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STOP MECHANISM FOR BOX NAILING MACHINES

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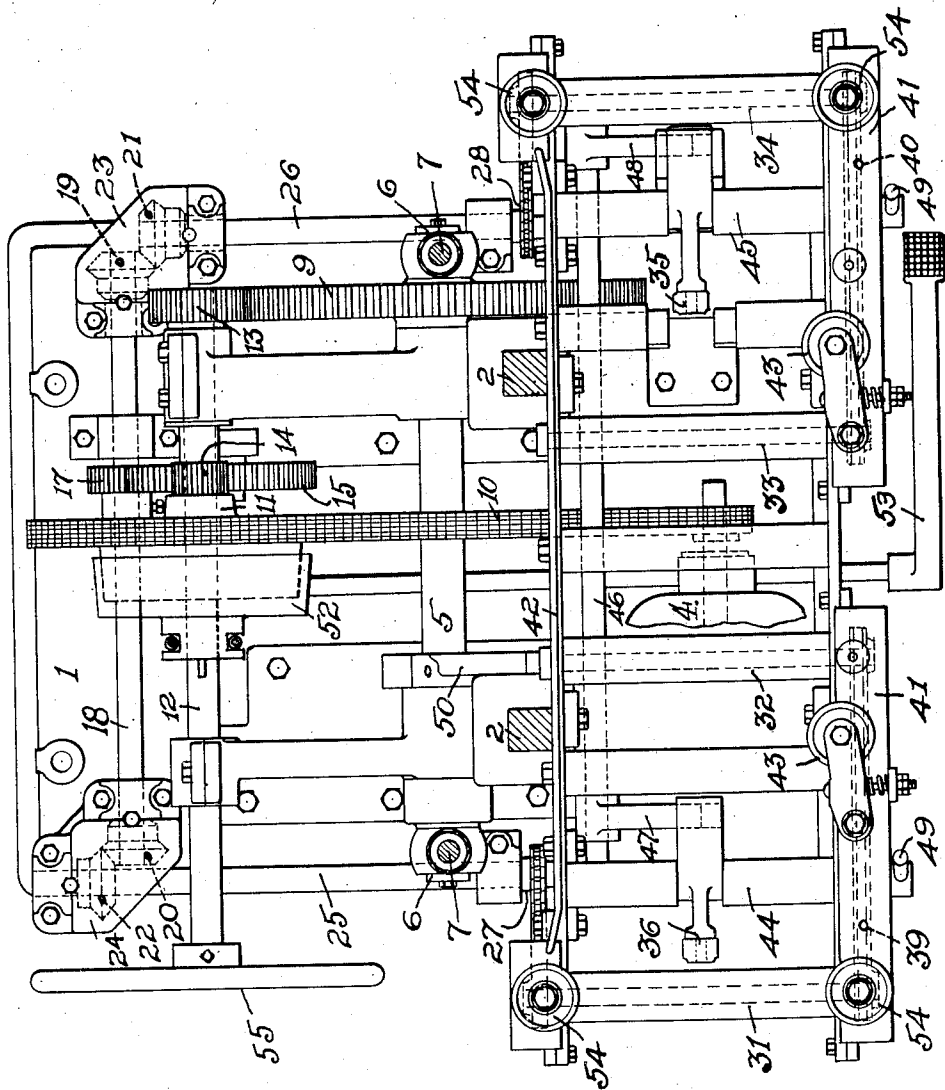


Fig. 2.

