

April 10, 1951

H. J. GOFF

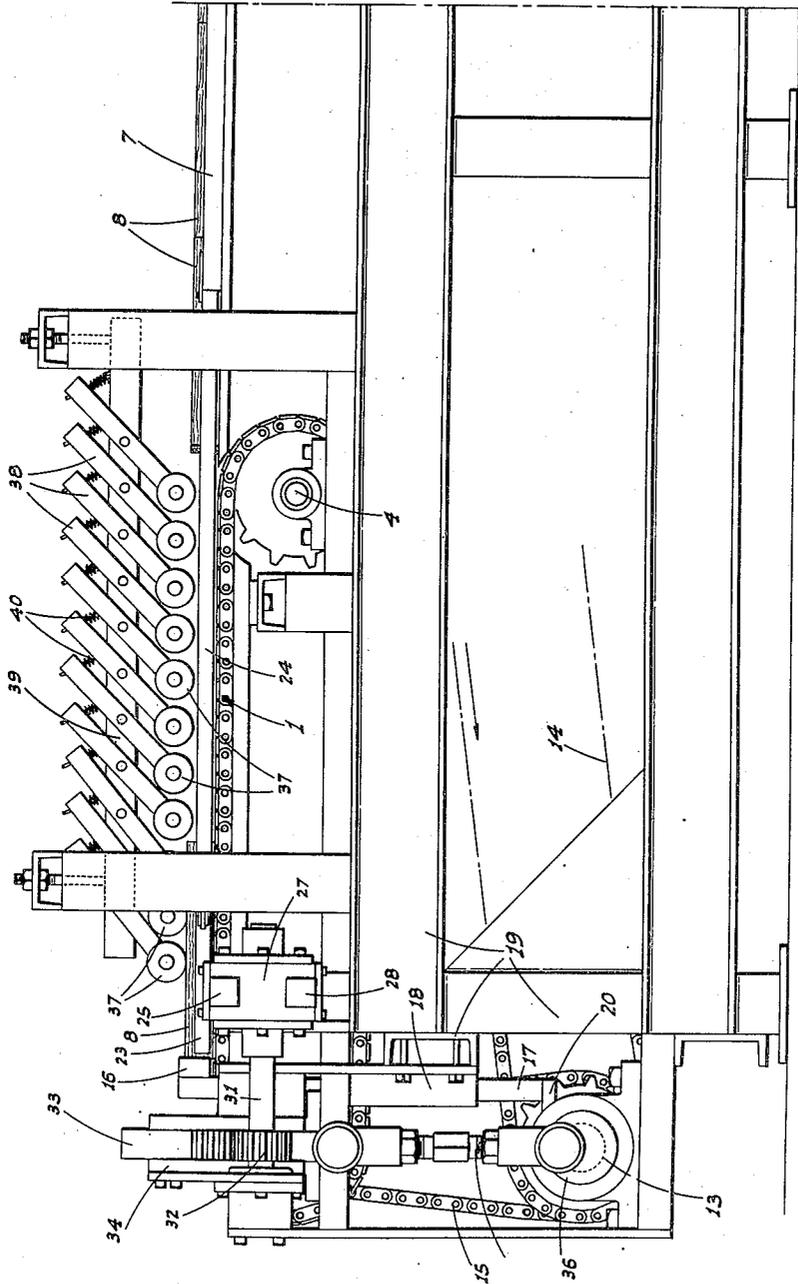
2,548,527

BOX END ASSEMBLY MACHINE

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5 Sheets-Sheet 1

Fig. 1



