Jan. 20, 1953 C. J. PETERSON 2,625,779

PAPER FEEDING MECHANISM FOR BOX WRAPPING MACHINES

Original Filed Nov. 19, 1946 4 Sheets-Sheet 1

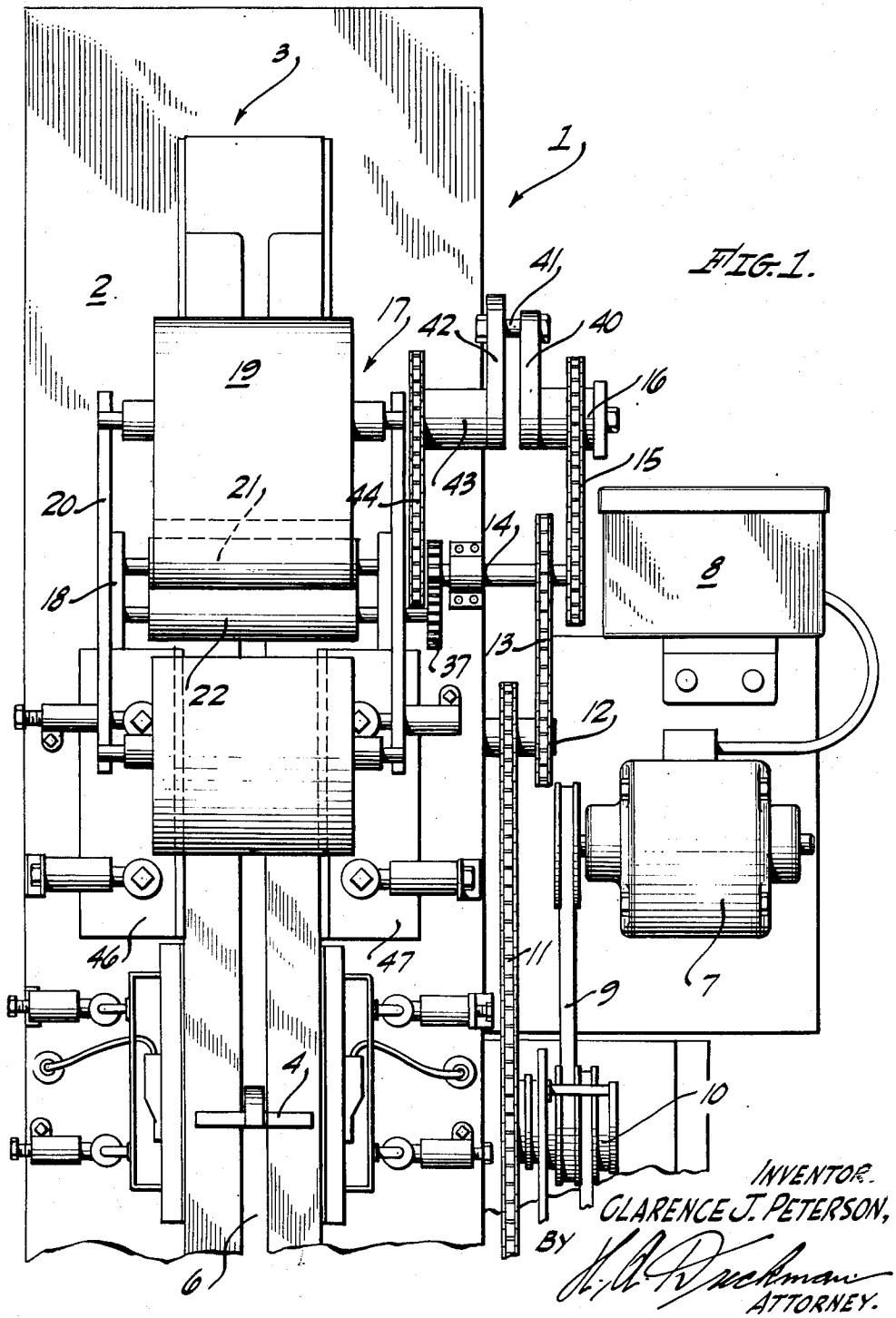


FIG. 1.

