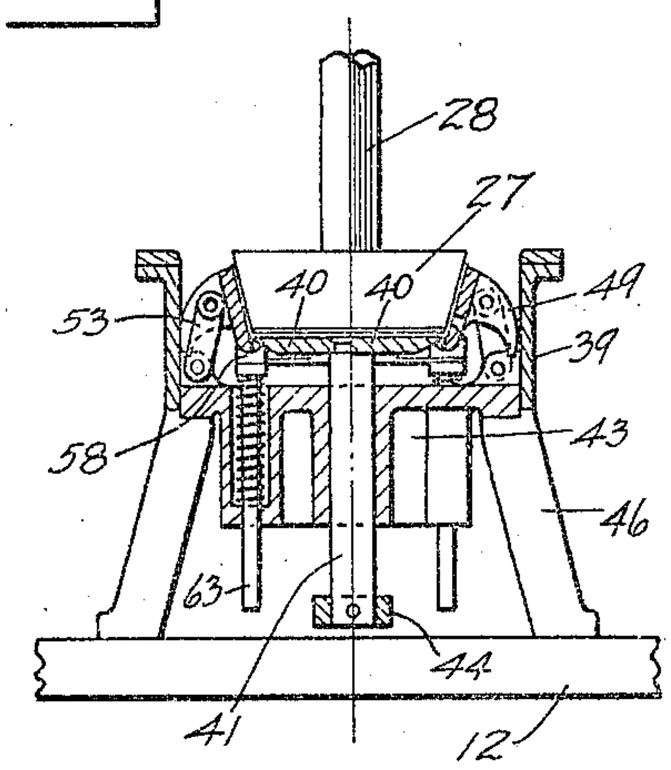
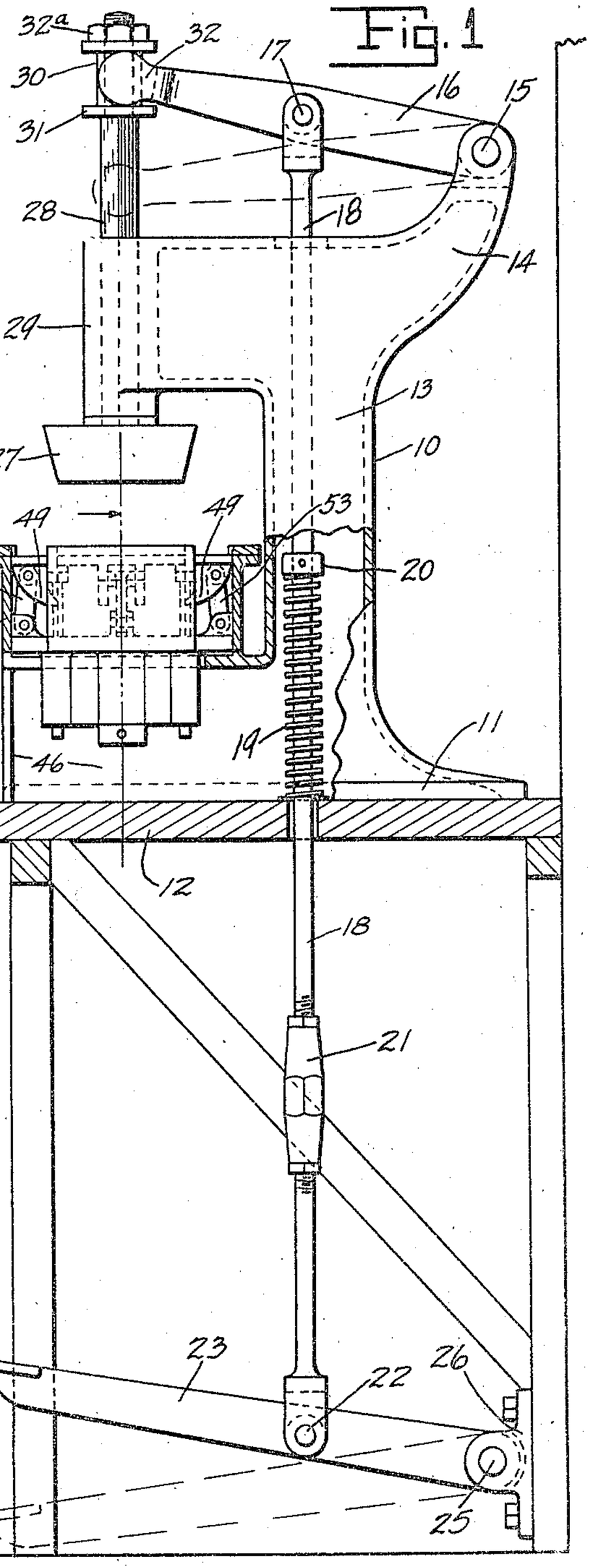


Fig. 1



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3 SHEETS—SHEET 2.