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2,548,527

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5 Sheets-Sheet 2

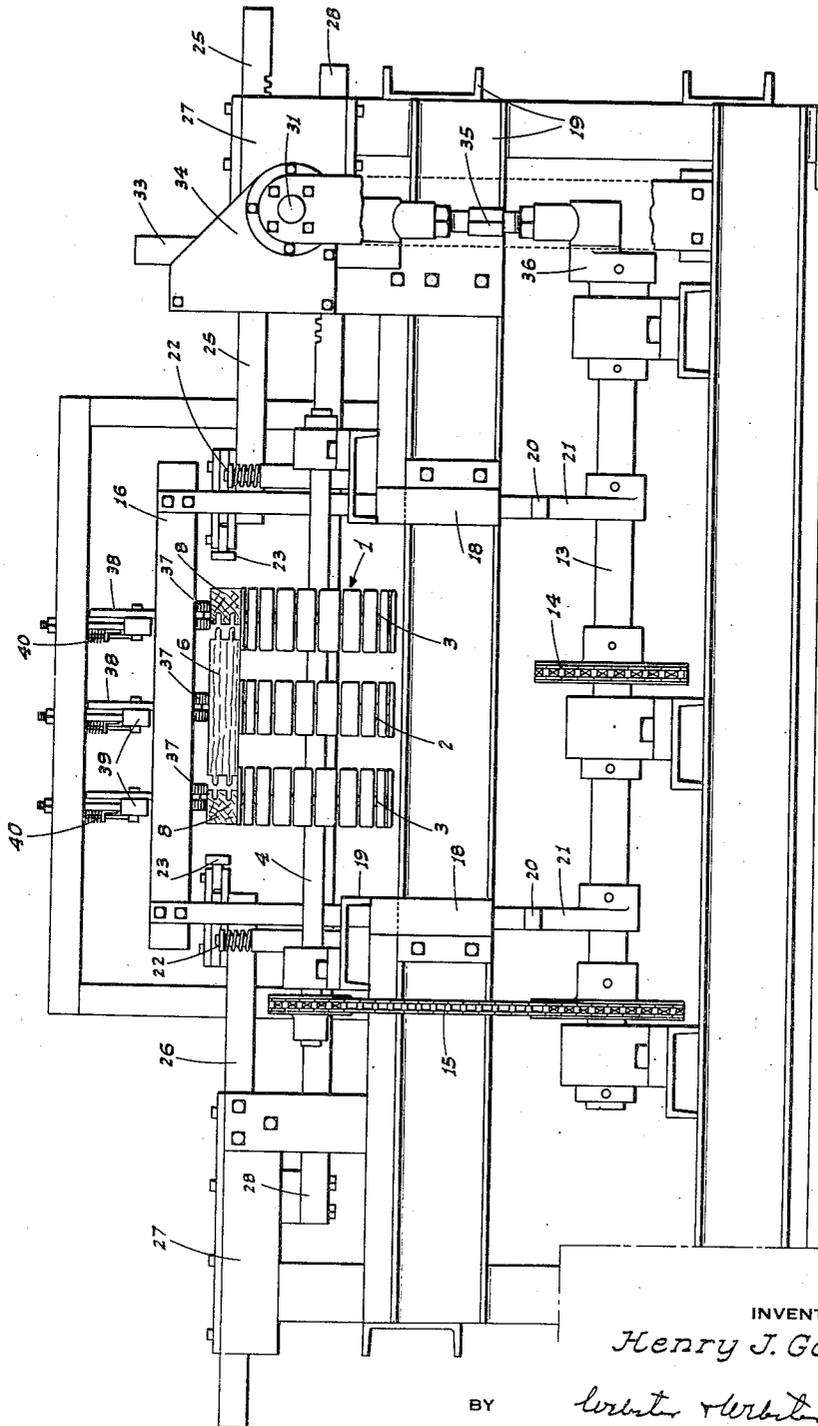


Fig. 2

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2,548,527

