

Oct. 18, 1955

A. RUSSELL ET AL

2,721,077

FEEDING OF WRAPPING MATERIALS TO WRAPPING MACHINES

Filed July 21, 1951

6 Sheets-Sheet 1

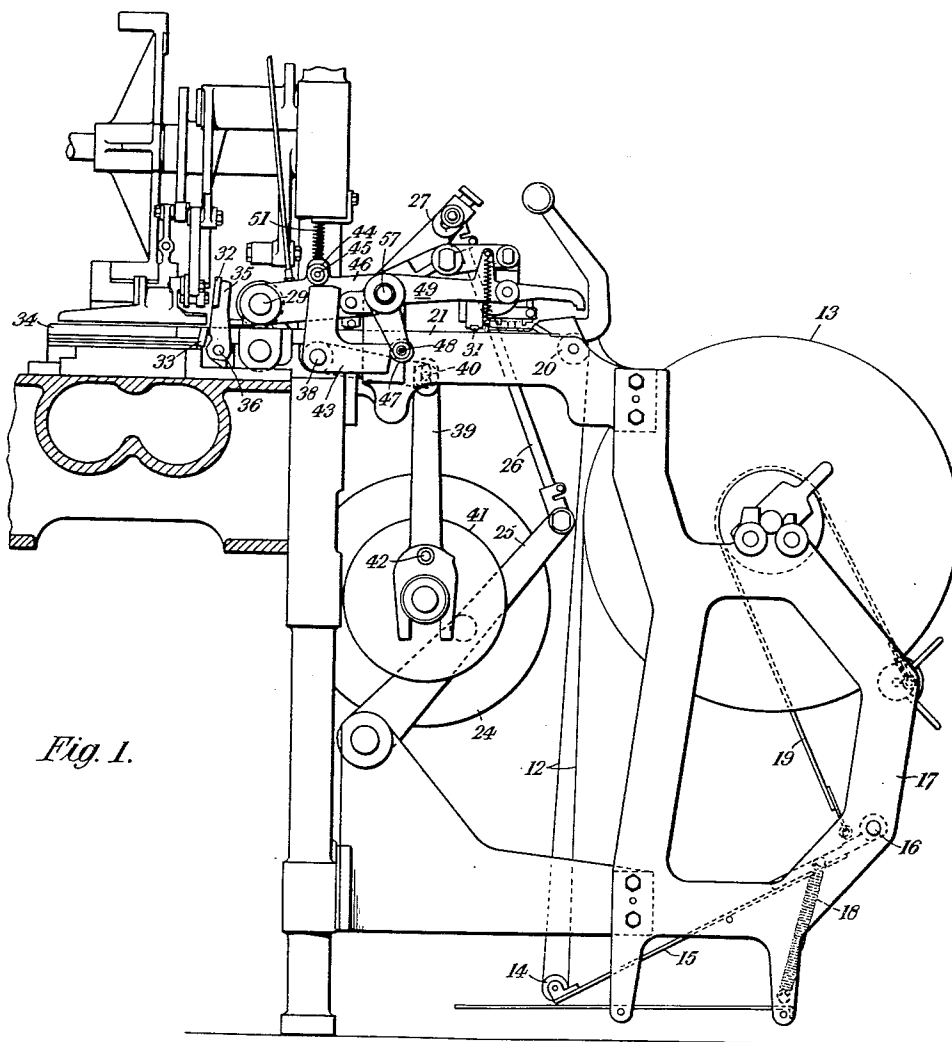


Fig. 1.