Fig. 5

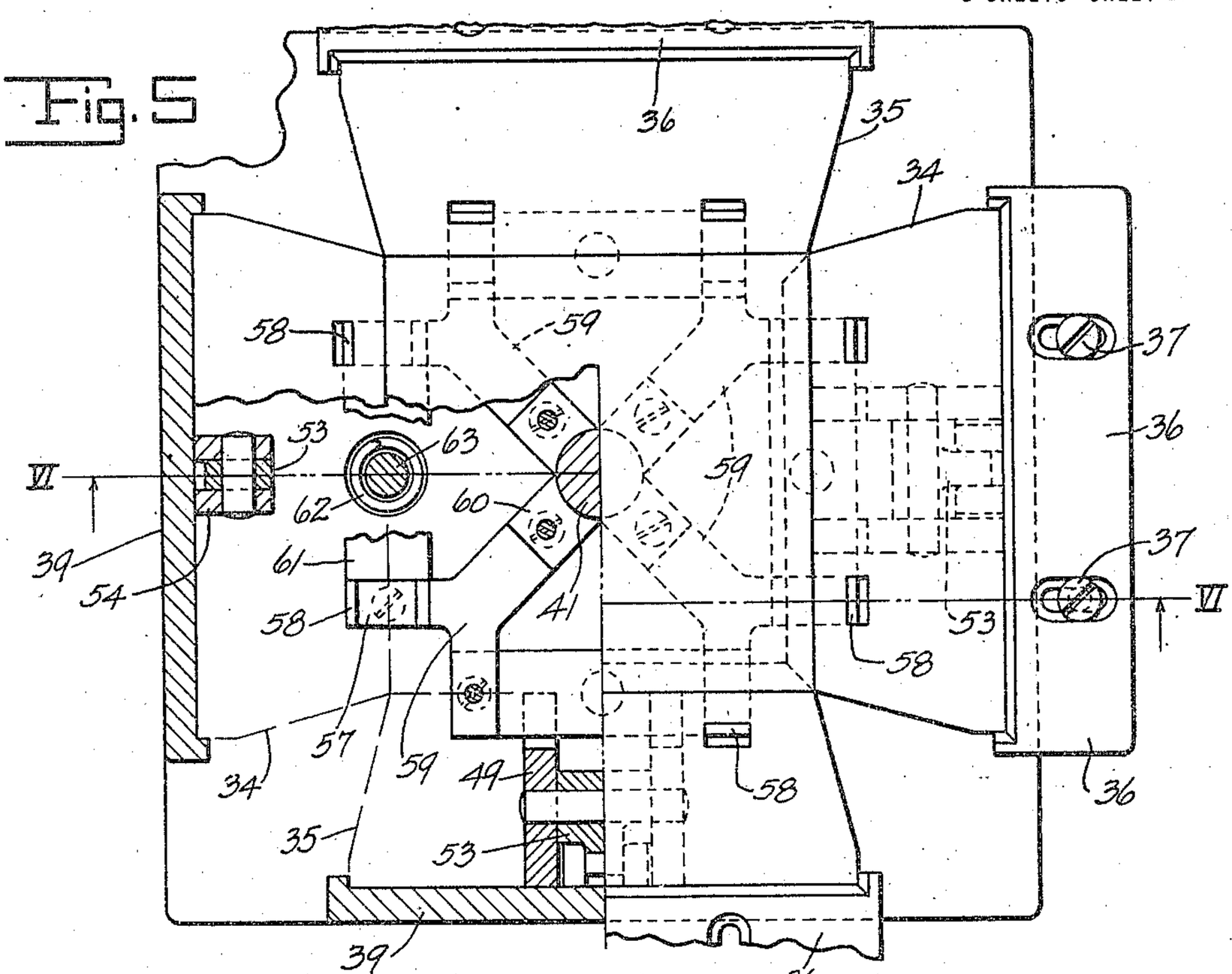
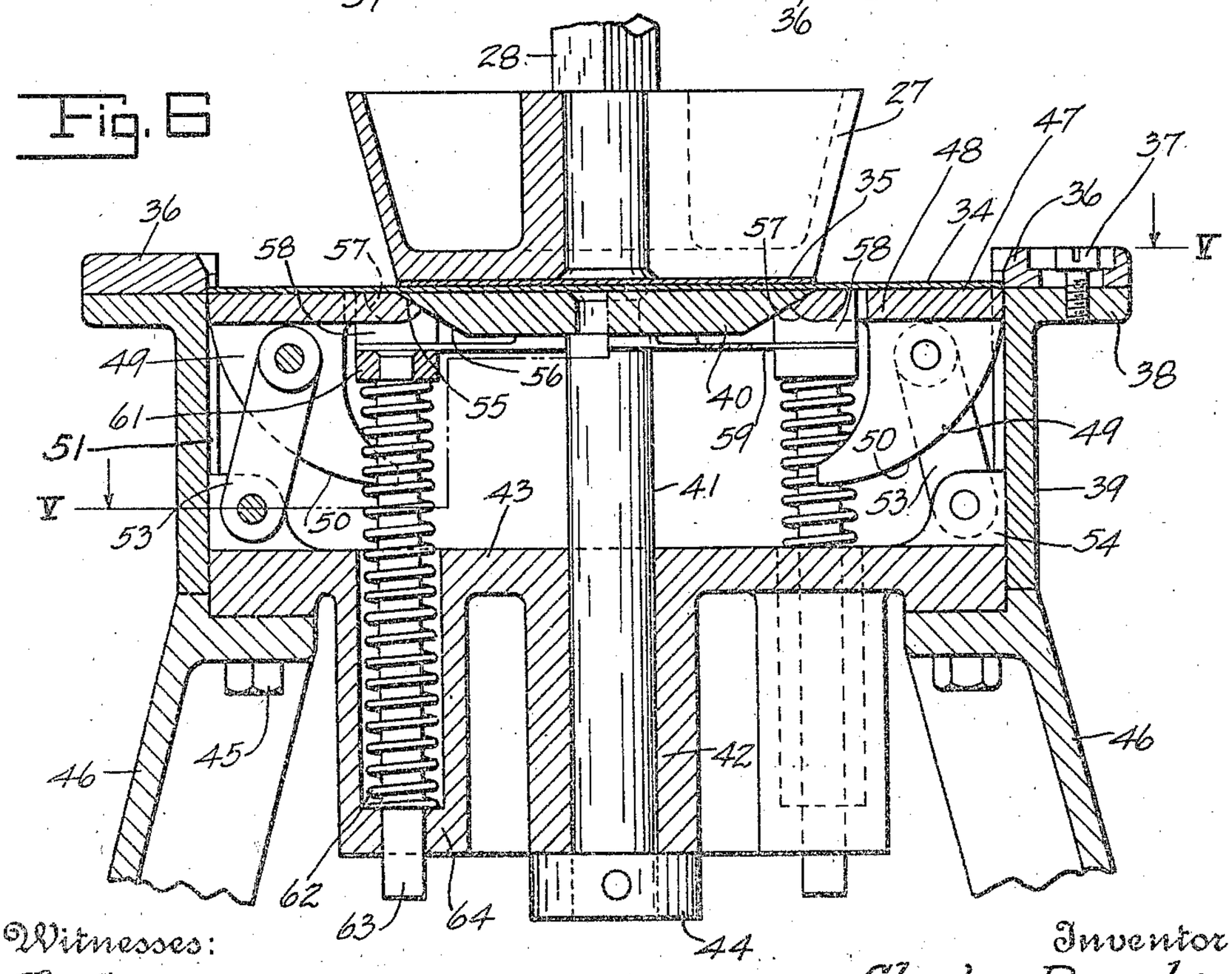