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5 Sheets-Sheet 3

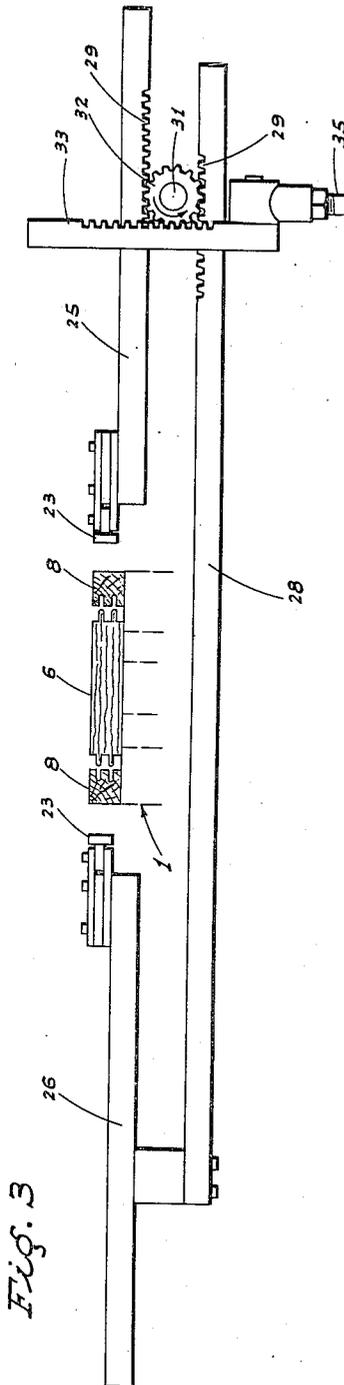


Fig. 3

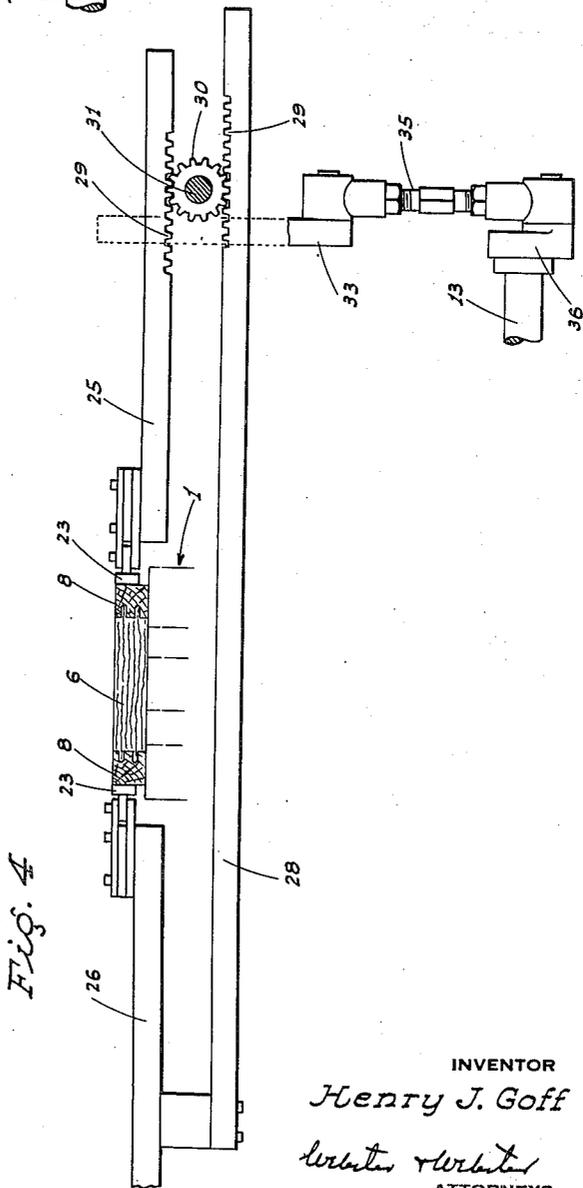


Fig. 4

