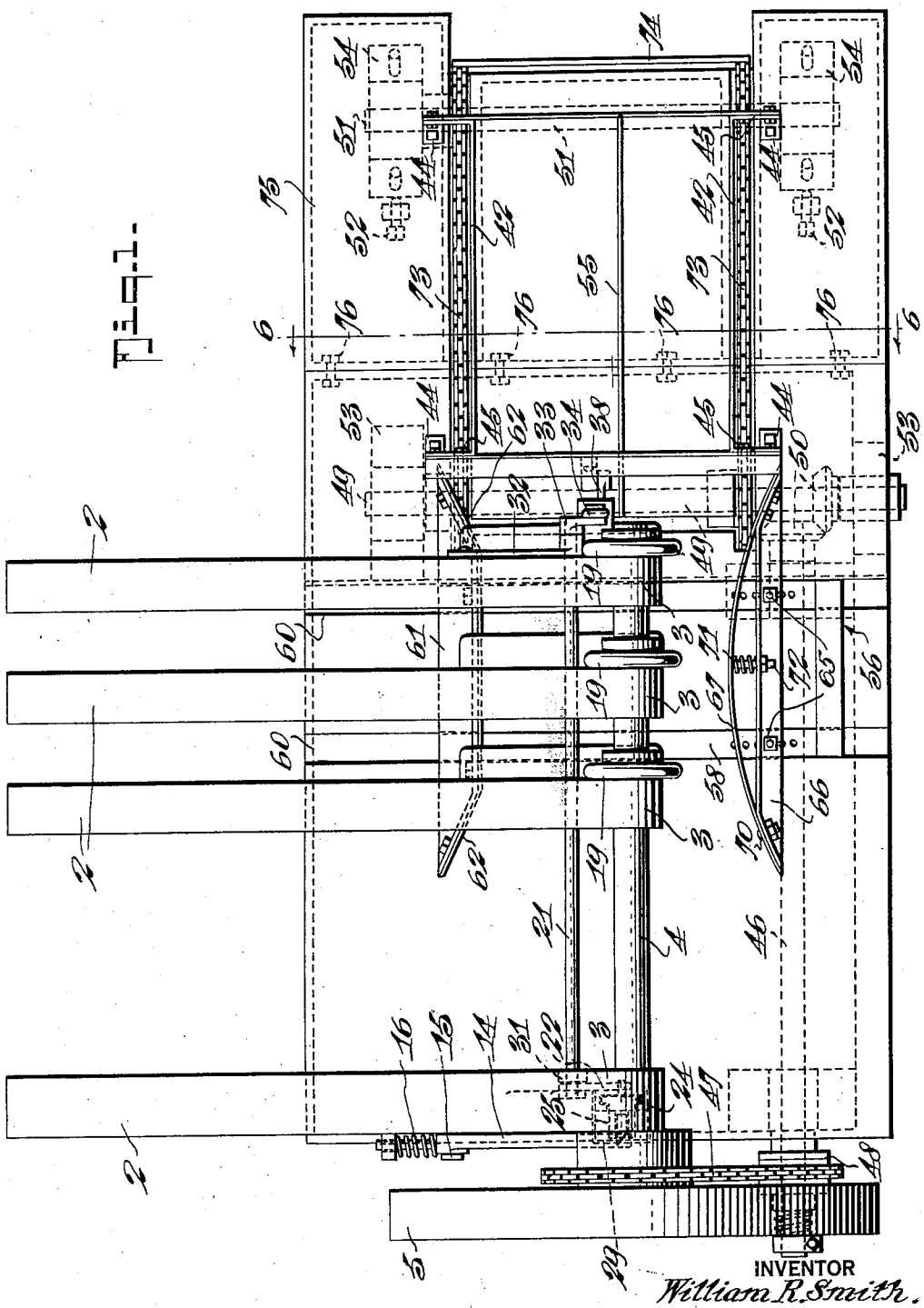
June 28, 1932. W. R. SMITH 1,864,865

BOX SHOOK SPLICING MACHINE

Filed May 24, 1930 6 Sheets-Sheet 1



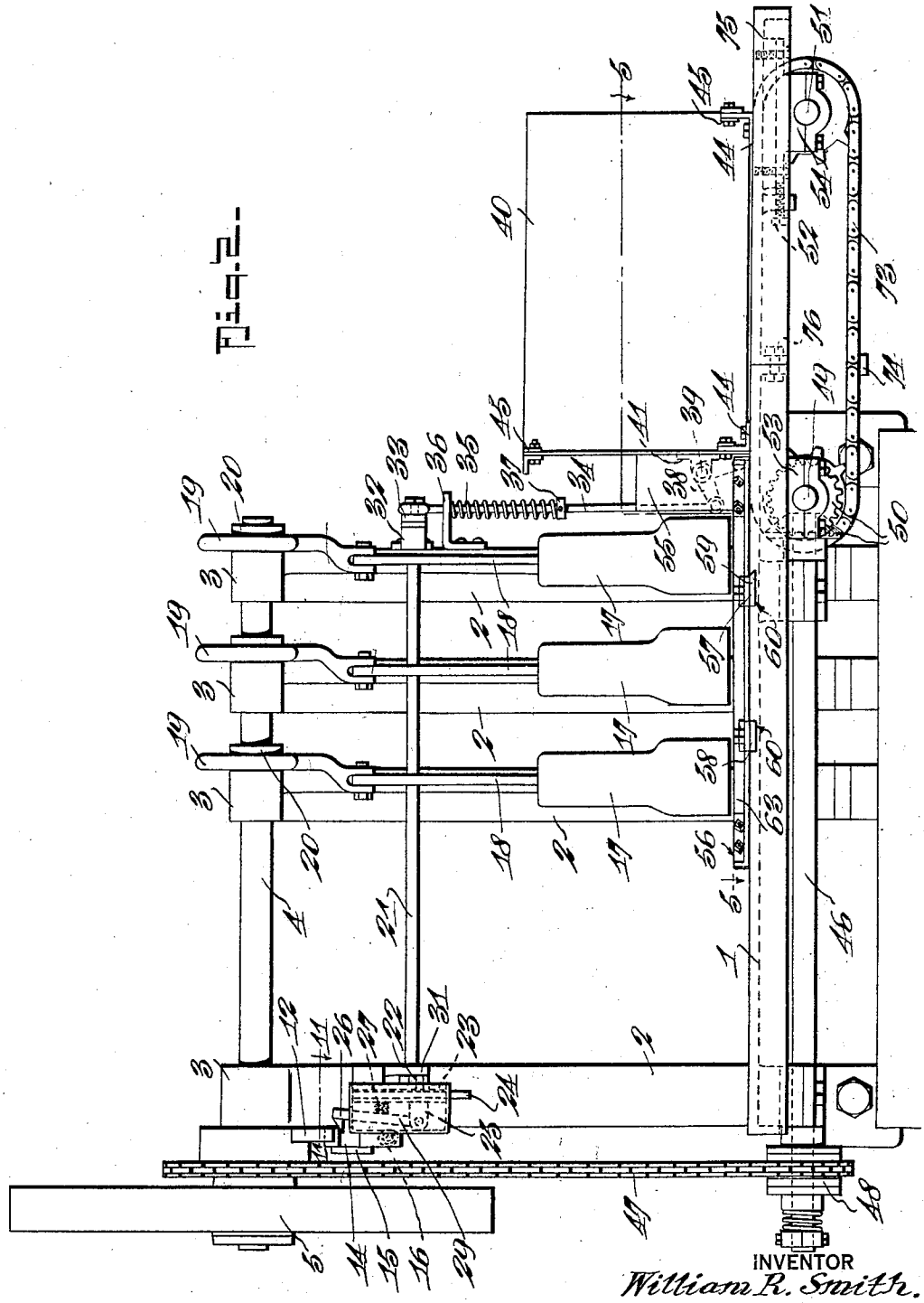
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BOX SHOOK SPLICING MACHINE