Fig. 6



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3 SHEETS—SHEET 3.

Fig. 8

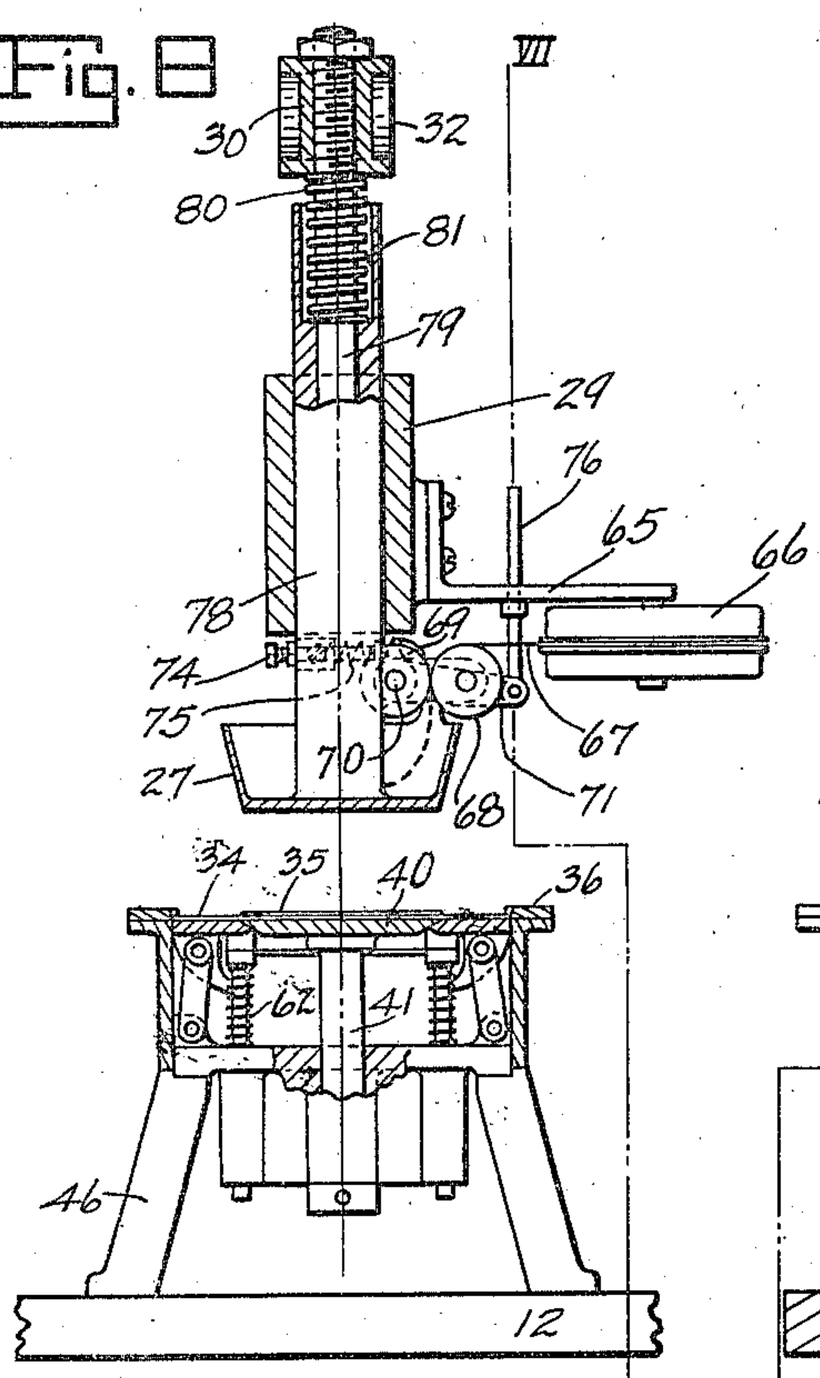


Fig. 7

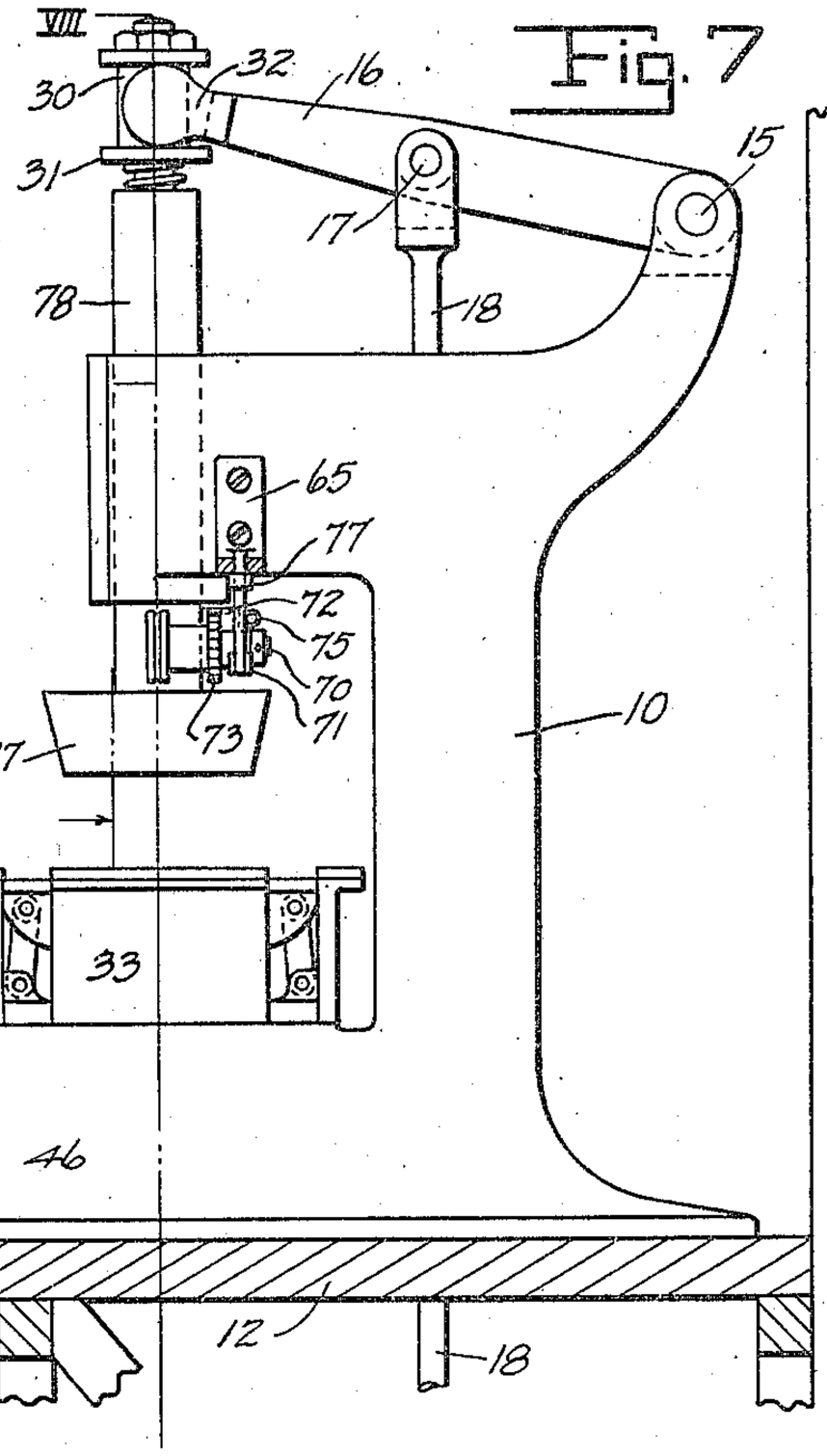


Fig. 9

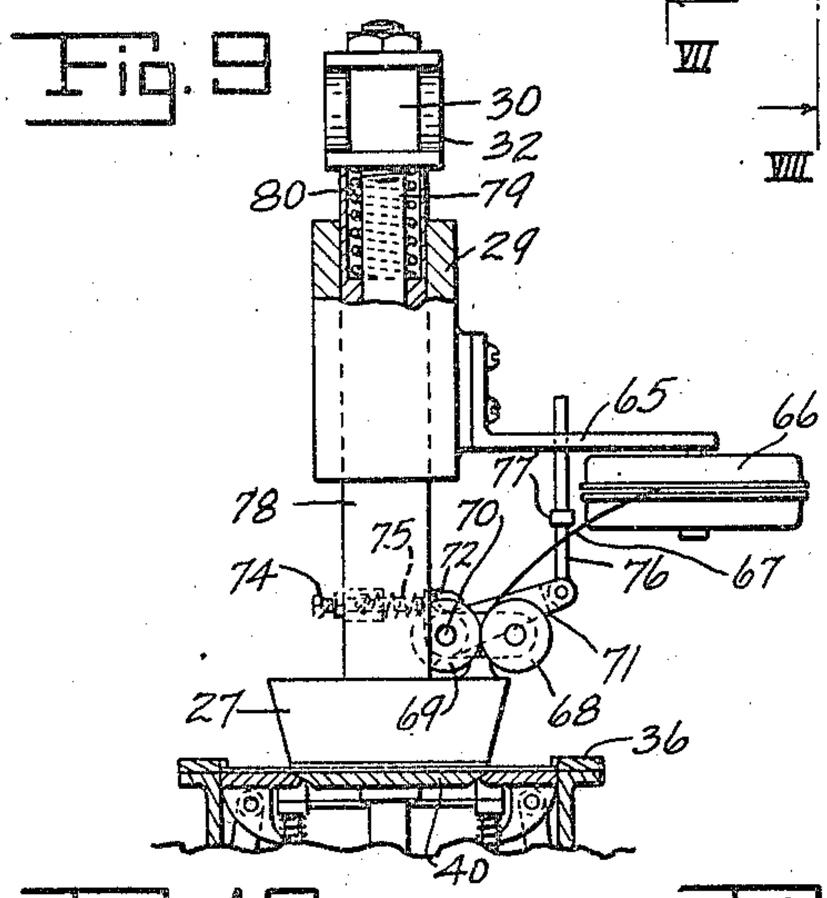


Fig. 12

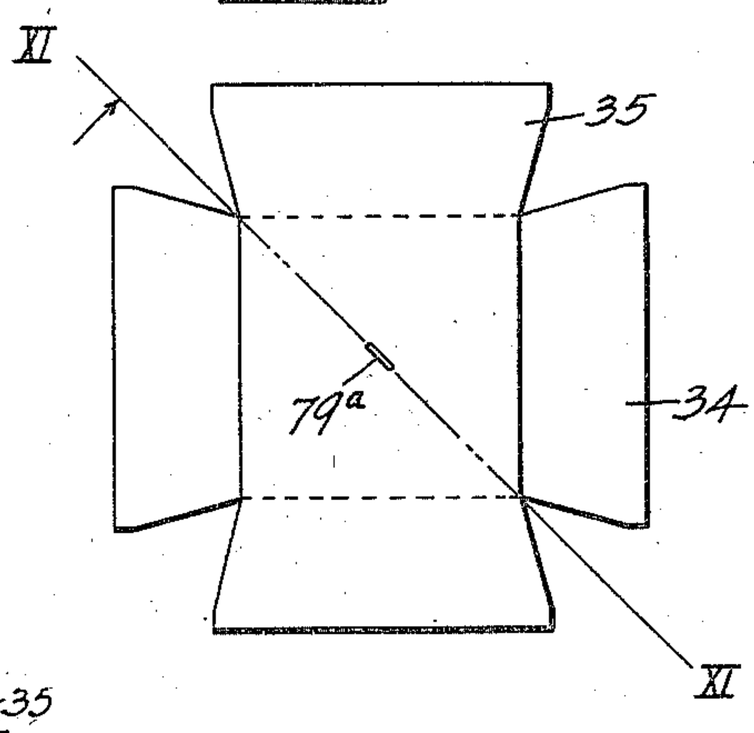
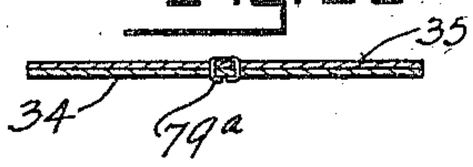


Fig. 10

Fig. 11



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UNITED STATES PATENT OFFICE.

CHARLES BURNHAM, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO BURNHAM BASKET COMPANY, A CORPORATION OF CALIFORNIA.

BOX-MAKING MACHINE.

1,154,969. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed May 14, 1914. Serial No. 838,518.

To all whom it may concern:

Be it known that I, CHARLES BURNHAM, a citizen of the United States, and a resident of Los Angeles, county of Los Angeles, and State of California, have invented certain new and useful Improvements in Box-Making Machines, of which the following is a full, clear, and exact description.

This invention relates more particularly to a machine for forming the body of berry boxes or baskets.

In other inventions of mine, the machine for forming the boxes or baskets is entirely automatic. Such machine takes the material from magazines, transfers the same in crosswise position to the mechanism for forming the box body. A metallic strip is fed from the opposite end of the machine folded lengthwise and bent transversely and applied and positively crimped about the open edge of the box body as the said box body is formed. Under some methods of making boxes of this character, the several steps are accomplished by hand or hand-operated devices, and in some makes of baskets or boxes instead of a metallic strip being used for binding and holding the bent shooks in shape, one or more strips of wood is passed about the inner and outer edge of the open end of the basket and held thereto by staples or suitable fastening means. This latter step may be done by