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Original Filed Nov. 19, 1946 4 Sheets-Sheet 2

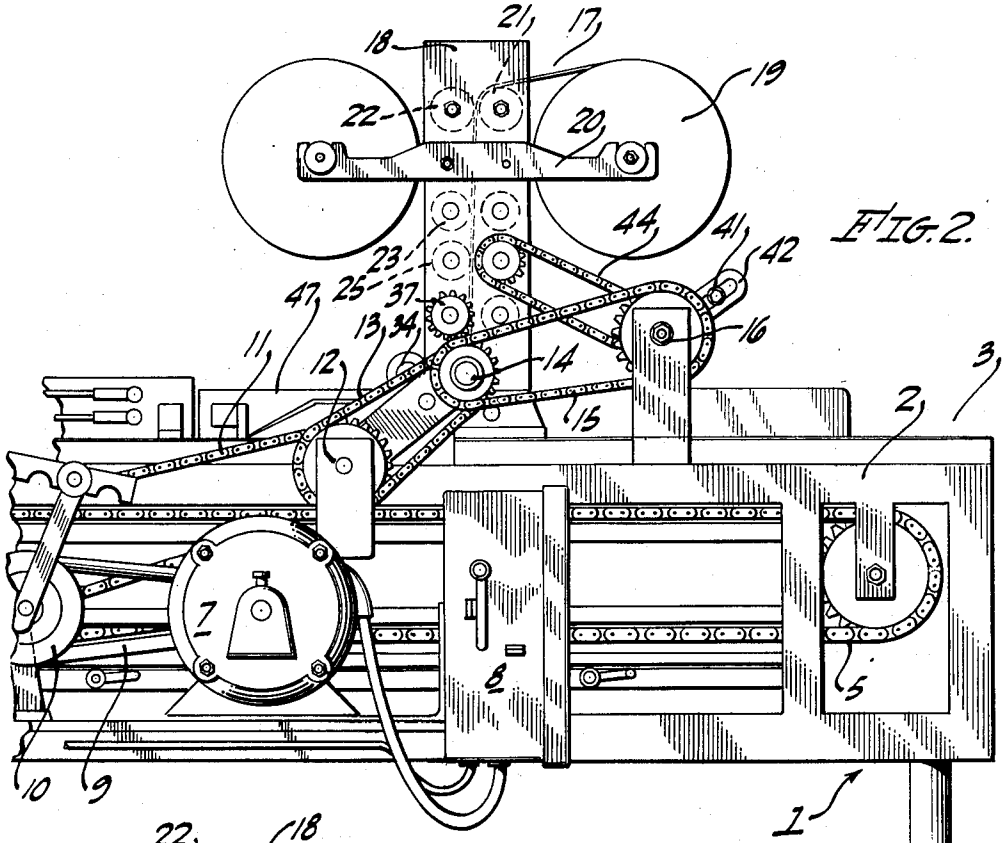


FIG. 2.