Filed May 24, 1930 6 Sheets-Sheet 2

Fig. 2.



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BOX SHOOK SPLICING MACHINE

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Fig. 2.

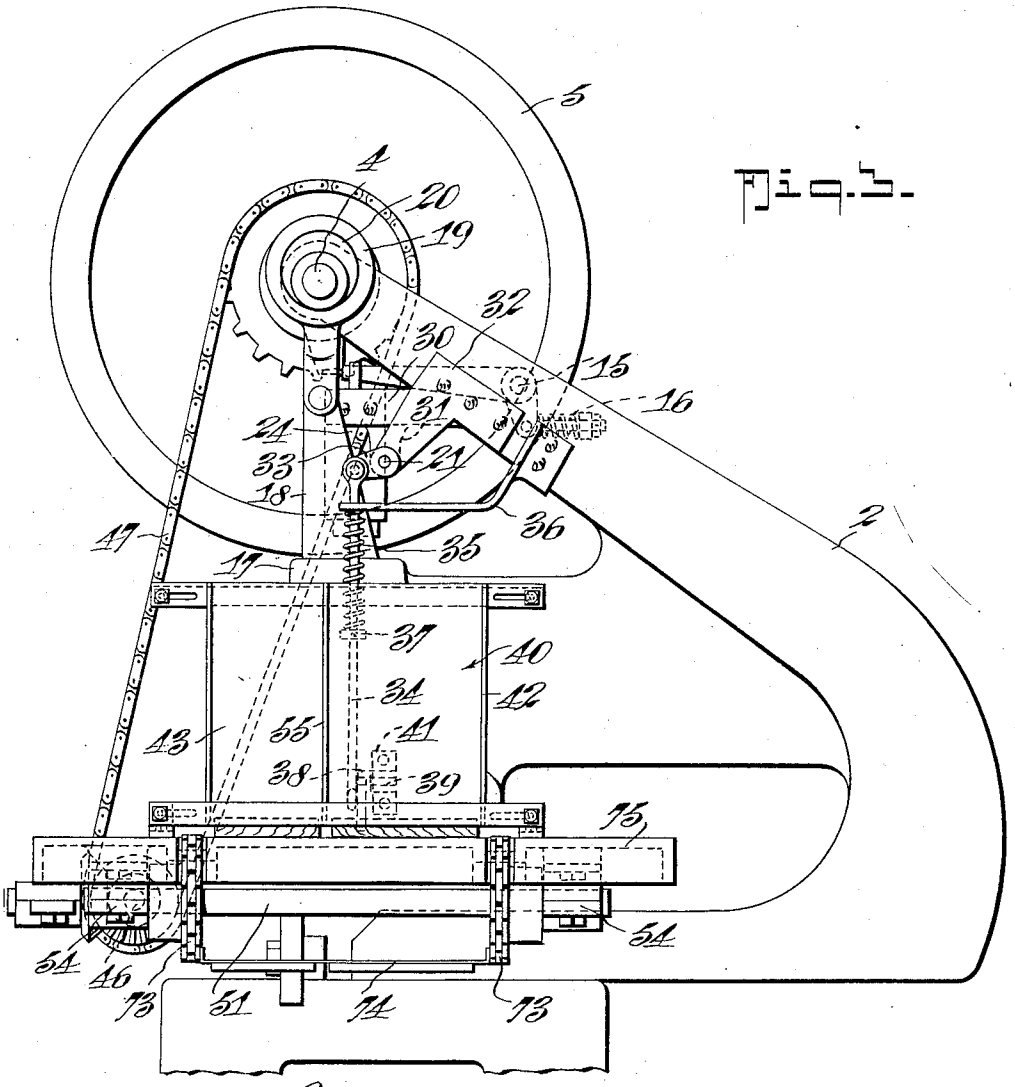


Fig. 8.