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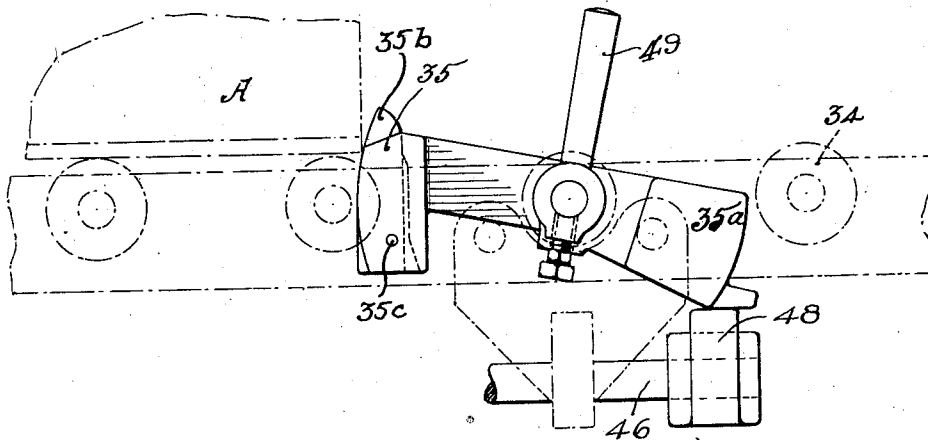
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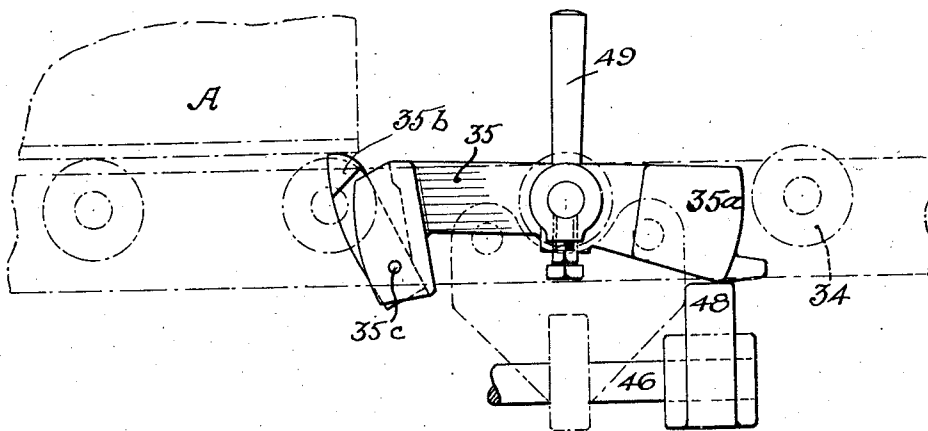
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*Fig. 4.*



*Fig. 5.*



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# UNITED STATES PATENT OFFICE

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## STOP MECHANISM FOR BOX NAILING MACHINES

Application filed September 25, 1929. Serial No. 394,983.

This invention relates to a machine for nailing covers on boxes filled with merchandise of various kinds and the particular apparatus shown is adapted to nailing covers on boxes containing two five gallon cans of oil.

In nailing machines heretofore provided for this purpose boxes have been placed into nailing position by the hand of the operator and judgment was required to get them properly aligned so that the nails would be driven in just the correct place to make the most secure closure, furthermore boxes of this type containing two filled cans of oil are somewhat heavy to handle and an operator becomes tired before the day is ended and cannot give as strict attention to the accurate placing of the boxes as might be desired.

The operators timing element is also variable. Being more or less tired or fatigued during the day he will not present the boxes to the nailing mechanism as uniformly and consistently as can be done by automatic mechanism which does not tire from continued timed operation. Even where the best of ordinary facilities have been provided for bringing the boxes adjacent the nailing machine by means of gravity roller conveyors, they have had to be moved into actual nailing positions by the operators.

The specific improvement applied to cover nailing machines as disclosed in this application comprises the provision of means for automatically stopping the boxes in exact alignment, both laterally and longitudinally, to the nailing mechanism; to provide automatic feeding means on the table supporting the boxes to place them in the desired positions without the help of an operator except that an operator is present at the machine to see that the automatic devices are functioning properly and to give such slight assistance as may be necessary from time to time to keep the machine in continuous operation; to provide means whereby the operator may manually manipulate the various operating devices to facilitate an operation and keep the movement of boxes uniform and regular; to provide means for holding back the advancing line of boxes while the one

under the nailing heads is having its top nailed on; and to provide means whereby a box may be passed through the machine without having a cover nailed thereto if this happens to be necessary on account of some condition of the contents which prohibits the placing or nailing of a cover to that particular box.