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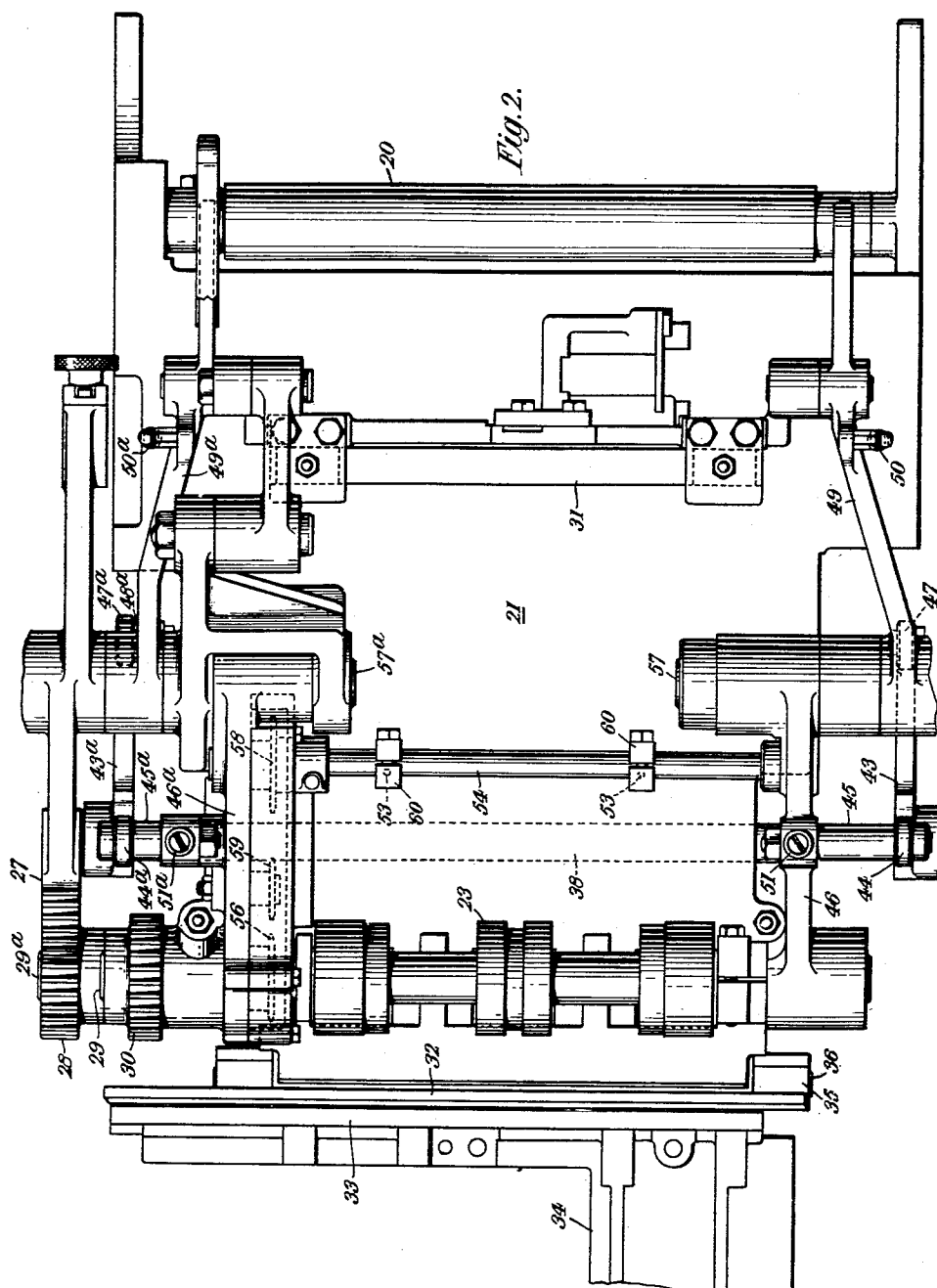
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6 Sheets-Sheet 2



