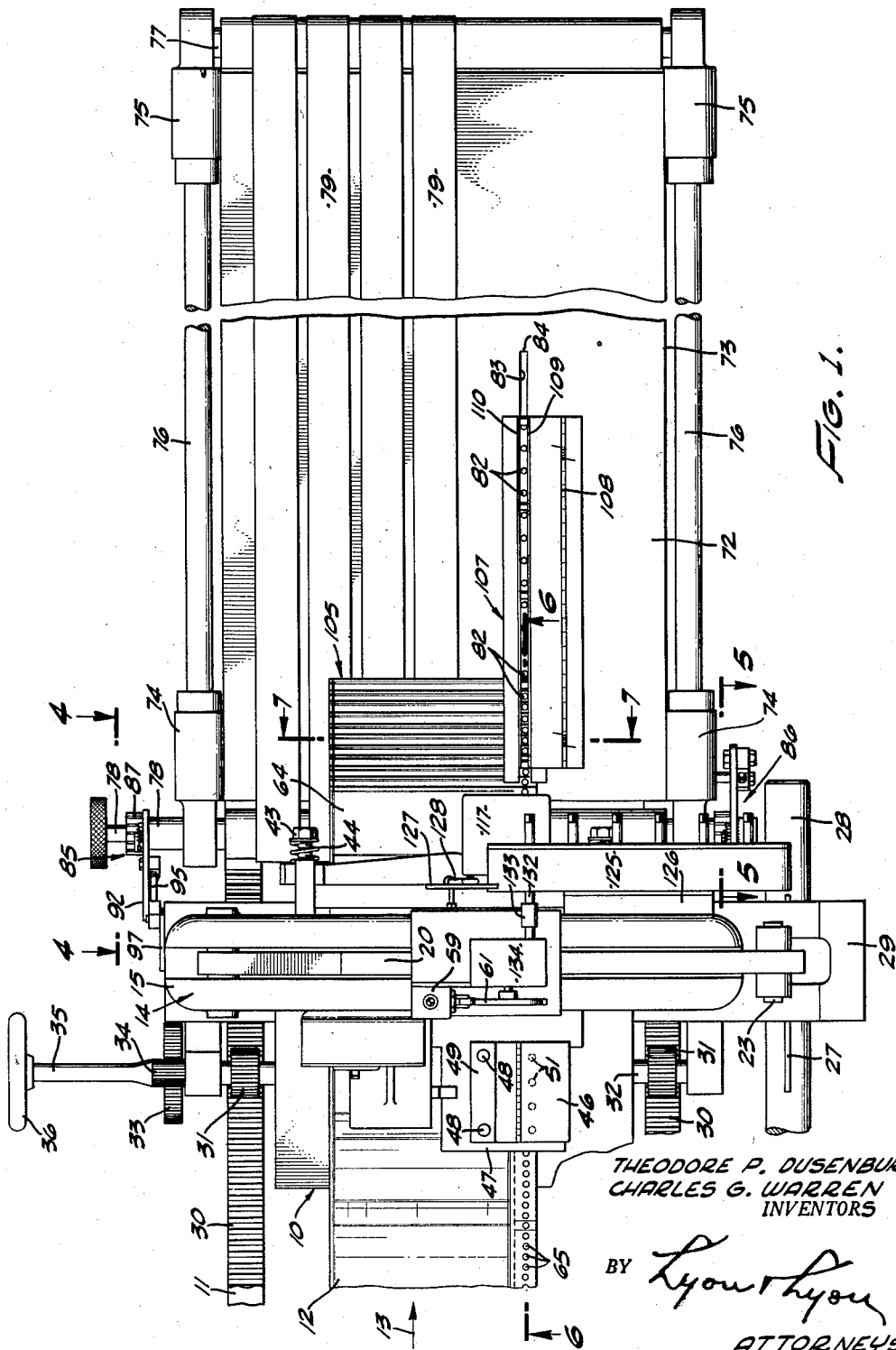


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5 Sheets-Sheet 1