With such objects in view as well as other advantages which may be inherent in the invention, consisting in the parts and combinations hereinafter set forth and claimed, it is understood that the several necessary elements and combinations constituting the same may be varied in their proportions, placement and general arrangement without departing from the scope and nature of the invention.

In order to make the invention more clearly understood, there are shown, somewhat diagrammatically, in the accompanying drawings means and mechanism for placing the same in concrete form, without limiting the improvements in their application to the particular construction chosen to illustrate the invention.

Reference is now made to the accompanying drawings whereby a better and clearer understanding of the invention may be had.

Figure 1 is a front elevation showing a section of the roller conveying runway immediately adjacent the nailing machine. In this view the main portion of the driving motor is broken away to clearly show the mechanism back of it. This view also clearly shows the drive means for the power driven feed rolls for moving the boxes into and out of nailing position. The nailing mechanism proper being no part of this invention none is shown except the nail driving chucks that contact with the box top, the rest of this mechanism being broken away or not shown at all.

Figure 2 is a plan view of the device shown in Figure 1 with the nailing mechanism omitted so that the view shows only the top of the improved feed table and in this view the boxes shown in Figure 1 have been omitted to better show the actual operating mechanism.

Figure 3 is an end elevation looking from the right of Figure 1 but showing only the feed and table mechanism and the power mechanism. In this view a box is shown in nailing position.

Figure 4 is a detail view showing one of the automatic stops elevated to hold a box against longitudinal movement. Much of the associated mechanism has been omitted to give a clear view of the stop as it would appear in its elevated position.

Figure 5 is a companion view to Figure 4 but shows the stop in its depressed position.

The numeral 1 represents a base plate on which the nailing machine and all operative parts are mounted. 2 represents standards rising from the base 1 and forming vertical supports for substantially all of the upper mechanism of the nailing machine. 3 represents laterally extending brackets on which the roller conveyor and attending mechanism are carried. 4 is a power motor mounted on the front side of the base 1. 5 is the main power shaft carrying on its opposite ends the crank arms 6 which in turn carry and operate the vertically disposed connecting rods 7 which operate the nail heads 8, only the nailing chucks of these heads being shown in Fig. 1. A large gear 9 is positioned on the shaft 5. A chain drive 10 passes from the motor 4 to a gear 11 mounted on a rear transverse shaft 12 which in turn carries a pinion 13 meshing with and driving the large gear 9, also a pinion 14 meshing with a gear 15 mounted on the shaft 16. The gear 15 meshes with a pinion 17 on the transverse shaft 18. The right hand end of the shaft 18 carries the bevel gear 19 while the left end of the shaft 18 carries the miter gear 20. Gear 19 in turn meshes with the miter gear 21, and the gear 20 meshes with the miter gear 22, each set of miter gears being enclosed in the housings 23 and 24. The miter gear 22 is mounted on a shaft 25 extending toward the front of the machine, while the miter gear 21 is mounted on a like shaft 26 also extending toward the front of the machine. The two shafts 25 and 26 are supported in suitable bearings and on their forward ends carry the sprocket gears 27 and 28.

A gravity roller conveyor system joins the feed table mechanism and with it forms a continuous runway through and past the machine. The runway on the left may be designated by 29 and that on the right by 30.

Supported by the brackets 3 and filling the gap between the runway sections 29 and 30 is located my improved box supporting, aligning and feeding device. This device comprises four power driven feed rolls designated by 31, 32, 33 and 34. 31 and 32 constitute the first pair that feeds the boxes in succession from the runway section 29 forward to the cover nailing position. The final adjustment of the box, however, is con-

trolled by both of the pairs of feeding rolls. As the box is moved from the 29 section by the first pair of rolls 31 and 32 it passes into the zone of the next pair 33 and 34 and as it becomes centered to the nailing chucks 8 it rests on the rolls 32 and 33.