hand or otherwise. So far as I am aware, the shooks, except when my folding means is employed, have to be scored at the point where they are bent, which requires the shooks to be much thicker than would be the case if no scoring was required, and the scoring often causes the shooks to break and part where scored. If the veneer shooks are not scored and the shooks during the bending operation are not folded by proper means the bending will be irregular and result in breaking the shooks or causing the shooks to sliver at the point of bend with the objections incident thereto.

One of the principal objects of the present invention is to provide a simple and efficient machine wherein box shooks may be readily folded or bent in the shape of a box body without scoring the shooks, thus saving one operation and adapting much thinner shooks to be employed and consequently a considerable saving in the material employed in the manufacture of the article.

Another object of the invention is to provide a simple and efficient foot power machine which is adapted to fold the shooks in the form of a box body and to fasten the shooks thus formed by a staple during the same movement of the pedal or power driven element by which the box body is formed.

Other objects of the invention are to provide simple and efficient yieldingly held folding members which positively support and engage the box shooks at the point where the folding takes place; to provide simple and efficient means for properly alining the shooks; and to provide a simple machine in which a former or plunger may be employed and in which the plunger in its downward movement is adapted to cause the actuation of the folding members.

Another object of the invention is to provide simple and efficient means mounted upon a part of the box-forming means and movable therewith whereby a staple may be driven into the shooks to hold the same together prior to the forming of the box body.