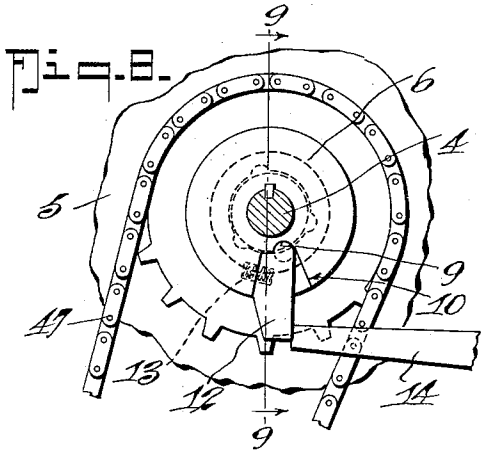
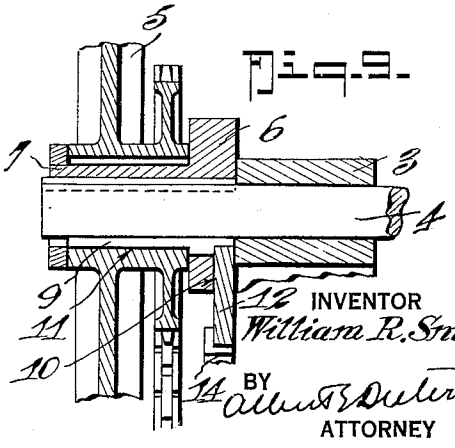


Fig. 9.



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BOX SHOOK SPLICING MACHINE

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Fig. 12.

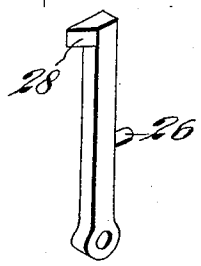


Fig. 4.

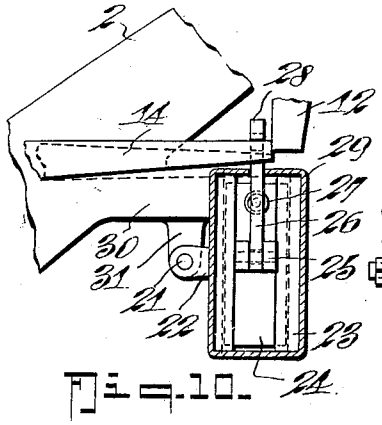


Fig. 10.

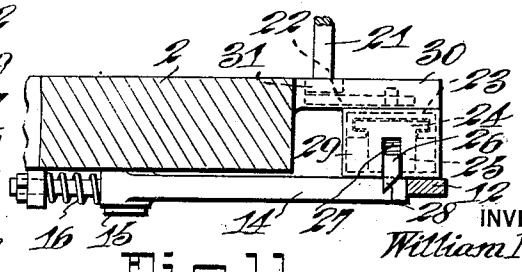


Fig. 11.