As the box reaches its nailing position it comes in contact with a hinged or swinging stop 35, which arrests its forward movement and locates it exactly for the nailing operation.

A like stop 36 engages the first of the stream of following boxes and holds the line back while the one in position has its cover nailed on.

The power driven rolls 31 and 34 receive rotative motion through the medium of the chains 37 and 38 connecting with the sprockets 27 and 28. Power is transmitted to the rolls 32 and 33 by means of the chains 39 and 40 enclosed in the housings 41.

A guide rail 42 is positioned on the inner side of the machine runway and two spring pressed placing rolls 43 are located on the outer side of the machine runway. The box in entering the machine is engaged by the rolls 43 and pushed transversely to its direction of movement against the guide rail 42. These elements together with the stop 35 act to place each box in succession into exact nailing position.

The stops 35 and 36 are mounted on rock shafts 44 and 45 and have free rocking movement. They are automatically operated to release their respective boxes by means of the rock shaft 46 extending longitudinally of the machine feed table together with the actuating arms 47 and 48 mounted thereon, the ends of which arms contact with the weighted ends of the stops 35 and 36 and lift the weighted ends, thus depressing the stop ends whenever the rock shaft 46 is moved. The stops 35 and 36 are manually controlled whenever desired by means of the handles 49. The occasion for manual control arises only when it is desired to pass a box by the nailing station without nailing a cover thereon, and since the connection between the weighted ends of the stop members 35 and 36 and the arms 47 and 48 is only touch contact they may be moved by either means at will.

The rock shaft 46 receives intermittent impetus through the medium of an arm 50 secured to the crank shaft 5 and rotating continuously therewith, which in its rotation contacts with another arm 51 secured to the rock shaft 46 and disposed in the path of the rotating arm 50, the overlap of the contacting ends of the arms 50 and 51 determining the extent of movement imparted to the arm 51 by the passing of the arm 50. The contact between the ends of these arms is so timed that movement is imparted to the rock shaft 46 and thereby to the arms 47 and 48 to move the stops 35 and 36 at the right instant to

stop an incoming box and to release an outgoing box.

The operation of the machine is controlled by means of a foot pedal the same as other machines of this type. I have not aimed to show any particular manner of control since it is not a part of this invention and is furthermore a well known and used device, just as a matter of illustration, however I have indicated a friction clutch 52, seen only on Fig. 2, which is controlled by the foot pedal 53 in the manner shown.

I will now proceed with a description of the operation of my improvements as applied to a nailing machine wherein the description will apply to an arrangement and placement of parts as shown but may vary somewhat therefrom with a different arrangement or as applied to another type of nailing machine to which they may be adapted.

Referring to Figure 1 I will designate the box in position for having a cover nailed thereto as position "A", and the first box of the advancing line of boxes as position "B". The box in position A is ready to have the cover nailed on, or it may have had this operation performed and is just ready to be released and pass away from position A. We will take this latter assumption as the correct one in this instance because the actuating arm 50 is just contacting with the arm 51 which in turn will rock the shaft 46, raise the arms 47 and 48 and thereby retract the stops 35 and 36 thus releasing the boxes A and B and permitting them to move in the direction of the arrow above B. When this occurs the stops 35 and 36 will assume the position of Fig. 5 which brings the hinged stop faces below the line of travel of the boxes and permits the continuously moving rollers 31, 32, 33 and 34 to carry box A away from the nailing position and bring box B into nailing position. The power driven rollers 31, 32, 33 and 34 are speeded to move the boxes faster than they would otherwise move by gravity over the roller runway so that the box B is moved quite rapidly away from the following box C and thereby creates a space between these boxes for the stop 36 to enter and form an abutment against which the box C will contact and be arrested in its movement when it will assume the position now occupied by B, while box B will be conveyed into nailing position A and abut against the stop 35. During the time that the stops have been retracted and the boxes are passing thereover the arm 50 will have passed out of contact with the arm 51, so that as soon as the bottoms of the boxes pass over the depressed stops 35 and 36 their weighted ends 35a and 36a will drop and raise the stop members up into the path of the advancing boxes against which they will abut and thereby be aligned as has been described.