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FEEDING OF WRAPPING MATERIALS TO WRAPPING MACHINES

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6 Sheets-Sheet 3

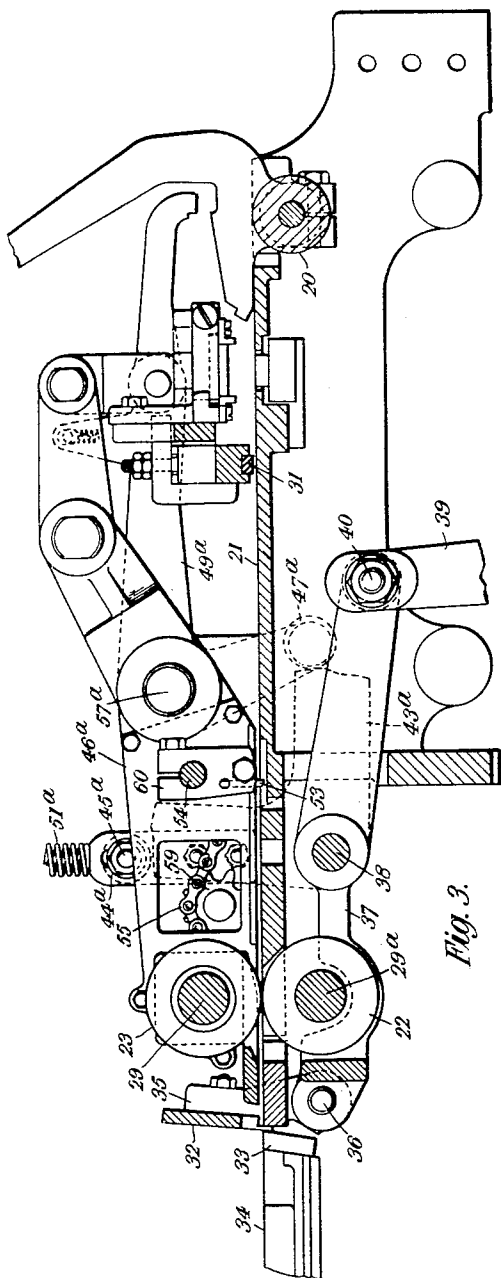


Fig. 3.

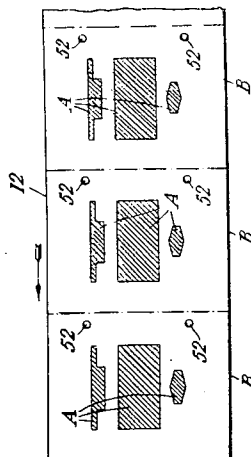


Fig. 5.

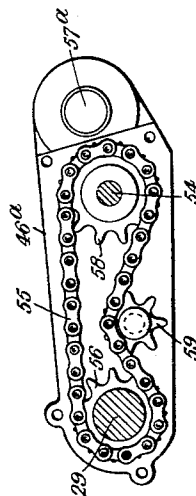


Fig. 4.

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FEEDING OF WRAPPING MATERIALS TO WRAPPING MACHINES

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6 Sheets-Sheet 4

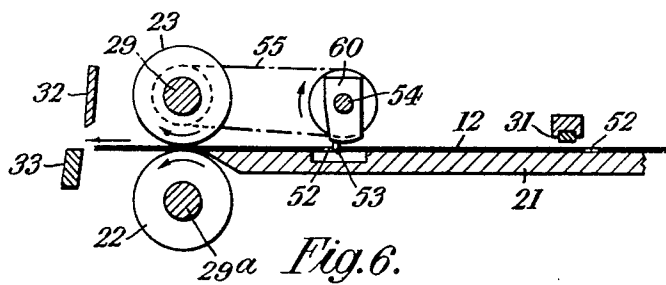


Fig. 6.

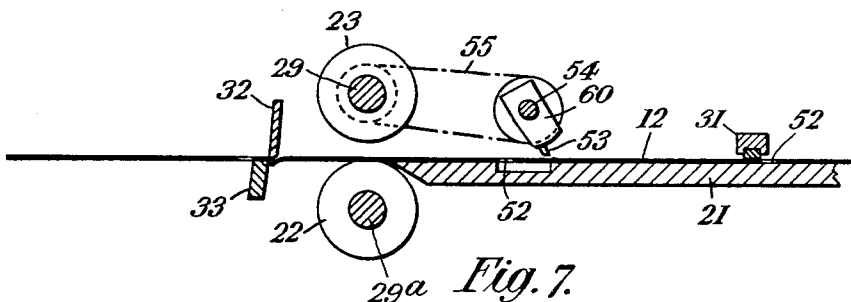


Fig. 7.