A further object of the invention is to provide a simple and efficient machine which may be readily made and assembled and in which all the parts are readily accessible.

With these and other objects in view, the invention will be hereinafter more particularly described with reference to the accompanying drawings, which form a part of this specification, and will then be pointed out in the claims at the end of the description.

In the drawings, Figure 1 is a vertical section, partly in elevation, of one form of machine embodying my invention. Fig. 2 is a fragmentary vertical section showing the machine in the initial position shown in Fig. 1, the section being taken substantially central of the plunger and die mechanism and looking in the direction of the arrow in said figure. Fig. 3 is a view similar to Fig. 2, except that the plunger or former has been moved to a position to partly fold the shooks. Fig. 4 is a view similar to Fig. 3, except that the machine has been moved to a position to completely fold the shooks. Fig. 5 is an enlarged sectional plan, partly in elevation, taken on the line V—V of Fig. 6. Fig. 6 is an enlarged vertical section, partly in elevation, taken on the line VI—VI of Fig. 5. Fig. 7 is a side elevation, partly in

section, of the machine showing how a tacking or stapling mechanism may be applied thereto, the view being taken on the line VII—VII of Fig. 8. Fig. 8 is a vertical section, partly in elevation, taken on the line VIII—VIII of Fig. 7. Fig. 9 is a view similar to Fig. 8, except that the parts are shown in a position wherein the tacking or stapling of the shooks has been accomplished ready for folding the shooks into the box body. Fig. 10 is a section of two shooks showing the staple forced therethrough. Fig. 11 is a section taken on the line XI—XI of Fig. 12 and showing the ends of the staple clenched; and Fig. 12 is a plan view, partly diagrammatic of two of the shooks fastened together before folding.