The contact between the arms 50 and 51 is

only momentary, and in order to insure that the stops 35 and 36 will remain depressed long enough to permit the boxes to begin movement, I provide latch mechanism by which the stops, when depressed, are instantly engaged, and held in depressed position, by the bottoms of the boxes. This is shown in Figs. 4 and 5 in connection with the stop 35, the stop 36 being similarly constructed. A swinging latch member 35b is pivoted at 35c to the stop 35. When the stop is depressed, by having its weighted end 35a raised by the cam 48, the member 35b swings forwardly beneath the bottom of the box, as shown in Fig. 5. This retains the stop in depressed position, even if the arms 50 and 51 pass out of contact before the box begins to move. When the box passes on over the stop, and its weighted end 35a again drops, the succeeding box engages the latch member 35b and moves it back to normal position as shown in Fig. 4, in which position the stop prevents further advance of the box.

The rollers 31, 32, 33 and 34 driven continuously so that they exert a constant urge to the boxes in contact therewith to move forward. This holds the boxes in firm contact with the stops 35 and 36 and starts them forward as soon as said stops are retracted. The rollers, moreover, as alluded to above, separate the boxes to permit the stops to rise between them. As the boxes approach on the gravity feed conveyer 29, they are very likely to be in close contact, as shown at B and C in Fig. 1, especially when the box at B is arrested by the stop 36. When said stop 36 is depressed, the roller 31 (and subsequently the rollers 32 and 33) advance the box from B toward A at a speed somewhat greater than that of the gravity impelled box advancing from C to B, so that a space opens between said boxes to permit the stop 36 to function. Similarly, the box moving out of the machine, from the position 4, is impelled by the rollers 32, 33, and 34 at a speed at least equal to that of the incoming box moving from B to A, so that the space is maintained between said boxes in which the stop 35 may function. This last mentioned condition is assured by having the box at A rest upon two live feed rollers 32 and 33, while the box at B rests only upon one, 31. The box at A therefore receives a greater forward impetus than that at B, when the stops 35 and 36 are retracted.

About the only feature of this operation that is dependent on the operator is the placing of the box cover. It is his duty to have covers in easy reach and place one on each box as it is automatically positioned for nailing and then trip the machine by means of the foot pedal when the nailing operation is automatically performed.

In order to guide the boxes onto the nailing table I provide additional guide rollers 54 at each end thereof which will center the

boxes approximately as they enter and leave the table. The boxes are accurately centered and aligned by means of the spring pressed rollers 43 pushing the entering boxes against the guide rail 42.

In order to handle boxes of differing lengths the stops ends of the arms 35 and 36 may vary in length from their fulcrum, in that arms of differing lengths may be easily placed in the machine by simply removing the arms 35 and 36 and replacing with longer or shorter arms on the one desired to effect the change. For example the stop face of arm 35 could be nearer the fulcrum of the arm which would permit handling a longer box, while the stop face of arm 36 could remain as is. This manner of adjustment will accommodate a wide variety of lengths, and with the nailing chucks adjustable laterally and longitudinally, they could be placed to drive the nails in the proper locations.

Inasmuch as I have not shown the top part of a nailing machine other than the nailing chucks, I would refer to my Patent No. 1,576,213, issued March 9th, 1926, for Combined cover press and nailing machine, which discloses fully this part of the machine and which should be in hand when reading the present specification.

A hand wheel 55 has been provided for moving the machine manually for timing or inspection purposes. This is shown only on Fig. 2 and is mounted on the end of shaft 12.

What I claim as new and desire to cover by Letters Patent is:—

1. An apparatus for nailing covers to boxes comprising a nailing station including a series of nailing chucks, power operated roller means located under said chucks, a trackway along which boxes may move when engaged by said rollers, spaced stop means located in said trackway timed to engage adjacent boxes and space them along said trackway and hold them against movement during the nailing operation, and power means for operating said spaced stop means to release said adjacent boxes to permit their continued movement along said trackway and to then intercept the next two adjacent boxes moving along said trackway and intercept their movement during the cover nailing operation.