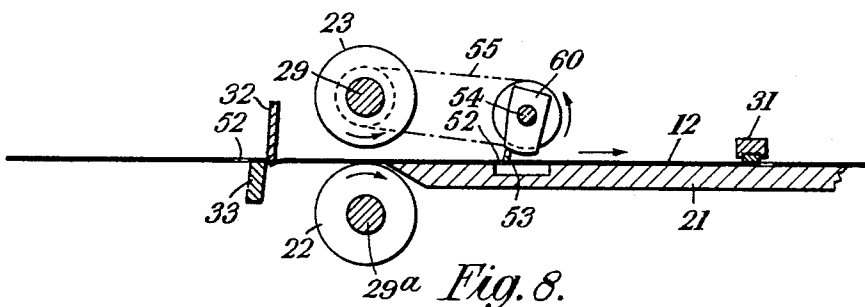


Fig. 8.

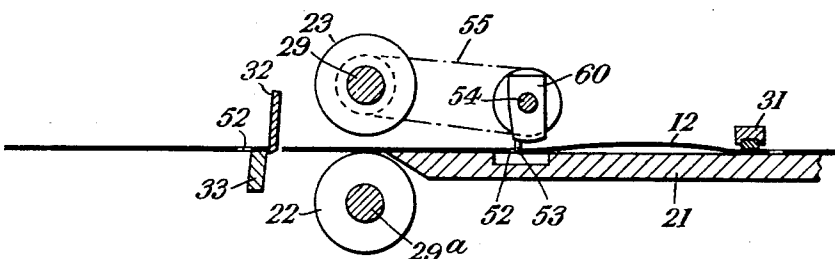


Fig. 9.