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BOX SHOOK SPLICING MACHINE

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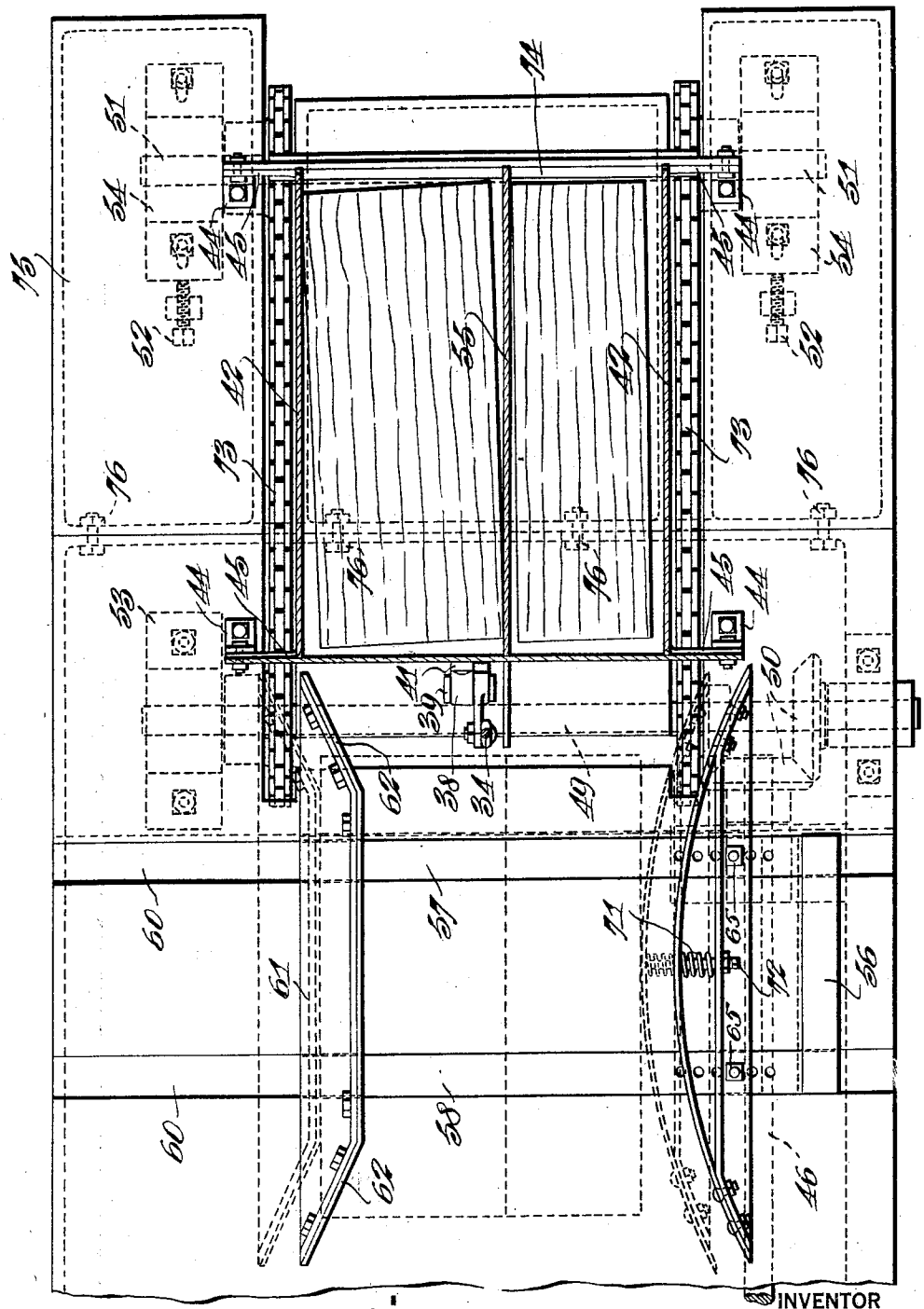


FIG. 5.

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BOX SHOOK SPLICING MACHINE

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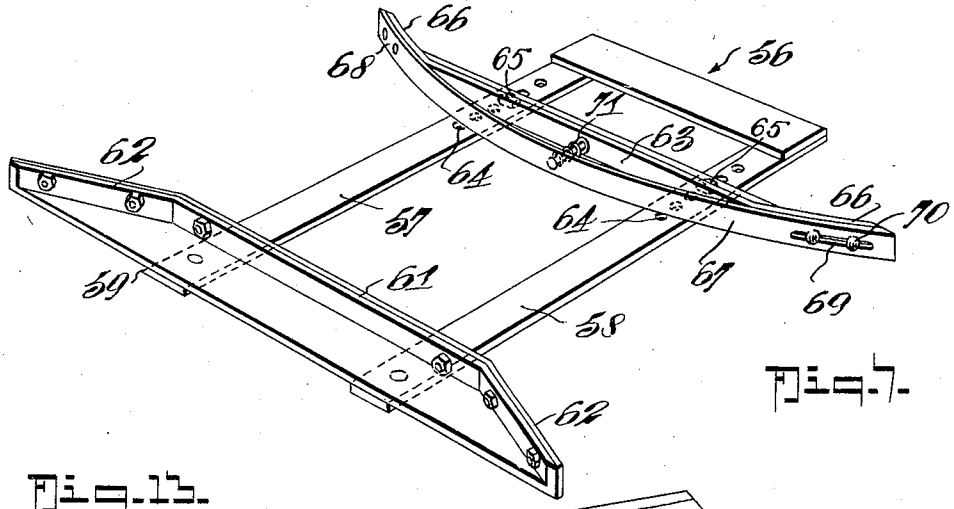


Fig. 7.

Fig. 12.