2. An apparatus for nailing covers on boxes comprising a nailing station including nailing chucks, a trackway along which boxes may be moved in abutting relation, a section in said trackway where the stream of abutting boxes may be spaced apart, power driven means for engaging each box in succession and moving it away from the following boxes and carrying it into nailing position, stop means normally without the path of moving boxes adapted to enter the space created between the said boxes and temporarily arrest their movement along said track-

way during the cover nailing operation, and means for moving said stop means out of the path of moving boxes whereby their movement along said trackway may be continued.

3. An apparatus for nailing covers on boxes comprising a trackway along which boxes may be moved in abutting relation, means along said trackway for separating said boxes from abutting relation and moving them in spaced relation, means for temporarily arresting the movement of said boxes during the nailing operation, nailing means for securing covers to said boxes during their arrested movement and while positioned under said nailing means, and yielding positioning means for aligning said boxes laterally of their direction of movement when they are approaching alignment with said nailing means.

4. An apparatus for nailing covers on boxes comprising a trackway along which boxes may be moved in abutting relationship, means in said trackway for engaging the bottom of each box as it approaches and moving it faster than the following boxes to produce a space between it and the next following box, other means in said trackway for entering the space thus created and engaging the first of the following boxes and temporarily arresting their movement while the forward box is positioned under the nailing station and its cover secured thereto, and means for then releasing said arresting means to permit the stream of boxes to again move along said trackway and the above cycle of operations repeated.

5. An apparatus for nailing covers on boxes comprising a trackway along which boxes may be moved in abutting relationship, a series of rollers in said trackway for successively engaging each box and moving it away from its abutting companion, a pair of spaced stop means arranged between said rollers and adapted to engage the front edges of two spaced boxes, positioning one at a nailing station and arresting the movement of the remaining boxes along said trackway while a cover is nailed on said positioned box, cover nailing chucks located at the nailing station and operable while a box is positioned at said station to nail a cover thereto, and means for retracting said stop means to permit further advance movement of said boxes to repeat the said cycle of operations.

6. An apparatus for nailing covers on boxes comprising a trackway along which boxes may be moved in abutting relation, means along said trackway for engaging each box as it approaches and moving it ahead of the following boxes to create a space therebetween, stop members along said pathway pivoted to swing into and out of said pathway, one end of said members being weighted to cause the stop member to project in said pathway and intercept boxes moving there-



along, automatically operated means for moving said stop member out of the path of moving boxes whereby boxes may move along said trackway, and means for nailing covers to boxes while held from movement by said stop member.

7. An apparatus for nailing covers on boxes comprising a trackway along which boxes may be moved in succession, constantly rotating propelling means for engaging each box and moving it faster than the following boxes, pivoted stop means for arresting the movement of the propelled box, cover nailing means for attaching a cover to said box while its movement is arrested, and stop releasing means to permit continued movement of said arrested box, said releasing means and said propelling means being driven from the same power source.

8. An apparatus for operating on boxes comprising conveying means for advancing a procession of boxes, means for spacing adjacent boxes of said procession, a pair of pivotally mounted spaced stop members normally held by gravity in position to respectively engage said spaced boxes, means for operating upon one of the stopped boxes, and means for automatically moving said stop members to release said boxes for continued movement.

9. In an apparatus for operating on boxes, conveying means for advancing a procession of spaced boxes, a stop member normally positioned in the path of the advancing boxes, means for moving said stop member out of said path, and a latch movably mounted upon said stop member to hold it out of said path by engagement with the released box.

10. In an apparatus for operating on boxes, conveying means for advancing a procession of spaced boxes, a swinging stop member having one end normally positioned in the path of the advancing boxes, means for moving said stop member out of said path, and a swinging latch pivotally mounted upon said stop member to hold it out of said path by engagement with the released box.

In testimony whereof I have signed my name to this specification.

GEORGE D. PARKER.

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