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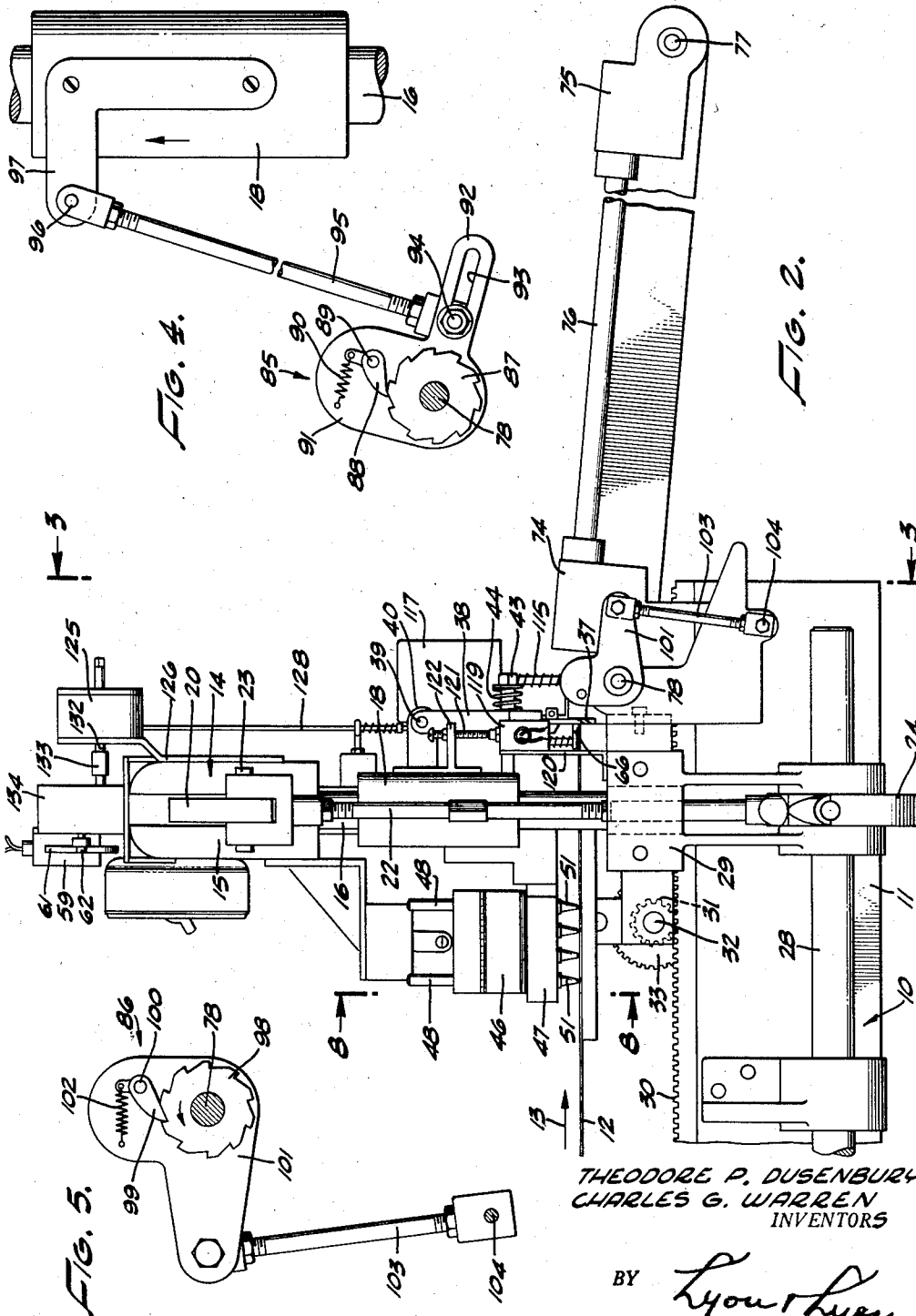
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