While the invention is shown as applied to a machine for foot power and which is adapted to be placed upon a bench, table or like support, it will be understood that certain parts of the invention may be used in connection with machines otherwise constructed and in which any suitable power-driven mechanism is employed or in which the machine is wholly or only partly automatic in its action.

The machine pedestal, or support frame 10 has a base 11 which is adapted to be held to a table or bench 12 at a sufficient height to permit ready access to the working parts of the machine. This pedestal or support has a tubular part 13 from the upper portion of which extends an arm 14. In said arm 14 of the frame is a shaft or stud 15 to which is pivotally held a lever 16. This lever 16 is pivotally connected at 17 to a vertically extending rod 18 which is guided in and passes through the tubular part 13 and through the table 12. The rod 18 is normally forced upward by a spring 19 arranged around the same and interposed between the table 12 and a collar 20 on said rod. The rod is adjustable by means of a turn buckle 21 or otherwise and its lower end is connected, at 22, to a pedal 23. This pedal is provided with a foot rest 24 at one end and its other end is pivoted, at 25, to a bracket 26, so that when the pedal 23 is forced downward, it will carry the rod 18 therewith against the tension of the spring 19 and will move the arm or lever 16, and on the release of the pedal the spring 19 will restore the rod and arm 16 to the position shown in full lines in Fig. 1.

A former, plunger or head 27 corresponding substantially to the shape of the box to be made is held to a vertically movable shaft or rod 28. This rod or shaft 28 is polygonal in form and is guided in an overhanging part 29 of the machine pedestal or frame 10. At the upper end of the rod 28 is a collar 30 having flanges 31 between which is adapted to rest the bifurcated end 32 of the lever 16 so that on the movement of the arm as already explained, the rod 28 and plunger 27 will be raised or lowered, the said collar 30 being held to the rod 28 by a nut 32^a or otherwise.

The die mechanism 33 is located below and in the path of movement of the plunger or former 27 and is adapted on the downward movement of the plunger to form the shooks into the shape of the box body. The shooks 34 and 35, Figs. 2 to 6, are arranged transversely of each other to lie crosswise one over the other and are adapted at their edges to be engaged by alining bars or plates 36. These bars are adjustably held by screws 37 or otherwise to the flanges 38 of a box-like casing or frame 39 of the die mechanism. As the machine is constructed to form a box or basket substantially square when viewed in plan, the former or plunger 27 as well as the frame 39 are similarly shaped. The purpose of having the adjustable bars 36 is to properly aline the shooks when placed by hand or otherwise within the frame 39 in position to be folded. A die base 40 having the same form as the lower surface of the box plunger and of substantially the same size is secured to a vertically movable rod 41.

This rod has its lower end guided in a boss 42 of a frame member 43, and said rod 41 is provided with a collar 44 at its lower end by which the upward movement of the rod is limited through the engagement of said collar with the lower surface of the boss 42. The frame member 43 is substantially square in form and its outer edge is provided with flanges which are secured by bolts 45 to the frame member 46, the latter being formed as part of the machine frame 10 and to which the box-like casing 39 is detachably held. By constructing the frame member 43 and the box-like casing 39 as independent of each other and of the base portion 46 of the main frame, the several parts forming the frame for the die mechanism are more readily made and assembled and the parts thereby made more accessible.

To fold the shooks about the former or plunger 27 and to utilize an important feature of the present invention to adapt the shooks to be folded without breaking at the point where folded and to avoid the necessity of scoring the shooks as is required by the present means of folding, it is necessary that the shooks at the point of fold be positively held or supported. As one means of accomplishing this result, I provide four wings or folding members 47 which are entirely independent of the die base 40 and are yieldingly held and guided in such a way as to be in a measure free in their movements and not rigidly held at the point of fold of the shooks. These wings each have a plate-like part 48 the lower portion of which is provided with a guide

or guiding segment 49. This guide has its guiding surface 50 adapted to move against the inner surface 51 of the upright portion of the casing 39. Each wing is connected by a link 53 to lugs 54 formed as a part of the frame member 43 or of the casing 39 as preferred. There are two guides or portions 49 on each wing and each link has its upper end pivotally held between said cam portions, and said link causes the outer end of the wing to which it is held to move upward as the die base 40 is forced downward by the plunger 27, as will be presently described. The inner ends of each wing is beveled, as at 55, to correspond to the bevel part 56 of the die base 40 and said wings are each rounded for a part of its width at two places, as at 57, which are adapted to rest loosely in saddles or socket pieces 58. These saddles, two for each wing, are connected to the vertically movable rod 41 of the die base by substantially Y-shaped springs 59, the outer arms of which are connected to the saddles and the inner stem being secured to outwardly extending arms 60. The saddles 58 are connected together in pairs by a bar or plate 61 and each plate is normally forced upward by a spring 62 which is arranged around a rod 63. The rod 63 is located substantially midway of each plate or bar 61 and is guided at its lower end in a socket or extension 64 of the frame member 43, said frame member being recessed for the greater part of its length to receive the lower end of the spring 62.