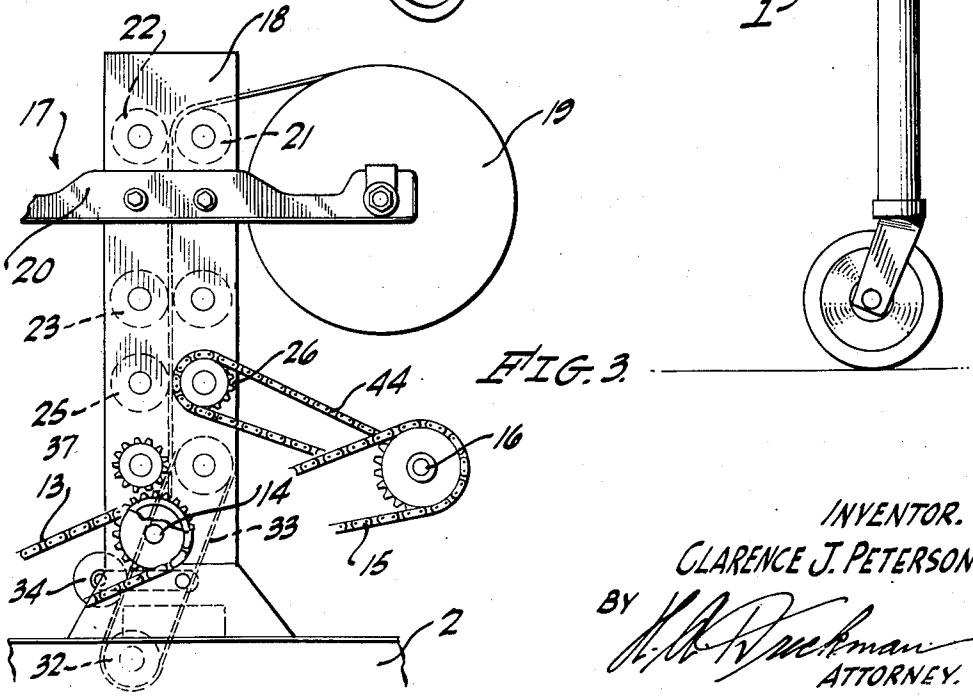


FIG. 3.

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PAPER FEEDING MECHANISM FOR BOX WRAPPING MACHINES

Original Filed Nov. 19, 1946 4 Sheets-Sheet 3

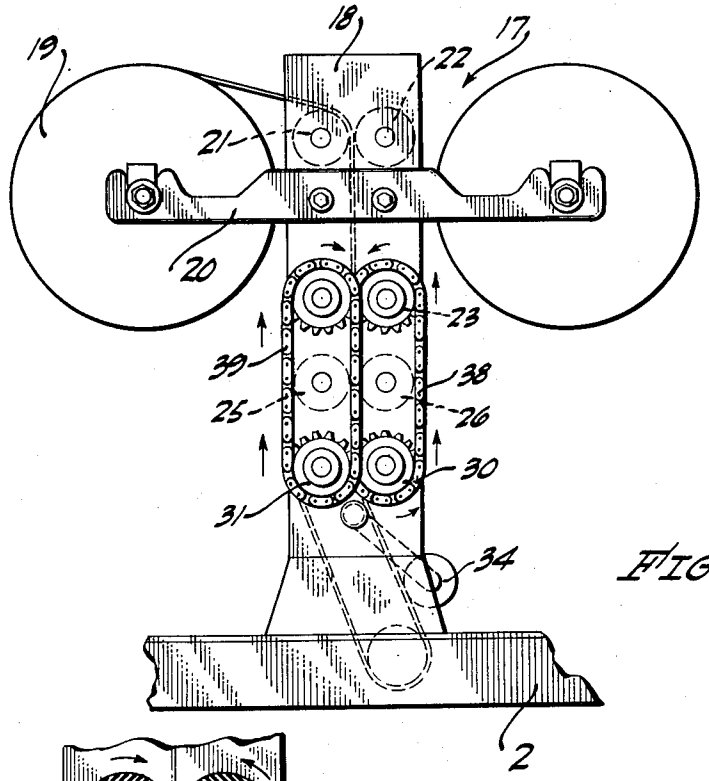


FIG. 4.