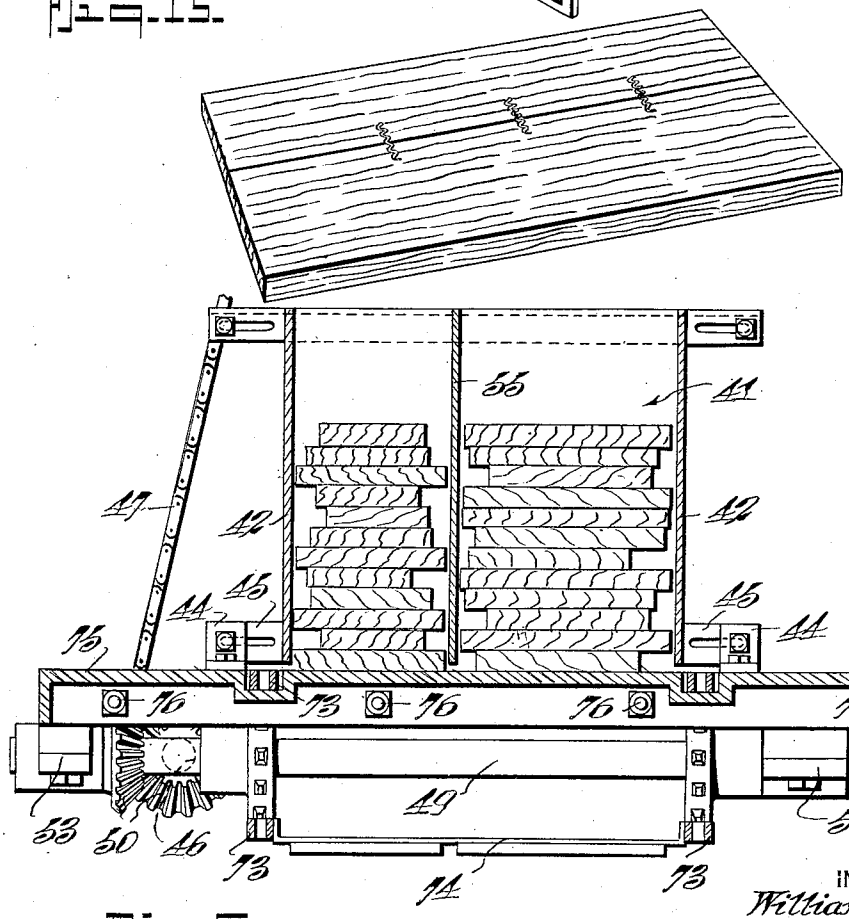


Fig. 6.

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UNITED STATES PATENT OFFICE

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BOX SHOOK SPLICING MACHINE

Application filed May 24, 1930. Serial No. 455,298.

My invention relates to the art of box manufacture and especially to that branch of the art which has to do with the making up of box boards. In the manufacture of wooden boxes it is the practice to build up the walls of the boxes (especially the larger sizes) of several boards of varying widths as for example a twelve inch wall might be made up of two six inch shooks, or of a four inch and an eight inch shock, or a three and a nine inch shook, or a five and a seven inch shook. These shook combinations constitute the boards which are then used to make the sides, ends, top and bottom of the box.

My present invention has particularly to do with the assembling and combining of the shooks to make the box board and securing the shooks of the combinations together as single board units.

One of the principal objects of the invention is to provide in a single machine means for assembling the individual shooks of the units' combinations and while holding them assembled, secure the shooks together by nailing or stapling.

Further, it is an object of the invention to provide a machine for splicing box shooks, into the hopper of which any combination of shooks to make up a board of a given width may be placed, and all such combinations of shooks will automatically adjust the shook clamping fence of the nailing machine to operate properly with relation to the hammers, regardless of the widths of the specific shooks making up the respective combinations.

Further, it is an object to provide a box shook splicing machine which may be adjusted to make up boards of different widths, as for example twelve inch boards, fourteen inch boards, sixteen inch boards, eighteen inch boards, etc., without the necessity of changing the position or operation of the nailing or stapling heads.

Again it is an object to provide an attachment for nailing or stapling machines that will feed the shooks beneath the nailing and stapling heads in position to be nailed or stapled and to control the action of the hammers by the movement and position of the shooks from the hopper to the nailing or stapling part of the machine.

Further, it is an object to provide a box shook splicing machine in which the shook feeding mechanism is so designed as to deliver the complimentary shooks together beneath the stapling or nailing heads with their adjoining edges always in the same general vertical longitudinal plane intersecting the axes of the hammers.

Further, it is an object to provide an intermittent drive or actuating mechanism for the hammers which includes a one-cycle operating mechanism, the commencement of whose cycle of operation is effected by the entrance of a shook into the nailing or stapling part of the machine from the hopper.

Further, it is an object to provide a continuously driven shook feeding device (preferably of the endless chain type) which is provided, however, with a slip clutch arrangement whereby should the device be retarded by shooks meeting obstructions or jamming in the machine, the driving connection will yield until the obstructions shall have been removed.

Further, it is an object to provide an extension table for a shook nailing machine on which is mounted a hopper and in part a feed mechanism for conveying the shooks from the hopper to the table of the nailing machine proper.

Other objects will in part be obvious and in part be pointed out hereinafter.

To the attainment of the aforesaid objects and ends, the invention still further resides in the novel details of construction, combination and arrangement of parts, all of which will be first fully described in the following detailed description, then be particularly pointed out in the appended claims, reference being had to the accompanying drawings, in which:—

Figure 1 is a plan view of a preferred embodiment of the invention.

Figure 2 is a side elevation of the same.

Figure 3 is an end elevation looking from right to left in Figure 1.

Figure 4 is an end elevation looking from left to right in Figure 1.

Figure 5 is a horizontal section on the line 5—5 of Figure 2.

Figure 6 is a cross section on the line 6—6 of Figure 1, shooks being shown in place in the hopper.

Figure 7 is a detail perspective view of the adjustable fence and shook clamp.

Figure 8 is an enlarged detail face view of the clutch mechanism.

Figure 9 is a vertical section on the line 9—9 of Figure 8.

Figure 10 is an enlarged detail face view of the hook mechanism, the cover place being shown in section.

Figure 11 is a plan view of the parts shown in Figure 10.

Figure 12 is a perspective view of the hook lever.

Figure 13 is a perspective view of one of the sets of spliced shooks.

In the drawings in which like numerals of reference indicate like parts in all of the figures, 1 represents the table of the nailing or stapling machine proper, from which standards 2 project and have bearings 3 for the intermittently rotatably cam shaft 4. On the cam shaft 4 is mounted a clutch sleeve 6 which is keyed to and turns with the shaft. This sleeve is provided with a bearing portion 7 on which the hub of the drive wheel 5 rotates. The clutch sleeve 6 has a cut-away portion 8 in which the clutch dog lever 12 has a limiting movement. The lever 12 carries a rocking dog 9 which is adapted to be brought into locking engagement with the clutch recess 10 in the hub of the drive wheel 5 when the lever 12 is moved to the limit of the cut-out part 8 under the influence of the clutch dog engaging spring 13. The rocking clutch dog 9, however, will be held out of engagement with the recess 10 when the lever 12 is moved to the limit of its position in the cut-out part 8 against the tension of the spring 13.