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2,548,527

BOX END ASSEMBLY MACHINE

Filed Oct. 3, 1945

5 Sheets-Sheet 4

Fig. 5

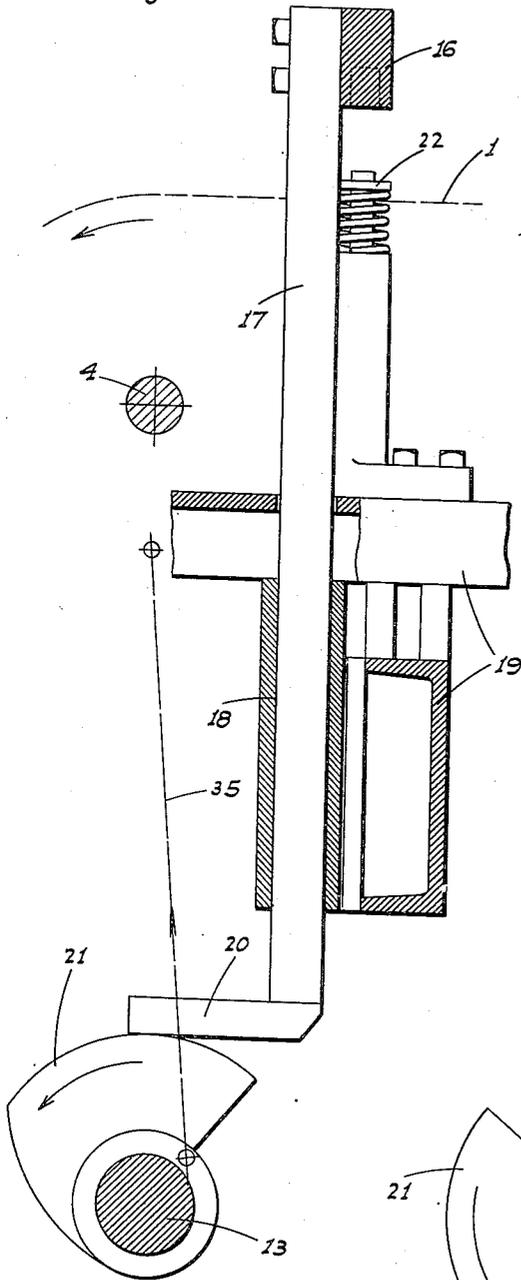
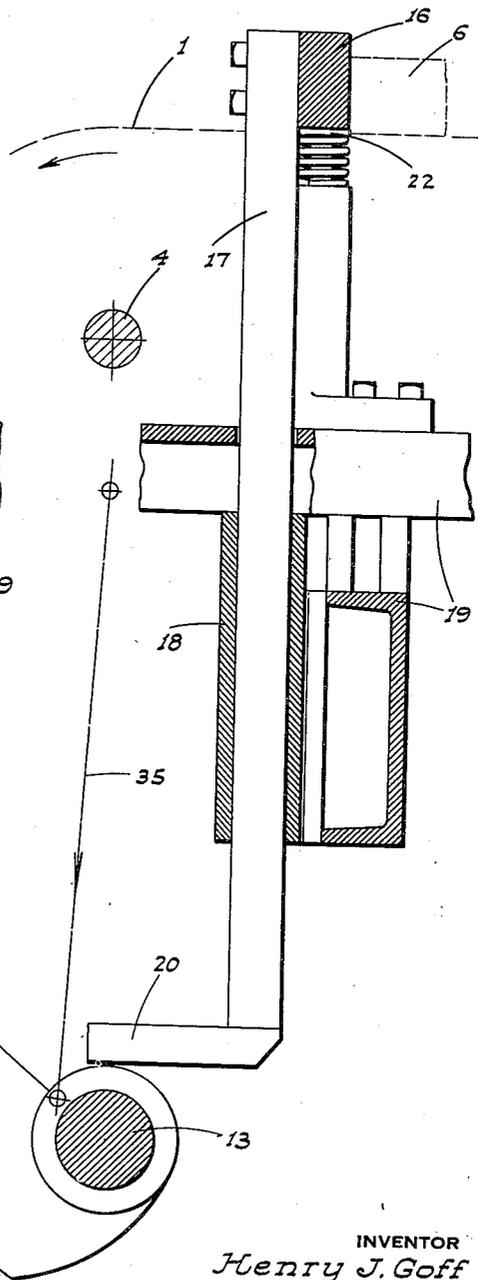