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6 Sheets-Sheet 5

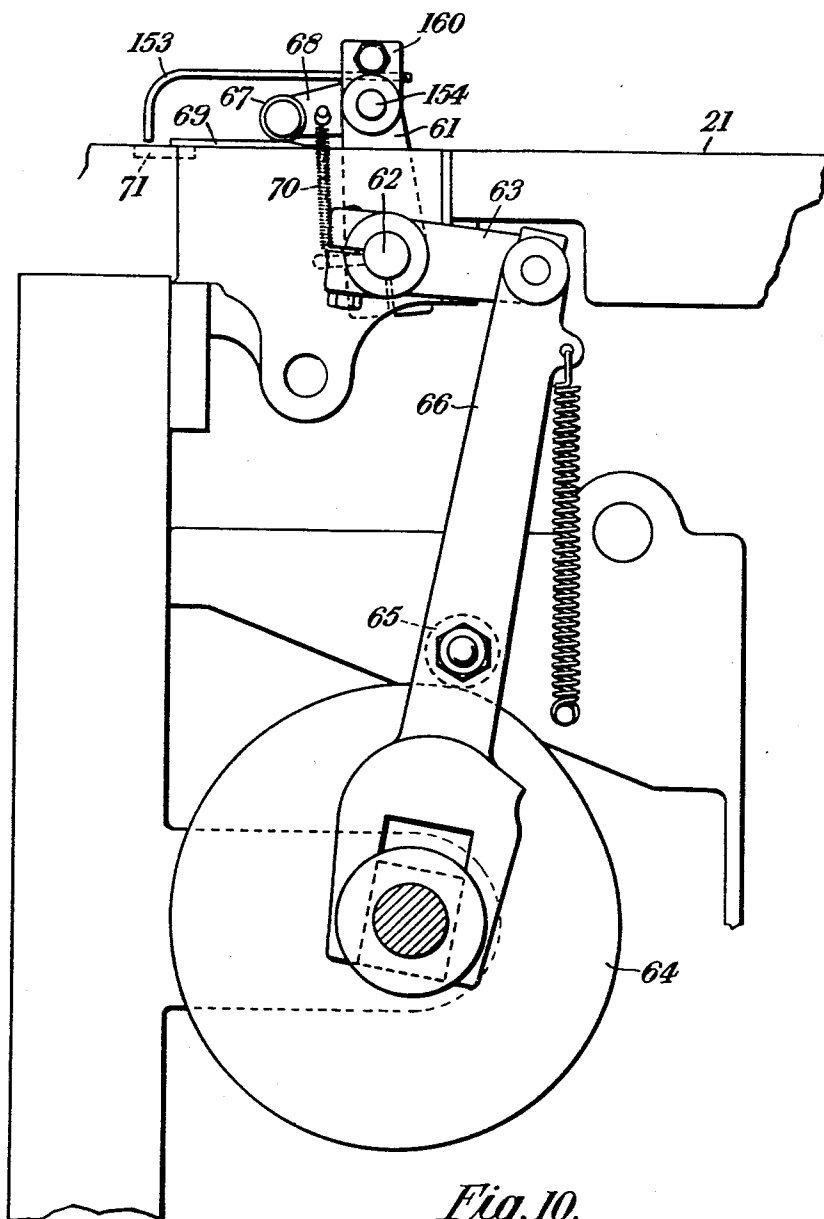


Fig. 10.

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FEEDING OF WRAPPING MATERIALS TO WRAPPING MACHINES

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6 Sheets-Sheet 6

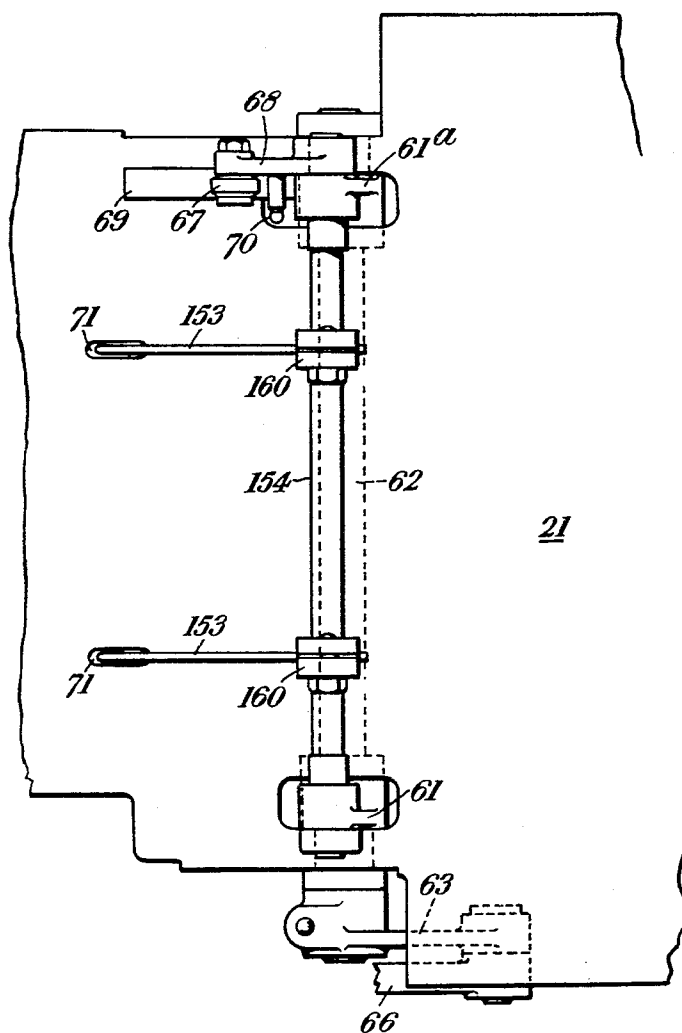


Fig. 11.

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FEEDING OF WRAPPING MATERIALS TO WRAPPING MACHINES

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Application July 21, 1951, Serial No. 237,892

2 Claims. (Cl. 271—2.6)

It is necessary, in machines for wrapping articles in wrappers bearing printed or other matter and individually severed from a reel of wrapping material, to ensure that the wrappers are presented to the articles with the printed matter properly registered in relation thereto. The present invention relates to mechanism for ensuring correct registration of the wrappers.

The invention provides, in a wrapping machine, the combination with a pair of feed rollers, which are intermittently operative to feed a web of wrapping material from a reel, of a clamp arranged to clamp the web, during the periods while the feed rollers are ineffective, at a point between the feed rollers and the reel, a knife in advance of the feed rollers for severing a wrapper from the web while the latter is held by the clamp, and a registering device disposed between the clamp and the knife and operative, after each operation of the knife and while the web is held by the clamp, to impart a slight reverse feed to the web.