The sleeve 6 has a bearing seat 11 for the rocking dog 9 as best shown in Figure 9.

14 is a bell crank lever which is fulcrumed at 15 to one of the standards 2 and has its long arm adapted to project into the rotational path of the lever 12 so as to force it against the tension of the spring 13 to a position to release the drive wheel 5 and permit it to rotate freely on the bearing 7 while the lever 12 is in engagement with the end of the lever 14. The bell crank lever 14 is continuously pushed toward the position where it will engage the lever 12 by a spring 16.

17 designates the nailing heads which may be of any approved construction and per se are not of my invention. These nailing heads usually have provisions for feeding the nails or staples into position beneath the hammers 18 and holding them ready to be placed by the hammers. This feature of the machine is at present well known and in use.

The hammers 18 are reciprocated by means of eccentrics 20 on the shaft 4 and eccentric loops 19 with connections to the shanks of the hammers 18 so that as the shaft 4 is rotated the eccentrics 20 will reciprocate the hammers 18.

21 designates a trip shaft which is adapted to be rocked in a manner presently explained. The trip shaft 21 has a crank 22 that is connected to a tripper slide 24 which is vertically reciprocably mounted in a slide bearing 23 suitably mounted on a bracket or lug 30. The tripper slide 24 has ears 25 to which is pivoted a hook 26 that is adapted to hook over the long arm of the bell crank lever 14 to pull it down at times out of the path of rotation of the lever 12 as will presently be explained. The hook 26 is continuously pressed toward the bell crank lever 14 by a pressure spring 27.

The hook 26 has a cam face 28 which is adapted to cooperate with the lever 12 so that as the lever 12 begins to move through its rotational path it will strike the cam face 28 and force the hook 26 out of engagement with the bell crank lever 14, thereby leaving that lever free to be restored to its initial position by the spring 16 and serve again as a stop to limit the rotation of the shaft 4 to a single revolution at a time. A suitable cover 29 is provided over the parts 24, 26, 27, etc.

A bearing 31 is provided on the bracket 30 in which the trip shaft 21 is journalled, a second bearing bracket 32 being provided on the standards 2 at the entrant end of the nailing or stapling part of the machine.

At the entrant end of the nailing or stapling part of the machine a second crank 33 is secured to the shaft 21 and this crank is connected with a setting bell crank 38 by means of a connecting rod 34, the latter passing through a bearing bracket 36 and be continuously pressed in one direction by a hold-down spring 35 engaging an adjustable collar 37 on the rod 34.

The bell crank 38 is pivoted at 39 to a suitable support 41 on the front wall 34 of the hopper 40 and has its free arm projected down into the path of movement of the shooks when they emerge from the hopper 40.

The hopper is also composed of side walls 42 which are laterally adjustable toward and from one another but being mounted on suitable brackets 44 and having slotted ears 45 to permit of the adjustment. By having the side walls of the hopper adjustable, shook combinations to constitute boards of different widths may be handled on the same machine.

A countershaft 46 receives its motion by a sprocket and chain drive 47 from the drive wheel 5 through a slip clutch connection 48. The shaft 46 is connected through bevelled gears 50 to drive the feed conveyer drive shaft 49 which is mounted in a suitable bearing 53 and carries sprocket wheels spaced

apart around which conveyer chains 73 pass, these chains also passing around sprocket wheels on an idle shaft 51 at the extreme entrant end of the machine. The shaft 51 is mounted in adjustable bearings 54, the position of which may be varied by means of the chain tightener device 52. The chains 73 carry a single transverse pusher bar 74 that once in each cycle of the chain engages the rear end of a pair of box shooks within the hopper and pushes them onto the table of the nailing and stapling part of the machine.

In order that the proximate edges of the shooks constituting a combination may always appear beneath the hammers in a constant position, I provide a fixed partition wall or center guide 55 in the hopper, to one side of which one of the shooks of the combination is placed while the other shook of the combination is placed at the other side thereof.

The pusher delivers the complementary pair of shooks onto the table 1 of the nailing or stapling part of the machine proper and into the floating shook holder 56. This shook holder 56 is composed of transverse bars 57 and 58 operating in grooves in the table, the front bar 57 having its front edge bevelled as at 59 and the grooves in which it fits being correspondingly bevelled, the grooves in the table being indicated by the reference numeral 60.

The shook holders also includes a relatively fixed fence 61 which is spot-welded or otherwise suitably secured to the transverse bars 57 and 58 and has its ends inclined in a horizontal direction as at 62, both ends being preferably inclined. Opposite the fixed fence 61 is an adjustable fence 63 consisting of an angle iron bolted to the bars 57 and 58, which bars are provided with a series of bolt holes to permit the changing of the distance between the fences 62 and 63 as when boards of different widths are to be formed, the adjusting holes being indicated by 64 and the securing bolts by 65.

The fence 63, like the fence 62, has its ends preferably inclined as at 66 and the fence 63 carries a bow spring 67, one end of which is secured rigidly to the fence end 66 as at 68 while the other end 69 is slotted and secured by bolts 70 as a slide connection. Between the bow spring 67 and the fence 63 is a suitable buffer spring 71 whose tension may be adjusted by suitable means 72.

So far as described the manner in which my invention operates is as follows.