Fig. 6



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2,548,527

BOX END ASSEMBLY MACHINE

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5 Sheets-Sheet 5

Fig. 7

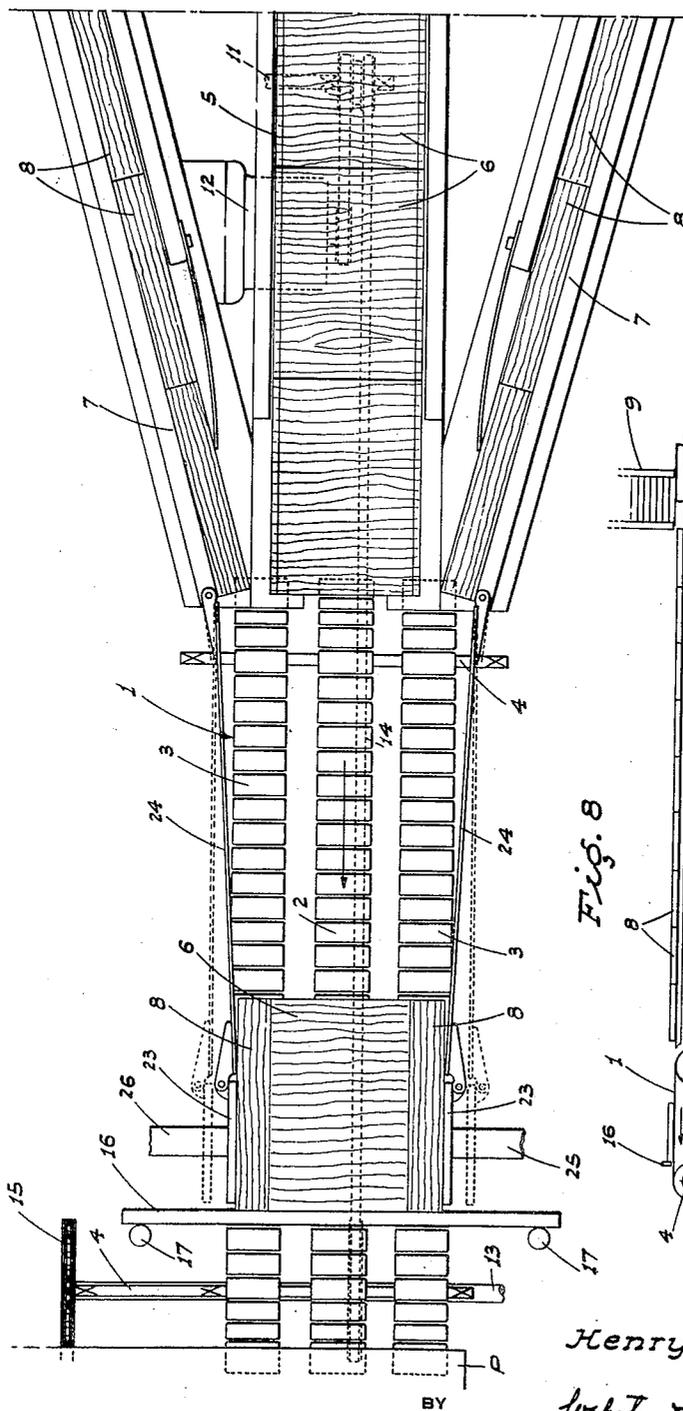
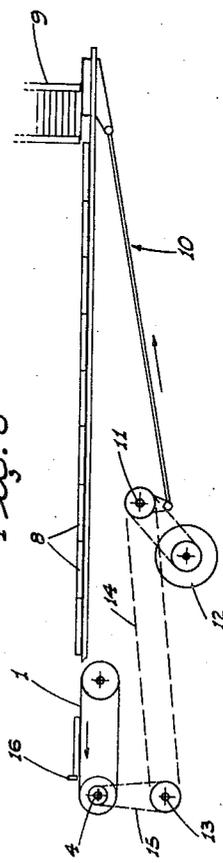


Fig. 8



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# UNITED STATES PATENT OFFICE

2,548,527

## BOX END ASSEMBLY MACHINE

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Application October 3, 1945, Serial No. 619,926

5 Claims. (Cl. 144-7)

1

This invention relates to box end making machines, and represents improvements over my Patent No. 2,038,510, dated April 21, 1936; particularly with respect to the mechanism for finally assembling and uniting the initially separate parts of the box ends at the discharge end of the machine.

In the original apparatus these parts as they came together, and to the adjacent edges of which glue was previously applied, were pressed together as they moved along without any positive alining of the parts either with respect to each other or to the pressing mechanism.

The main object of the present invention is to provide an operating structure for the purpose so arranged that the cooperating and initially separate parts of a box end will be definitely advanced to a definite position against a stop and will then be spaced from the parts of other advancing ends, and while so stopped said cooperating parts will be positively pressed together. As soon as the parts are thus pressed and united the stop then automatically moves out of the way and the finished box end automatically moves clear of the machine. The parts of the next box end to be united then immediately advance to a pressing position and the cycle is repeated; the various operations being so timed that they take place in proper sequence without any chance of the parts piling up, becoming misaligned, or otherwise interfering with the normal and efficient output capacity of the machine.

I have also provided an improved mechanism for exerting a yielding hold-down pressure on the parts as they are being finally advanced and while they are being pressed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a fragmentary side elevation of the machine at the discharge end thereof.

Figure 2 is a rear end elevation of the same.

Figure 3 is an elevation, transversely of the machine, of the pressing unit detached and in a retracted position.

Figure 4 is a similar view showing the unit in its advanced position.

Figure 5 is a fragmentary enlarged sectional elevation of the stop and its control mechanism, showing the stop in a raised or clear position.

Figure 6 is a similar view showing the stop lowered or in its operating position.

2

Figure 7 is a fragmentary top plan of the machine, somewhat diagrammatic, showing the relationship of the box end parts as their initial advance is halted, and also as they are further advanced and in cooperating pressing position.