Each time therefore the knife has severed a wrapper from the leading end of the web, the registering device retracts the web slightly to a datum position, ensuring that the feed rollers, when next operative on the web, will feed the latter to a position such that the printed or other matter thereon is correctly registered with respect to the knife. Preferably the registering device comprises at least one peg for engaging perforations in the web to impart the reverse feed thereto.

Two alternative embodiments of the invention will now be described in detail, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a side elevation of the wrapper feed mechanism of the first embodiment,

Fig. 2 is an enlarged plan view of part of the wrapper feed mechanism,

Fig. 3 is a side elevation, partly in section, of the mechanism shown in Fig. 2,

Fig. 4 is a detail view, showing the chain drive for the registering pegs,

Fig. 5 is a plan view of part of the wrapper,

Figs. 6-9 are diagrammatic views showing successive stages of operation of the peg roller.

Fig. 10 is a side elevation showing the second embodiment, and

Fig. 11 is a corresponding plan view.

Like reference numerals indicate like parts throughout the figures.

In the case of both embodiments, the wrapper feed mechanism is of the same general character. In the case of the embodiment shown in Figs. 1-9, the mechanism includes a rotary registering device, while in the case of Figs. 10 and 11 the registering pegs are given a reciprocating movement.

In the arrangement shown in Figs. 1-9, the web 12 (Fig. 1) of wrapping material passes from a reel 13 into a wrapping machine over a jockey roller 14 supported on an arm 15 hinged at 16, to a reel supporting bracket 17. A spring 18 tends to draw the arm 15 and jockey roller

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14 downwards, to pay off the web 12 from the reel 13, and a brake band 19, extending between the arm 16 and the bracket 17, coacts with the spindle of the reel 13. From the jockey roller 14 the web 12 passes over another roller 20 on to a horizontal feed plate 21. Near the forward end of the feed plate are a pair of horizontal feed rollers 22, 23 (see Fig. 3) which engage the upper and lower surfaces of the web 12 and are intermittently operative to feed it forward.

The feed rollers 22, 23 are actuated by means of a positive cam 24, the cam lever 25 of which oscillates a link 26 pivoted to a toothed quadrant 27 (Fig. 2) engaging a gear 28 on the shaft 29a of the bottom feed roller 22. Equal gears on their respective shafts are used for the drive from the bottom feed roller 22 to the top feed roller 23, one of these gears being shown at 30 in Fig. 2.

The feed rollers 22, 23 are positively driven to feed the web 12 forward during the forward stroke of the quadrant 27. When the feed rollers 22, 23 are at rest, and before the return stroke of the quadrant 27, the top feed roller 23 is lifted off the web, without however bringing the gears 30 out of mesh, a clamp 31 is lowered on to the web to clamp it to the feed plate 21 and a moving knife 32 is brought down on to the web, in advance of the feed rollers 22, 23, the clamp 31 being lowered before the top feed roller 23 is lifted. The moving knife 32 cooperates with a fixed knife 33 to sever a wrapper from the web. The reverse takes place at the end of the return stroke of the quadrant 27. The top feed roller 23 is then lowered to grip the web and the clamp 31 is lifted while the feed rollers 22, 23 are again at rest.

The top feed roller 23 and the clamp 31 are raised and lowered by means of the knife movement, which will now be described.

The fixed knife 33 is attached to a part 34 of the wrapping machine frame. The moving knife 32 is supported on a lever 35 pivoted at 36 to a knife lever 37 fixed to a pivot shaft 38 extending transversely to the plate 21. A cam lever 39 is coupled to the knife lever by a stud 40 and a knife cam 41 imparts rocking movement to the knife lever 39 to lower and raise the moving knife 32 in timed relation to the movement of the feed. The knife lever 39 carries a follower 42 which coacts with the knife cam 41. Suitable compression springs (not shown) keep the cutting edge of the moving knife 32 in contact with the cutting edge of the fixed knife 33 during cutting of the web.