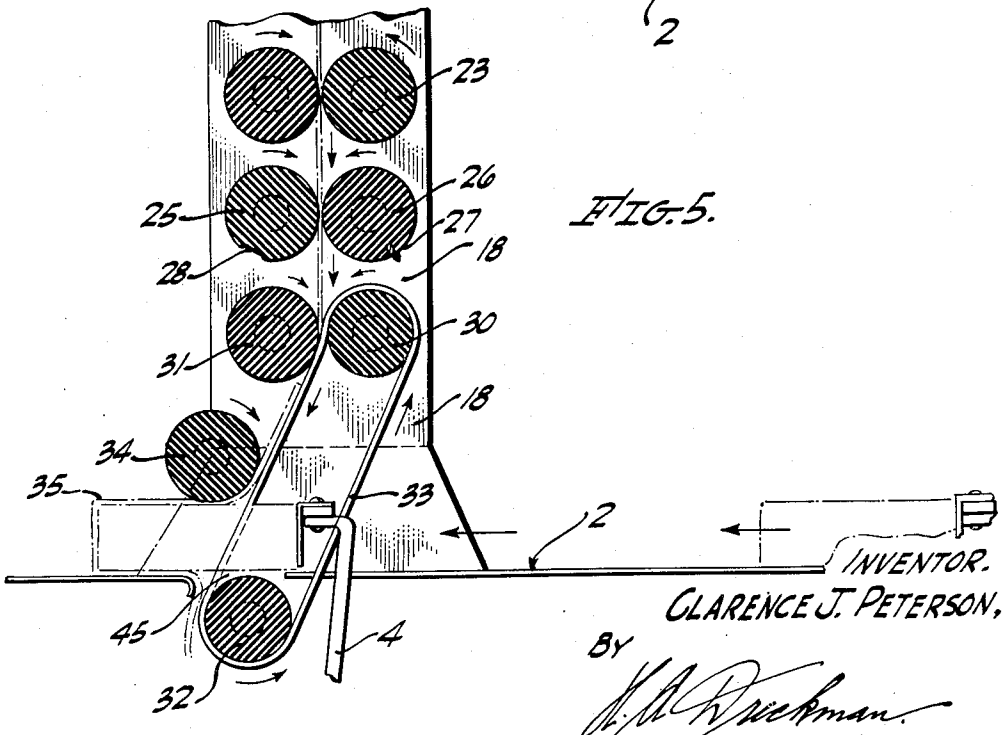


FIG. 5.

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PAPER FEEDING MECHANISM FOR BOX WRAPPING MACHINES

Original Filed Nov. 19, 1946 4 Sheets-Sheet 4

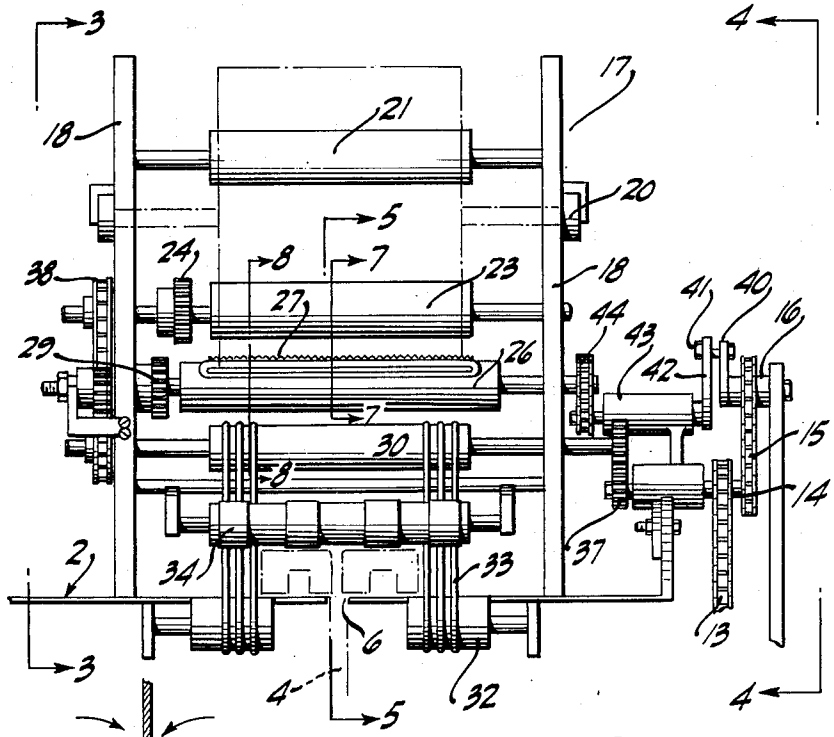


FIG. 6.

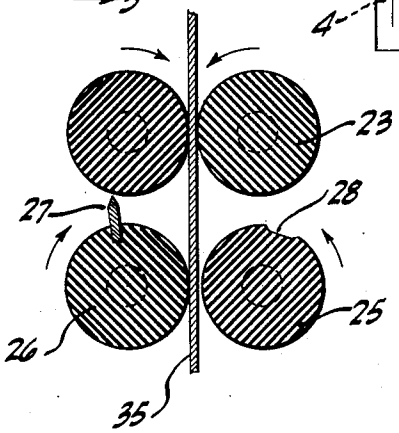


FIG. 7.

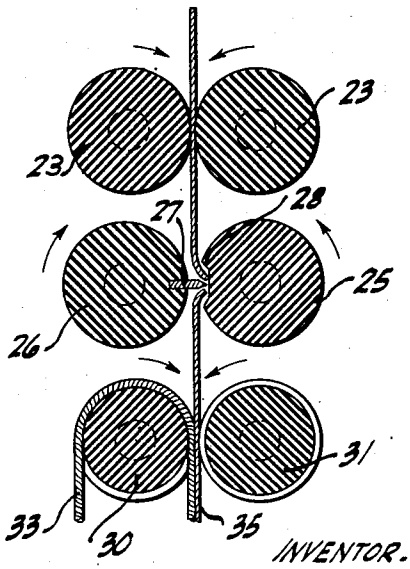


FIG. 8.