Figure 8 is a diagram showing generally the driving relationship of the reciprocating parts-feed device to the final parts advancing conveyor.

Referring now more particularly to the characters of reference on the drawings, the structure comprises a horizontal conveyor unit 1 which includes a central conveyor 2 and spaced side conveyors 3; all substantially identical in construction and all fixed on common end shafts 4, the rear one of which is driven, as will be hereinafter seen, so that the upper run of the conveyor unit moves rearwardly.

The central conveyor receives at its forward end from a runway 5 alined with said conveyor, and which supports the central panels 6 of the box ends, each of which panels while of the same length being possibly pressed up of two or more pieces, as shown in said patent. The side conveyors 3 substantially aline with and receive from diverging runways 7 in which cleats 8 ride. These cleats are the same length as the panels 6, and while they are actually the end elements of the box ends they will here be considered as side cleats, since they occupy that relationship with respect to the longitudinal plane of the machine.

The panels and cleats are fed simultaneously from hoppers 9 by a suitable reciprocating feed device, indicated diagrammatically at 10 in Fig. 8, which operates through a stroke lengthwise of the panels; the distance between the hoppers and the conveyor unit 1 being such that the advancing stroke of the feed device leaves the foremost of a string of box end parts just short of the unit 1, as shown in Fig. 7. The feed device 10 is driven off a countershaft 11, itself driven by an electric motor 12; the countershaft driving another countershaft 13 at the rear end of the machine by means of chain and sprocket drive 14. The shaft 13 in turn drives the rear shaft 4 of the conveyor unit 1 at a speed greater than that of the countershaft 11 by means of a chain and sprocket drive 15; the reason for this increase in speed being explained later.

A stop gate 16 of bar form extends across the conveyor 1 a short distance ahead of the rear shaft 4, the gate being mounted on depending posts 17 slidable through sleeves 18 mounted on the framework 19 of the machine. At their lower end these posts carry horizontal, rearwardly projecting feet 20 riding on cams 21 fixed on the

shaft 13. These cams are arranged so as to lift the gate to a position such that the box and parts may pass under the same, as shown in Fig. 5, and upon rotation of the shaft 13 in one direction to allow the gate to suddenly drop to a position just clear of the conveyor unit, as shown in Fig. 6; the downward drop of the gate being cushioned by suitable spring stops 22.

Above but immediately adjacent the conveyor 1 in front of and close to the gate 16 are longitudinally extending presser plates 23 spaced apart transversely a distance normally greater than the full width of the box ends. At the forward end of the plates, diverging guide strips 24 are pivoted thereon, said strips extending forwardly to pivotal connection with the rear end of the runways 7 on the laterally outermost side thereof, as shown in Fig. 7.

The plates 23 are reciprocated toward and from each other by the rotation of shaft 13 in timed relation to the movement of the gate by the following structure, as shown in Figs. 3 and 4.

The plates 23 are secured on the adjacent ends of bars 25 and 26 which extend laterally away from each other and are suitably supported in frame mounted, guide boxes 27. The bar 26 is connected to another lateral bar 28 which extends below the bar 26 across the machine between the runs of conveyor unit 1 to a termination below bar 25. The adjacent faces of bars 25 and 28 are formed with rack teeth 29 engaged by a pinion 30. This pinion is mounted on a shaft 31 journaled in the adjacent guide box 27. Another pinion 32 is fixed on the shaft 31 directly above the shaft 13 at one end thereof, and is engaged on its laterally inward side by a vertical rack bar 33 slidable in a guideway 34 (see Fig. 1). At its lower end the bar 33 is pivoted to a connecting rod 35, which in turn is pivoted on a crank 36 fixed on the adjacent end of the shaft 13. As the rack bar 33 moves up and down, therefore, the bars 25 and 26, and consequently the presser plates mounted thereon, are moved alternately toward and from each other. The stroke of the crank 36 which determines the movement of the bars is such that the presser plates are moved laterally toward each other from a position where they clear the cleats 8 when the latter are immediately adjacent but not actually engaged with the central panels 6, to a position such that such cleats and panels are firmly and positively pressed into holding engagement with each other. This movement of the presser plates is shown in Figs. 3 and 4.