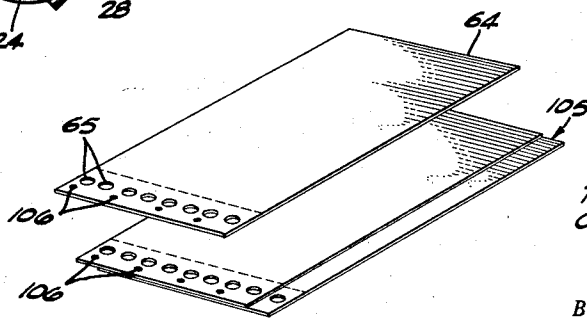
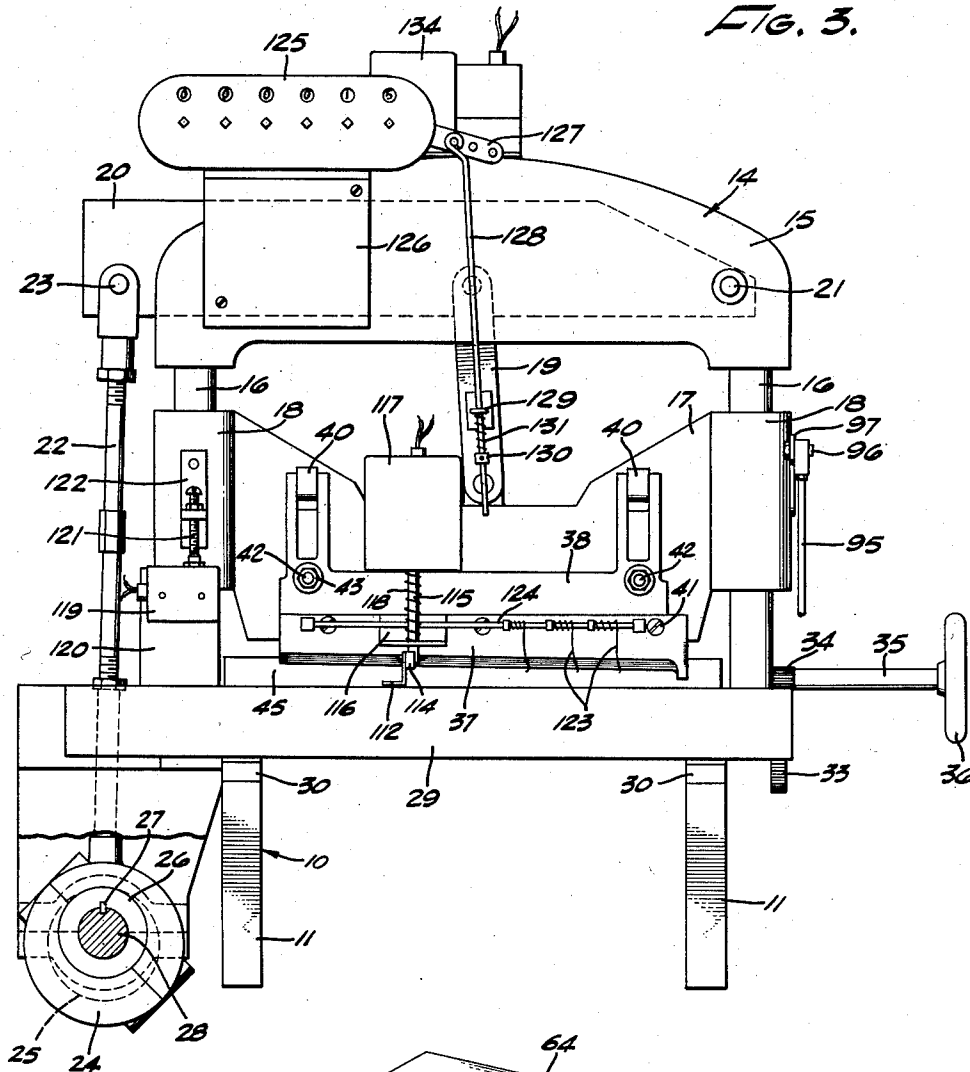


FIG. 11.