Having determined the width of board to be obtained the adjustable fence 63 is set accordingly and the side walls of the hopper are correspondingly set. The hopper is then ready to receive the shooks. Let us assume that a board of twelve inch width is to be produced. The attendant places in the hopper the necessary shooks to make up the required combinations. For instance in one side of the hopper he will place a four inch shook and in the other side an eight inch shook. Four and eight inch shooks exclusively may be filled into the hopper but it is not necessary to do so since any other combination of shooks which will make up a twelve inch board may be placed into the hopper. When the shooks in the hopper are piled one on top of another the attendant must, of course, take care to place complementary shooks in the same horizontal plane, that is to say if the first two shooks placed in the hopper are six and six inch shooks and the attendant places a four inch shook in one compartment of the hopper on top of the preceding six inch shook, he must place an eight inch shook in the other compartment of the hopper on top of the other six inch shook and so on. It is, of course, to be understood that the front wall of the hopper has its lower edge arranged so that the shooks will just clear beneath it in passing from the hopper.

Now assume that shooks are in the hopper and the machine is ready to run. Power is applied to the wheel 5 in any suitable way as for example by a belt drive (not shown), thus setting the shaft 46 into continuous rotation and thereby imparting continuous rotation to the chain 73. As soon as the pusher bar 74 reaches the righ hand ends of the lowermost pair of shooks in the hopper 40 it will push those shooks from the hopper and in doing so causes the bell crank lever 38 to be rocked in a direction to raise the rod 34 and thereby rock the shaft 21 which in turn causes the tripper slide 24 to be elevated, thereby raising the hook 26 so that its hook end will be sprung over the long arm of the bell crank lever 14. The pusher continues pushing the shooks into position on the table 1. As soon as the forward ends of the shooks engage the fences 62 and 67—63, the shooks will be caused to hug the partition or guide 55 and thus pass beneath the hammers with their proximate edges in the plane of the axes of the hammer gang, it being, of course, understood that the floating shook holder 56 will move laterally of the table to accommodate itself to the shooks passing from the hopper, the pressure of the bow spring 67 cooperating with the fence 62 to clamp or hold the shooks with their proximate edges in contact as soon as they leave the hopper, thus holding the complementary shooks in pressure-edge-contact while the nails or staples are applied.

As soon as the shook combination has passed from the hopper completely and from under the end of the bell crank 38, the pusher 74 will leave the shooks and their motion will be arrested. At the same time, due to the action of the spring 35, the trip shaft 21 will be rocked in a direction reverse to its first rocking movement in view of which the hook

26 will pull down on the lever 14 and cause its end to be moved out of the path of rotation of the lever 12. The lever 12 now being free to move under the action of the spring 13 does so, whereby the rocking clutch dog 9 will engage the recess 10 and connect the drive wheel 5 operatively to the shaft 4, thus causing that shaft to turn, and consequently operating the hammers 18 through the eccentrics. As the shaft 4 turns the lever 12 will engage the cam edge 28 of the hook 26 and disconnect that hook from the lever 14, whereupon the lever 14 will be moved to its initial position by the action of the spring 16 hereinbefore described so that by the time the lever 12 has made one revolution it will then be engaged by the lever 14, its motion stopped with the result that the dog 9 will be rocked out of the recess 10 and the wheel 5 will continue to turn while the shaft 4 remains stationary. This completes the cycle of operation, which cycle is repeated so long as shooks are fed from the hopper 40, it being of course, understood that succeeding shooks push preceding spliced shooks successively from the shook holder and permit their discharge from the machine.

My improvements may be added to present types of nailing machines and to this end I have provided the table extension 75 which may be made of any length depending upon the length of the shook, it of course being understood that when longer table extensions 75 are used longer sections will be quired, the extension 75 being detachably secured at 76 to the table 1.

The drawings disclose and I have described the preferred embodiment of the invention but it should, of course, be understood that changes in the details of construction and arrangement of parts may readily be made without departing from the spirit of the invention or the scope of the appended claims.

What I claim is:

1. In box shook splicing machines, a table, nailing mechanism mounted on the table, a shook hopper, means for feeding complementary shooks from the hopper onto the table into positon with respect to the nailing mechanism, and means for coordinating the time of action of said feeding means and said nailing mechanism, a guide element in the hopper located in the vertical plane of the hammer axis, and a self-adjusting shook clamping fence bodily laterally movable on the table as a unit into which unit the shooks are delivered from the hopper.

2. In box shook splicing machines, a table, nailing mechanism mounted on the table, a shook hopper, means for feeding complementary shooks from the hopper onto the table into position with respect to the nailing mechanism, and means governed by the advancing shooks for effecting the timely operation of said nailing mechanism, a guide element in the hopper located in the vertical plane of the hammer axis, and a self-adjusting shook clamping fence bodily laterally movable on the table as a unit into which unit the shooks are delivered from the hopper.

3. In box shook splicing machines, a table, nailing mechanism mounted on the table, a shook hopper, means for feeding complementary shooks from the hopper onto the table into position with respect to the nailing mechanism, means for coordinating the time of action of said feeding means and said nailing mechanism, said nailing mechanism including a hammer, an intermittently-acting actuating mechanism for said hammer, means governed by the advancing shook for setting said actuating mechanism into action, a guide element in the hopper located in the vertical plane of the hammer axis, and a self-adjusting shook clamping fence bodily laterally movable on the table as a unit into which unit the shooks are delivered from the hopper.