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UNITED STATES PATENT OFFICE

2,625,779

PAPER FEEDING MECHANISM FOR BOX WRAPPING MACHINES

Clarence J. Peterson, Watsonville, Calif., assignor to Bank of America National Trust and Savings Association, a national banking association

Original application November 19, 1946, Serial No. 710,865. Divided and this application March 4, 1950, Serial No. 147,716

5 Claims. (Cl. 53—155)

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This invention relates to a paper folding mechanism, whereby oiled or paraffined paper is fed into a box wrapping machine, this paper being wrapped around a box, as the box moves through the machine.

An object of my invention is to provide a novel paper feeding mechanism, in which a vertical paper feed moves a sheet of paper in front of each box as the box goes into the machine. The box is moved against the paper by the conveyor means, and the paper is thus partly folded around the box.

Another object of my invention is to provide a novel paper folding mechanism of the character stated, in which paper is fed from a large roll through feed rollers, and is automatically cut at the proper length and is then held in vertical position in front of the advancing boxes so that the box, as it moves, will carry the sheet of paper away from the feeding rollers and into the folding mechanism of the machine.

A feature of my invention resides in the novel means of positioning the sheet of paper in front of advancing boxes so that the paper is correctly wrapped around the box as said box advances through the machine.

Still another feature of my invention is to provide a novel drive means for the paper feeding mechanism, which so times the movement of the paper that said paper will be positioned correctly as each box starts through the machine.

Other objects, advantages and features of the invention may appear from the accompanying drawing, the subjoined detailed description and the appended claims.

In the drawing:

Figure 1 is a fragmentary top plan view of a box wrapping machine, including my paper feeding mechanism.

Figure 2 is a side elevation of the same.

Figure 3 is a fragmentary side elevation, as viewed from the line 3—3 of Figure 6.

Figure 4 is a fragmentary side elevation, as viewed from the line 4—4 of Figure 6.

Figure 5 is a fragmentary sectional view taken on line 5—5 of Figure 6.

Figure 6 is an end view of my paper feeding mechanism, as viewed from the front end, or intake end, of the machine.

Figure 7 is an enlarged fragmentary sectional view, taken from the line 7—7 of Figure 6.

Figure 8 is an enlarged sectional view, taken from the line 8—8 of Figure 6.

This invention is a division of my co-pending application, Serial Number 710,865, filed November 19, 1946, for Box Wrapping Machine.

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Briefly, in my paper feeding mechanism for box wrapping machines, the boxes are fed on to one end of a horizontal table. These boxes are then moved by a conveyor against a sheet of paper, which is stretched vertically in front of each box. The paper is cut just before the box engages it, and the box, in moving against this cut sheet of paper, causes the same to fold around the front edge of the box, and also the top and bottom. Thereafter, the box, with the paper partly wrapped around it, is carried through folders, which fold the two opposite sides of the paper and seals the same, and finally the rear or trailing edge of the paper is folded and sealed to entirely close the box.

Referring more particularly to the drawing, my box wrapping machine and paper feed therefor comprises a frame 1, which supports or includes the feed table 2. The boxes are fed substantially horizontally on to the table 2, at the feed end, and are subsequently discharged completely wrapped, as shown in my co-pending application above described.

The boxes are advanced singly along the table 2 by spaced rams 4, which are mounted on conveyor chains 5, all as described in my copending application. The rams 4 are substantially T-shaped and project through a slot 6 in the top of the table 2. The entire machine is driven by a motor 7, which is controlled by a switch box 8. The switch box and the motor are both fixedly mounted on the frame 1, substantially as shown. A belt 9 extends from the motor 7 to a variable pitch pulley 10, the purpose of this pulley being to vary the speed of the machine. Pulleys of this type are usual and well known in the art and the detailed construction thereof forms no part of this invention.

The pulley 10, through means shown in my above defined co-pending application, drives a chain 11, which chain, in turn, drives the shaft 12. A second chain 13 drives a shaft 14 from the shaft 12, as shown. The shafts 12 and 14 are both suitably journalled on the frame 1, in the usual and well known manner. A third chain 15 extends from the shaft 14 to the shaft 16, and this last named shaft drives the paper feeding mechanism 17, which will be subsequently described.