Cam arms, 43, 43a, also fixed to the knife lever pivot shaft 38, raise and lower the top feed roller 23 and the clamp 31 at the appropriate time. These cam arms contact rollers 44, 44a on studs 45, 45a which are mounted on levers 46, 46a, pivoted on shafts 57, 57a and supporting the top feed roller 23, and thus raise and lower the top feed roller 23.

The cam arms 43, 43a also contact rollers 47, 47a on studs 48, 48a which are mounted on levers 49, 49a supporting the clamp 31 and pivoted on the shafts 57, 57a, and thus the clamp 31 is raised and lowered. Tension springs 50, 50a are used to pull down the clamp levers 49, 49a and compression springs 51, 51a, Figs. 1 and 3, are used for pressure on the top feed roller 23.

The feed rollers 22, 23 thus act to feed the web 12 intermittently off the reel 13. As each length of web is fed forward, the jockey roller 14 is lifted. When the forward feed ceases, and the web is clamped, the jockey roller 14 falls to withdraw a length of wrapper from the reel for the next forward feed.

The web 12 is formed with spaced perforations 52 (Fig. 5) extending in two parallel rows spaced somewhat inwardly from its edges, the perforations 52 in the two rows being spaced at the same pitch and being opposite

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one another. The web carries printed matter in a repeated pattern as indicated by the cross hatched areas A in Fig. 5. The wrappers B cut from the web are 7" long, and the distance between the centres of adjacent perforations 52 in each row is also 7". The diameter of each perforation 52 is $\frac{3}{8}$ ". The feed rollers 22, 23 are arranged to feed the web 12 forward by $7\frac{1}{16}$ " at each machine cycle, and a registering device is arranged to retract the web by $\frac{1}{16}$ " at each machine cycle after a wrapper has been severed from its leading edge.

In the embodiment of the invention shown in Figs. 1-9, the registering device is constituted by a pair of pegs 53 (Figs. 2 and 3) mounted on a shaft 54 parallel to the shaft 29 of the top feed roller and driven therefrom by chain and sprocket gearing. This comprises a chain 55 (Fig. 4), sprockets 56, 58 and a small sprocket 59 for tightening the chain. The pegs 53 are clamped in peg-carrying members 60 fixed to the shaft 54. The shaft 54 is disposed between the feed rollers 22, 23 and the clamp 31, and as the feed rollers 22, 23 are moved in reverse, on the return stroke of the quadrant 27, the pegs 53 engage in the perforations 52 in the web to draw it back, after the knife 32 has cut the web and before the top roller 23 is again lowered on to the web.

The sequence of operations is shown diagrammatically in Figs. 6-10. In these figures, for clarity, the thickness of the web 12, the extent of retraction of the web and the lift imparted to the top feed roller 23 are exaggerated.

Fig. 6 shows the commencement of the feed of the web, the feed rollers 22, 23 being shown about to rotate in the direction indicated by the arrows. During the feed movement, the shaft 54 rotates clockwise, clearing the pegs 53 from the perforations in the web, to the position shown in Fig. 7. At the commencement of the forward feed of the web 12 by the feed rollers 22, 23 the points of the pegs 53 are arranged to travel slightly faster than the web by an amount which ensures that the pegs 53 will rise clear of the web without contacting the web at the forward edges of the perforations 52. As will be clear from Fig. 7, the chain and sprocket gearing is such that the shaft 54 receives less than a complete revolution during the forward feed of the wrapper, so that the pegs 53 are kept clear of the web 12 throughout the forward feed thereof.

After the termination of the forward feed of the web, the top roller 23 is lifted, the clamp 31 is lowered and the moving knife 32 is operated to sever a wrapper from the web as shown in Fig. 7.

The quadrant 27 then rotates the feed rollers 22, 23 in the reverse direction, with the knife 32 and clamp 31 still in their down positions, and towards the end of the return stroke of the quadrant 27 the pegs 53 enter the perforations 52 to retract the web, Fig. 8 showing the beginning of the retraction of the web and Fig. 9 the end thereof. The knife 32 and clamp 31 are then lifted and the top feed roller 23 is lowered, the parts returning to the position shown in Fig. 6.