4. In box shook splicing machines, a table, nailing mechanism mounted on the table, a shook hopper, means for feeding complementary shooks from the hopper onto the table into position with respect to the nailing mechanism, means for coordinating the time of action of said feeding means and said nailing mechanism, said nailing mechanism including a hammer, an intermittently-acting actuating mechanism for said hammer, said intermittently-acting actuating mechanism including a rotatable cam shaft, a cam yoke connected to said hammer, and a trip mechanism actuated by the advancing shook for effecting the operation of said cam shaft, a guide element in the hopper located in the vertical plane of the hammer axis, and a self-adjusting shook clamping fence bodily laterally movable on the table as a unit into which unit the shooks are delivered from the hopper.

5. In box shook splicing machines, a table, nailing mechanism including hammers located over the table, and means to operate the nailing mechanism; combined with a bodily transversely movable shook holder located beneath the nailing mechanism, a shook hopper, means to advance complementary shooks from the hopper into the holder, and means to assemble the proximate edges of the complementary shooks and locate same in a constant vertical plane for cooperation with the hammers of the nailing mechanism.

6. In box shook splicing machines, a table, nailing mechanism including hammers located over the table, and means to operate the nailing mechanism; combined with a shook holder located beneath the nailing mechanism, a shook hopper, means to advance complementary shooks from the

hopper into the holder, means to assemble the proximate edges of the complementary shooks and locate same in a constant vertical plane for cooperation, with the hammers of the nailing mechanism, said means to assemble comprising a partition guide in the hopper, and means to mount said shook holder for transverse adjustment bodily as a unit.

7. In box shook splicing machines, a table, nailing mechanism including hammers located over the table, and means to operate the nailing mechanism; combined with a shook holder located beneath the nailing mechanism, a shook hopper, means to advance complementary shooks from the hopper into the holder, means to assemble the proximate edges of the complementary shooks and locate same in a constant vertical plane for cooperation with the hammers of the nailing mechanism, said shook holder including transverse slide bars, a fixed fence secured to said bars at one place, and an adjustable fence secured to said bars at another place, said fences serving to receive the complementary shooks between them.

8. In box shook splicing machines, a table, nailing mechanism including hammers located over the table, and means to operate the nailing mechanism; combined with a shook holder located beneath the nailing mechanism, a shook hopper, means to advance complementary shooks from the hopper into the holder, means to assemble the proximate edges of the complementary shooks and locate same in a constant vertical plane for cooperation with the hammers of the nailing mechanism, said means to assemble comprising a partition guide in the hopper, and means to mount said shook holder for transverse adjustment, said shook holder including transverse slide bars, a fixed fence secured to said bars at one place, and an adjustable fence secured to said bars at another place, said fences serving to receive the complementary shooks between them.

9. In box shook splicing machines, a table, nailing mechanism including hammers located over the table, and means to operate the nailing mechanism; combined with a shook holder located beneath the nailing mechanism, a shook hopper, means to advance complementary shooks from the hopper into the holder, means to assemble the proximate edges of the complementary shooks and locate same in a constant vertical plane for cooperation with the hammers of the nailing mechanism, said shook holder including transverse slide bars, a fixed fence secured to said bars at one place and an adjustable fence secured to said bars at another place, said fences serving to receive the complementary shooks between them, and means for applying clamping pressure to the shooks while between said fences.

10. In box shook splicing machines, a table, nailing mechanism including hammers located over the table, and means to operate the nailing mechanism; combined with a shook holder located beneath the nailing mechanism, a shook hopper, means to advance complementary shooks from the hopper into the holder, means to assemble the proximate edges of the complementary shooks and locate same in a constant vertical plane for cooperation with the hammers of the nailing mechanism, said means to assemble comprising a partition guide in the hopper, and means to mount said shook holder for transverse adjustment, said shook holder including transverse slide bars, a fixed fence secured to said bars at one place and an adjustable fence secured to said bars at another place, said fences serving to receive the complementary shooks between them, and means for applying clamping pressure to the shooks while between said fences.

11. In box shook splicing machines, a table, nailing mechanism including hammers located over the table, and means to operate the nailing mechanism; combined with a shook holder unit, means mounting said unit on the table beneath the nailing mechanism for self-adjustment transversely of the direction of travel of the shooks, a shook hopper, a partition carried by the hopper and dividing it into complementary shook compartments, means to advance the shooks from the compartments into the holder and simultaneously effect an alignment of the holder, and means cooperative with said partition and said shook holder to assemble the proximate edges of the complementary shooks and locate same in a constant vertical plane for cooperation with the hammers of the nailing mechanism.

12. In box shook splicing machines, a table, nailing mechanism including hammers located over the table, and means to operate the nailing mechanism; combined with a shook holder mounted for transverse movement bodily as a unit, a shook hopper, a partition dividing the hopper into two chambers and including a forwardly projecting portion on the outside of the hopper, means to advance complementary shooks from the chambers of the hopper onto the table and into said shook holder, said shook holder being engaged by the advancing complementary shooks for moving it into proper alignment with reference to the advancing shooks, and means forming a part of said shook holder for pressing the proximate edges of the complementary shooks in the holder together.

13. In box shook splicing machines, a table, nailing mechanism including hammers located over the table, and means to operate the nailing mechanism; combined with a shook holder mounted for transverse movement bodily as a unit, a shook hopper, a partition

dividing the hopper into two chambers and including a forwardly projecting portion on the outside of the hopper, means to advance complementary shooks from the chambers of the hopper onto the table and into said shook holder, said shook holder being engaged by the advancing complementary shooks for moving it into proper alignment with reference to the advancing shooks, and means forming a part of said shook holder for pressing the proximate edges of the complementary shooks in the holder together, and means governed by the advancing shooks in passing from the hopper to the shook holder to effect timely action of the nailing mechanism.

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