The position of the crank 36 relative to the cams 21 is such that the gate 16 begins to raise just as the presser plates start to back away from each other, and will be dropped into position to stop the next advancing parts before the presser plates start on another advancing or pressing stroke. Also, the parts-feeding stroke of the device 10 is so related to the gate and presser plate operation that the advancing stroke of the device 10 takes place after the pressing stroke has been completed and the gate opened. Therefore it will be seen that as the box end parts nearest conveyor unit 1 are advanced by the operation of the feed device 10, the relatively faster moving conveyor unit 1 will then pick up and advance the foremost box end parts at a greater speed than the initial feeding advance thereof, and will carry them clear of the remainder of the string so as to prevent any longitudinal jamming in said string. The parts-pressing operation takes place while the feed device 10 is on its back or retracting

stroke, so that no further box end parts will ever be advanced onto conveyor unit 1 while one set of parts is being pressed.

As the gate raises the completed box end passes onto a platform P, from which it is moved laterally as in the aforementioned patent.

In order to maintain the box end parts flatly engaged with the conveyor unit 1 as they are advanced thereby, and while being pressed, I provide longitudinal closely spaced rollers 37 disposed above and alined with the runs 2 and 3 of the conveyor unit 1. Each roller is individually mounted on the lower end of a forwardly sloping arm 38, pivotally supported intermediate its ends on a vertically adjustable frame-mounted bar 39. A spring 40 between the bar and each arm 38 acts to swing the arm in a direction to lower the corresponding roller to a position such that while it is clear of the conveyor 1, it is below the level of the top of the box and parts on said conveyor. As said parts are advanced under the rollers, therefore, the latter become spring-loaded and exert a holding pressure against the parts. This provides the necessary frictional contact between the parts and the conveyor so that the latter will positively advance the parts without slipping, and since said conveyor is constantly moving, said parts will thus be definitely held against the gate 16, and will also be positively advanced clear of the machine as soon as the gate is raised.

Due to the large number of independently mounted rollers, the parts are each engaged at a number of points in their length and are properly held down against the conveyor regardless of any difference or inequality in the height of the parts at various points in their length and relative to each other, and as is likely to be encountered in the relatively rough stock used in making up box ends.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful and upon which Letters Patent is desired:

1. In a machine for making box ends each of which comprises initially separate central and side parts adapted to be united by laterally applied pressure, separate runways for said parts, a constantly driven conveyor extending rearwardly from the runways, stop means for the parts extending across the conveyor at a point in the length thereof from the runways a distance greater than the length of the parts, means to exert lateral pressure against the side parts when halted by the stop means, and including presser plates disposed laterally out from the side parts when the latter are engaged with the stop means, and guide strips connected to and extending between the plates and the laterally outermost sides of the runways of the side parts.

2. In a machine for making box ends each of which comprises initially separate central and side parts adapted to be united by laterally applied pressure, a conveyor to advance the parts simultaneously, a stop limiting the advancing movement of the parts and serving to aline them; said stop extending across the conveyor, a driven

5

cross-shaft, presser plates above the conveyor ahead of the stop and disposed to engage side parts halted by said stop, means between the shaft and plates to reciprocate the latter laterally of the machine and means between said shaft and the stop to raise and lower the latter in predetermined timed relation to the operation of the plate reciprocating means.

3. In a machine for making box ends each of which comprises initially separate central and side parts adapted to be united by laterally applied pressure, a conveyor to advance the parts simultaneously, a stop limiting the advancing movement of the parts and serving to aline them; said stop extending across the conveyor, a driven cross-shaft, presser plates above the conveyor ahead of the stop and disposed to engage side parts halted by said stop; supporting bars extending laterally out from the plates, another bar parallel to and vertically spaced from the first named bars, and extending transversely of the machine, means securing said other bar and one of the first named bars adjacent the outer end of the latter, rack teeth on the adjacent faces of said other bar and the other one of the first named bars, a pinion engaging the teeth of both bars, and means to oscillate the pinion to move the bars and plates through a stroke of predetermined length upon rotation of the cross shaft.

4. A machine as in claim 3, in which said last named means comprises another pinion fixed with the first named pinion above the cross shaft and with its axis at right angles thereto, a ver-

6

tical rack engaging said other pinion, an eccentric on the cross shaft and a connecting rod between the eccentric and said vertical rack.

5. A machine as in claim 2, in which said last named means includes vertical posts depending from the stop, guide means for the posts, and cams on the cross shafts supporting the posts; the cams being arranged to give a quick drop to the posts and stop after the latter has been raised.

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