The paper feed mechanism consists of a frame 18, formed as vertical arms, which extend at right angles to the table 2, and this frame is fixedly secured to the table. The paper roll 19 is mounted on a horizontal support 20, which is fixedly secured to the frame 18, substantially as shown. The support 20 extends on both sides of the frame 18, as shown, so that two rolls of paper can be

supported thereon, one roll merely acting as an auxiliary supply and is used when the other roll is exhausted. The paper roll 19 is so mounted that it is free to rotate when pulled by the feed rollers which will be subsequently described.

The paper from the roller 19 first passes over an idler 21, which is freely journalled in the frame 18. A second idler 22, in the same plane as the idler 21, is used when the second paper roll is employed. The paper now moves downwardly to a pair of oppositely arranged feed rollers 23, which engage the sheet of paper and pull it downwardly. The rollers 23 are both journalled in the frame 18 and are geared together, as shown at 24.

Below the feed rollers 23, I provide a paper cutter which consists of two parallel rollers 25—26. The roller 26 is provided with a longitudinally extending knife 27, and the roller 25 is provided with a curve 28, into which the knife extends. These cutter rollers are geared together, as shown at 29, so that their movement will be synchronized. A second set of feed rollers 30—31 are positioned below the cutters 25—26, substantially as shown.

Spaced below the roller 30 and positioned under the top surface of the table 2, I provide a pair of horizontal rollers 32, which are driven by a plurality of belts 33. These belts encircle the rollers 30 and 32, and act as a conveyor for the paper sheet after it is cut by the rollers 25—26.

An idler roller 34, which rests against the belts 33 by gravity, will hold the sheet of paper in position against these belts, as shown in Figure 5. The paper sheet is indicated at 35. The idler roller 34 acts as a smoothing roller, the purpose being to smooth the paper over the top of the box as the box passes under this roller, as shown in Figure 5.

The drive for the paper feed mechanism from the shaft 16, is as follows:

The chain 13 drives the shaft 14, and this shaft, in turn, is geared to the roller 30 by the gears 37. The feed rollers 23 are driven from the rollers 30—31 by the chains 38—39, as shown in Figure 4. Thus, it will be evident that the feed rollers 23, 30, 31 and 32 are all synchronously driven.

In order to effectively cut the paper, it is desirable that the knife 27 shall move rapidly in an arcuate direction during the cutting operations, that is, the arcuate speed of the cutting rollers 25—26 should be high during the cutting operation. Thereafter, these cutting rollers can move at the same rate of speed as the feed rollers 30—31. To accomplish this variable speed, I provide the following drive:

The chain 15 rotates the shaft 16, as will be evident, and a finger 40 is fixedly secured to this shaft. A pin 41, projecting from the finger 40, operates in a slot in the finger 42, which is attached to a shaft 43 which is slightly misaligned with the shaft 16. A chain 44 extends from the shaft 43 to the cutter 26, thus driving this cutter and, as previously stated, the cutters 25—26 are synchronously rotated by the meshing gears 29.

The misalignment of the shafts 16 and 43, and the finger and pin connection between these shafts, provides a variable speed to the shaft 43, even though the shaft 16 rotates at a constant speed.

By properly positioning the fingers 40—42, it is possible to speed up the arcuate travel of the cutters 25—26 when the knife 27 enters the groove 28.

The paper is fed vertically into the path of the boxes which move on the top surface of the table 2. The paper feeds from the roll 19 and thence

between the feed rollers 23, and then between the cutter rollers 25—26, and the lower feed rollers 30—31, and thence against the belts 33 and the idler roller 34. After the paper has been cut by the knife 27, the lower edge of the paper will be somewhat below the top surface of the table 2 and extending through the slot 45 in the table. Almost immediately after the paper has been cut by the knife 27, the sheet, which is now held by the belts 33 and the idler roller 34, is engaged by the box, which is pushed ahead of the ram 4. The advancing box picks up this loose sheet of paper and pushes it forwardly, thus causing the paper to fold over the front edge of the box, as well as the top and bottom, as shown in dotted lines in Figure 5. The usual folding dies 46—47 will fold the sides of the paper around the box, thus preparing the box for its final folding, all of which is described in my co-pending application above described. The roller 34 and the front edge of the slot 45 will smooth the paper over the top and bottom of the box, as will be evident. The rams 4 are so spaced that the next box will reach the next sheet of paper as soon as that paper has been fed down to the proper position and has been cut. It will be evident from the foregoing description that the movement of the rams, as well as the rotation of the various feed rollers for the paper, are all driven from the same source of power and are so timed that the steps above enumerated are all carried out in proper sequence.