It will be evident that when the shooks or slices of veneer or other box body material is placed manually or otherwise to lie crosswise so that the edges thereof will be alined by the bars or members 36 and the plunger 27 is forced downward by the pedal 23 as already explained, the continued downward movement of the plunger will force the die base 40 with its rod 41 therewith. This downward movement of the base by reason of the engagement of the beveled edges 46 against the beveled edges 55 of the inner edges of the wings 57 will force the inner ends of the wings downward as shown in Figs. 3 and 4. The yielding connection will permit the wings 47 to accommodate themselves to any unevenness in the shooks and at the same time will cause the inner portion of said wings to hug snugly against and about the outer edges of the die base 40 and has a sliding or wiping action therewith so that there is no opportunity for the shooks to sliver or break at the point of bend. At this time the outer portion of the wings is caused to move upward by the non-yielding of the links 53 which serve to properly support the wings and to permit the outer ends thereof to be moved toward the former or plunger 27 in its continued downward movement, thus forcing the shooks positively against the plunger or former and in such a way as to clearly define the fold of the shooks so that the latter will normally retain their form or box shape when the plunger or former is removed as will be the case as soon as the pedal is released, owing to the tension of the spring 19. The releasing of the pedal and the return of the plunger to its normal position will also permit the springs 62 and the springs 59 to restore the parts of the die mechanism to their former normal position such as shown in Figs. 1 and 6 at which time the folded shooks can be removed for the completion of the box and other shooks placed in position to be folded in a manner similar to that already described.

Where the box body is made by hand, it is usual to tack or staple the two shooks together preparatory to the same being formed, the latter being accomplished by means separate and independent of the body forming means. It is desirable to do this stapling by the same operation that folds the shooks to save one operation. As one means, I provide in Figs. 7 to 12, a form of stapling mechanism by which a single staple is forced through the shooks immediately prior to the folding movement and during the same downward movement of the plunger or former 27. The stapling or fastening means may be of any desired form and construction. The frame and general character of the machine including the die mechanism is identical to that already described and differs from the construction shown in Figs. 1 to 6 only in the application of the stapling mechanism to the machine. The overhanging portion 29 of the machine frame 10 has a bracket 65, to the outer end of which may be held a suitable reel 66, the latter carrying the wire 67 from which the staples are made. The wire is fed between two rolls 68 and 69. The feed rolls 68 and 69 are mounted to move with the plunger 27. The inner feed roll has its shaft 70 forming a pivot for an arm 71. This arm 71 has a bell-crank form and carries a pawl 72 which is adapted to engage the teeth of a ratchet wheel 73 on its downward movement to rotate the rolls and feed a sufficient length of wire to form a staple. This feeding of the wire takes place during the upward movement and at the final part of the up-stroke of the plunger 27, the downward movement of the plunger causing enough of the wire to be unreeled to form a loop long enough to permit the feed or wire to form a staple. The arm 71 has its upper end adapted to be engaged by the end of an adjustable stop 74 and said arm is yieldingly held against the stop 74 by a spring 75, which serves to restore the arm 71 to its normal position. At its outer end

the arm is pivotally held to a rod 76 the upper end of which is guided in the bracket 65, and said rod has a collar 77 which is adapted to engage the under part of said bracket 65. When the plunger moves upward the feed rolls will be carried therewith together with the rod 76 and as soon as the collar 77 engages the bracket 65, it will force the rod 76 and the outer end of the arm 71 downward, thus carrying the pawl therewith to rotate the ratchet wheel 73 to feed the wire for the staple. The cutting off and staple-forming mechanism is not shown in detail but may be such as employed in the stapling machine known as the "Advance" manufactured by the Saranac Machine Company of St. Joseph, Michigan, the mechanism being modified somewhat to adapt the mechanism to be used with the box-forming means, and differs mainly in having the staple forming means and feed movable with a part of the box forming mechanism. The staple forming and driving means is adapted to be arranged within a tubular bar 78 which carries the plunger or former 27. Within this bar is a suitable driving and forming rod or member 79 to which the collar 30 is secured. A spring 80 is arranged around the rod 79 and is interposed between the lower flange 31 of the collar 30 and the bottom of a recess 81, in which latter the lower part of the spring is arranged. The spring 80 is of sufficient tension to cause the plunger 27 and rod 79 to be moved together by the arm lever 16 as the pedal 23 is depressed, but not of sufficient tension to cause the folding operation to take place. This will permit the spring to yield until the flange 31 engages the upper edge of the bar 78 and during this independent movement of the rod 79 the staple 79[a] is formed and driven into the shooks and bound thereto as shown in Figs. 10 to 12. As soon as the shooks are fastened together, the continued movement of the pedal forces the rod 79, rod 78 as well as the plunger 27 downward and will complete the folding operation of the shooks to form the box body in a manner similar to that explained in connection with Figs. 1 to 6.

From the foregoing, it will be evident that a simple and efficient machine is provided whereby box shooks of wood may be formed into a box body without scoring the shooks and without causing the shooks to break or sliver at the point of bend; that simple and efficient die mechanism is provided; that simple and efficient means is provided whereby the shooks may be stapled during the same movement of the machine that forms the box body; and that said machine is simple in construction and readily made and assembled and its parts easily accessible.

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

1. In a box-making machine, the combination of means adapted to hold shooks crosswise and to form the shooks into box form, and stapling mechanism coöperating with the box-forming means for fastening the shooks together.

2. In a box-making machine, the combination of means adapted to hold shooks crosswise to form the shooks into box form, and means coöperating with the box-forming means for fastening the shooks together.

3. In a box-making machine, the combination of die mechanism, a plunger, stapling mechanism movable with the plunger, a power driven element, and means whereby shooks may be held crosswise and made into box form and the shooks stapled together by said mechanism during the same movement of said power driven element.