An alternative form of registering device, in which the pegs are given a reciprocating instead of a rotary movement, is shown in Figs. 10 and 11. The parts shown in these figures replace the shaft 54, pegs 52 and mechanism for rotating the shaft 54 shown in Figs. 1-9, but the remaining parts of the machine are identical with those already described. In the arrangement shown in Figs. 10 and 11 the pegs are constituted by fingers 153 extending forwardly (i. e. towards the feed rollers) and downwardly from members 160 fixed to a shaft 154 extending transversely of the feed plate 21 and pivoted to a pair of arms 61, 61a fixed to another transverse shaft 62. The shaft 62 carries an arm 63 through which oscillating movement is imparted to the shaft 62, and therefore to the arms 61, 61a from a cam 64, through the agency of a follower 65 and lever 66. This causes the fingers to move forwards and backwards in relation to the feed plate. A roller 67, on an arm 68 fixed to the shaft 154,

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coacts with a fixed cam bar 69 so that the pegs, constituted by the downwardly extending arms of the fingers 153, are raised clear of the web during the forward movement of the fingers as shown in Fig. 10. A tension spring 70 keeps the roller 67 in contact with the cam bar 69. Towards the end of the return movement of the fingers 153, the cam bar 69 allows the pegs to drop down into the perforations in the web to draw the web back, recesses 71 being provided in the feed plate to allow the pegs to pass through the perforations in the web.

The register pegs function as in the embodiment already described to pull back the forward end of the web by means of the perforations in the web when the clamp is pressing on the web and the top feed roller is lifted clear of the web. After the top feed roller has lowered to nip the web the pegs move forward again and rise to clear the web.

What we claim as our invention and desire to secure by Letters Patent is:

1. In a wrapping machine, web feeding mechanism comprising a pair of feed rollers for feeding a web of perforated sheet material, mechanism for periodically moving one of said feed rollers away from the web and thereafter returning it into contact with the web, mechanism for imparting forward feeding movement to the feed rollers to feed the web while said movable feed roller is in contact with the web and for imparting reverse movement to the feed rollers while said movable feed roller is off the web, a clamp for clamping said web behind said feed rollers, means for moving said clamp to operative position during the periods while said movable feed roller is off the web and for withdrawing said clamp from operative position during the periods while said movable feed roller is in contact with the web, a registering device disposed between said feed rollers and the clamp, said registering device comprising a shaft disposed clear of the web and a peg projecting from said shaft, and gearing connecting one of said feed rollers to said shaft and arranged to rock said shaft during forward movement of said feed rollers through less than a complete revolution in a direction and at a speed sufficient to cause said peg to travel forwardly in relation to the web during the forward movement of said web, and to impart reverse rocking movement to said shaft during the reverse movement of said feed rollers, said peg engaging a perforation in the web to impart a slight reverse feed thereto during the last portion only of the reverse movement of said feed rollers.

2. In a wrapping machine, web feeding mechanism comprising a pair of intermittently operative feed rollers, located one above the other, for feeding forward along a horizontal path a web of perforated sheet material, mechanism for periodically lifting said upper feed roller off the web and thereafter lowering it into contact with the web, mechanism for imparting forward movement to the rollers while the upper feed roller is in contact with the web and for imparting reverse movement to the rollers while the upper feed roller is off the web, a clamp for clamping said web behind said feed rollers, means for moving said clamp to operative position during the periods while said feed rollers are inoperative and for withdrawing said clamp from operative position during the periods while said rollers are operative, a registering device disposed between said feed rollers and the clamp, said registering device comprising a shaft disposed clear of and extending transversely to the web, a plurality of pegs projecting from said shaft and gearing connecting the upper feed roller and the shaft, said gearing being effective during forward movement of said feed rollers to rock said shaft forwardly through a partial revolution at a speed sufficient to move the pegs forwardly in relation to the web during the forward movement of said web and to rock said shaft rearwardly to its initial position during reverse movement of said feed rollers, said pegs engaging perforations in the web to impart a slight reverse

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feed thereto during the last portion only of the reverse movement of said feed rollers.

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