Having described my invention, I claim:

1. A paper feeding mechanism for box wrapping machines, including in combination a horizontal table, a paper feed frame mounted at the intake end of said table, a paper carrying roller journalled on said frame, a pair of feed rollers journalled in the frame, a pair of juxta-positioned cutter cylinders journalled below said rollers, a knife on one of the cylinders, a second pair of feed rollers journalled in the frame below the cylinders, a pair of rollers journalled below the top surface of said table and below the second rollers, drive belts each encircling one of the second rollers and one of said last named rollers, and drive belts extending into the path of the paper feed.

2. A paper feeding mechanism for box wrapping machines, including in combination a horizontal table, a vertically arranged paper feed frame mounted on the table, said frame including a paper carrying roller journalled thereon, a pair of feed rollers journalled thereon, a pair of juxta-positioned cutter cylinders journalled in the frame below the feed rollers, a knife on one of the cylinders, a second pair of feed rollers journalled in the frame below the cylinders, a pair of rollers journalled below the top surface of the table, drive belts each encircling one of the second pair of feed rollers and one of the last named rollers, said belts extending into the path of the paper feed means synchronously driving said rollers, and variable speed drive means for said cylinders, whereby the speed of rotation of said cylinders is varied during each rotation thereof.

3. A paper feeding mechanism for box wrapping machines, including a frame arranged vertically on a horizontal table, a paper carrying roller journalled on said frame for free rotation, an upper pair of feed rollers journalled in the frame below the paper carrying roller, a pair of juxta-positioned cutter cylinders journalled in the frame below the feed rollers, a knife on one of the cylinders, a second pair of feed rollers journalled in the frame below the cutter cylinders,

drive means extending to the last named feed rollers, drive means extending from the last named feed rollers to the first named feed rollers, a pair of rollers journalled below the top surface of said table, drive belts each encircling one of the second named feed rollers and one of the last named rollers, and an idler bearing against said belts, said belts extending into the path of the paper feed and a variable speed drive means extending to said cylinders, whereby the speed of rotation during each revolution of the cylinders is varied.

4. A paper feeding mechanism for box wrapping machines, including a frame arranged vertically on a horizontal table, a roller carrying a web of paper and journalled on said frame, for free rotation, an upper pair of feed rollers journalled in the frame below the paper carrying roller, a pair of juxta-positioned cutter cylinders journalled in the frame below the feed rollers, a knife on one of the cylinders, a second pair of feed rollers journalled in the frame below the cutter cylinders, drive means extending to the last named feed rollers, drive means extending from the last named feed rollers to the first named feed rollers, a pair of rollers journalled below the top surface of said table, drive belts each encircling one of the second named feed rollers and one of the last named rollers, said belts being spaced longitudinally along said rollers and arranged on each side of a box to be wrapped, an idler bearing against said belts and holding the web of paper in position thereon, said belts extending into the path of the paper feed.

5. A paper feeding mechanism for box wrapping machines, including a frame arranged vertically on a horizontal table, a roller carrying a web of paper journalled on said frame, for free

rotation, an upper pair of feed rollers journalled in the frame below the paper carrying roller, a pair of juxta-positioned cutter cylinders journalled in the frame below the feed rollers, a knife on one of the cylinders, a second pair of feed rollers journalled in the frame below the cutter cylinders, drive means extending to the last named feed rollers, drive means extending from the last named feed rollers to the first named feed rollers, a pair of rollers journalled below the top surface of said table, drive belts each encircling one of the second named feed rollers and one of the last named rollers, said belts being spaced longitudinally along said rollers and arranged on each side of a box to be wrapped, said belts extending into the path of the paper feed, an idler bearing against said belts and holding the web of paper in position thereon, said idler roller being positioned above the box to be wrapped, whereby the web of paper is pulled taut over the top of the box to be wrapped.

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