4. In a box-making machine, the combination of a support, a vertically movable die base, a plurality of wings having their inner edges yieldingly held to fit snugly about the outer edge of said die base, links connecting the wings to said support, guides having the edges thereof guided by said support, and plunger mechanism coöperating with said base and wings to form shooks into box form.

5. In a box-making machine, the combination of a support, a vertically movable die base, a plurality of wings having their inner edges yieldingly held to hug snugly about the outer edge of said die base and have a wiping action therewith, guides held to the wings and having the edges thereof guided by said support, and means coöperating with said base and wings to form shooks into box form.

6. In a box-making machine, the combination of a support, a die base, a plurality of wings having their inner edges yieldingly held to hug snugly the outer edge of said die base and have a sliding connection therewith, and a movable plunger coöperating with said base and moving the same and said wings to form shooks into box form and clearly define the line of fold.

7. In a box-making machine, the combination of a support, a movable die base, a plurality of wings having their inner edges yieldingly held to hug snugly about the outer edge of said die base and having a sliding wiping connection therewith, means connecting the wings to said support, cams having the edges thereof guided by said support, and plunger mechanism coöperating with said base and wings to form shooks into box form.

8. In a box-making machine, the combination of a die base having outer beveled edges, wings movable about said edges and yieldingly held thereto and having a close

sliding connection therewith, and a former of substantially the same size and shape as the die base coöperating with said base and wings to form shooks into box form.

9. In a box-making machine, the combination of a main frame, a plunger, a pedal, connections between the plunger and pedal, and die mechanism having a base and folding members having a sliding connection at their inner edges with said base and adapted to be moved to a folding position during the movement of the plunger to fold the shooks thereabout.

10. In a box-making machine, the combination of a main frame, a plunger, and die mechanism having a base and folding members having a sliding wiping action at their inner portions with said base and adapted to be moved to a folding position during the movement of the plunger to fold the shooks thereabout.

11. In a box-making machine, the combination of a main frame, a plunger, and normally open die mechanism having a base and folding members in contact with but independent of the base and adapted to be moved to a folding position during the movement of the plunger to fold the shooks thereabout.

12. In a box-making machine, the combination of a die base having outer beveled edges, wings movable about said edges and held snugly against the same so as to have a sliding connection therewith, and a former of substantially the same size and shape as the die base coöperating with said base and wings to form shooks into box form.

13. In a box-making machine, the combination of a die base having outer beveled edges, wings movable about said edges and yieldingly held thereto so as to have a sliding connection therewith, and a movable former of substantially the same size and shape as the die base adapted to move said base and wings to form shooks into box form.

14. In a box-making machine, the combination of a support having a box-like frame member and a substantially rectangular member, a die base having a vertically extending rod, a plurality of saddles, means for connecting said saddles in pairs, vertically movable rods connected to the saddles, springs normally forcing the rods in one direction, wings having a portion thereof pivotally held in said saddles and having their inner edges made to hug snugly the outer edges of the die base, springs connecting the vertically movable rod of the die base and saddles, means whereby the outer ends of the wings may be guided to move upward during the downward movement of the die base, and a plunger coöperating with the die base and wings to form the shooks into box shape.

15. In a box-making machine, the combination of a support having a box-like frame member, a die base, a plurality of saddles, vertically movable rods connected to the saddles, springs normally forcing the rods in one direction, wings having a portion thereof pivotally held in said saddles and having their inner edges made to hug snugly the outer edges of the die base, springs for connecting the saddles with the die base, and a plunger coöperating with the die base and wings to form the shooks into box shape.

16. In a box-making machine, the combination of a support, a die base, a plurality of saddles, wings having a portion thereof pivotally held in said saddles and having their inner edges made to hug snugly the outer edges of the die base, springs connecting the die base and saddles, means whereby the outer ends of the wings may be guided to move upward during the downward movement of the die base, and a plunger coöperating with the die base and wings to form the shooks into box shape.

17. In a box-making machine, the combination of a support, a die base, a plurality of saddles, wings having a portion thereof pivotally held in said saddles and having their inner edges made to remain against the outer edges of the die base, springs connecting the die base and saddles, and means coöperating with the die base and wings to form the shooks into box shape.

18. In a box-making machine, the combination of a support, a die base having a vertically extending rod, a plurality of saddles, vertically movable rods connected to the saddles, springs normally forcing the rods in one direction, wings having a portion thereof pivotally held in said saddles and having their inner edges made to remain against the outer edges of the die base, means whereby the outer ends of the wings may be guided to move upward during the downward movement of the die base, and a plunger coöperating with the die base and wings to form the shooks into box shape.

19. In a box-making machine, the combination of a support, a die base having a vertically extending rod, a plurality of saddles, vertically movable rods connected to the saddles, springs normally forcing the rods in one direction, wings having a portion thereof pivotally held in said saddles and having their inner edges made to hug snugly the outer edges of the die base, springs connecting the vertically movable rod with the die base and saddles, and a plunger coöperating with the die base and wings and moving said base and wings to form the shooks into box shape.

20. In a box-making machine, the combination of a support, a die base, wings having edges in contact with the die base but

entirely independent thereof, and a plunger coöperating with said wings and base to form shooks into box form.

21. In a box-making machine, the combination of a support, a rectangular die base, wings yieldingly held against the outer edges of said base and having a sliding connection therewith, and a plunger corresponding to the shape of the base and substantially the same size as said base and cooperating with said base and wings to form shooks into box form.

22. In a box-making machine, the combination of a support, a rectangular die base having beveled edges, wings, one for each side of the base, having beveled edges resting against the beveled edges of the die base, means whereby the wings may be yieldingly supported against the edges of the die base, and means coöperating with the die base and wings to form shooks into box form.

This specification signed and witnessed this 11th day of May A. D. 1914.

CHARLES BURNHAM.

Witnesses:
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