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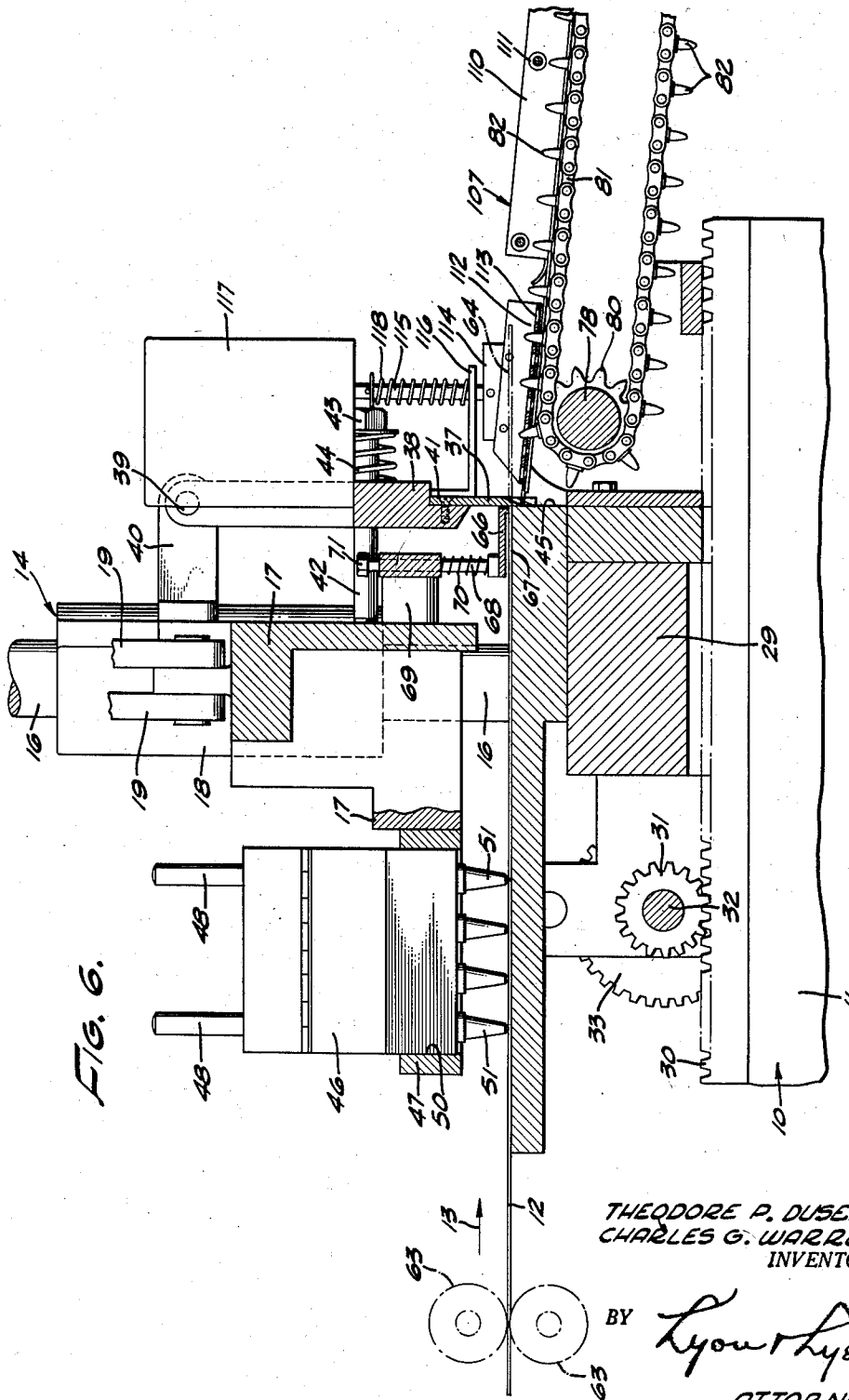
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Filed April 4, 1955

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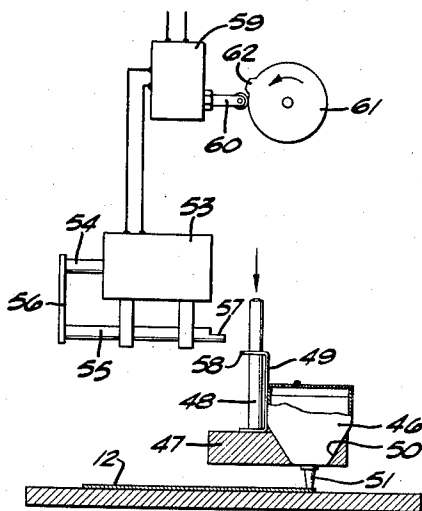
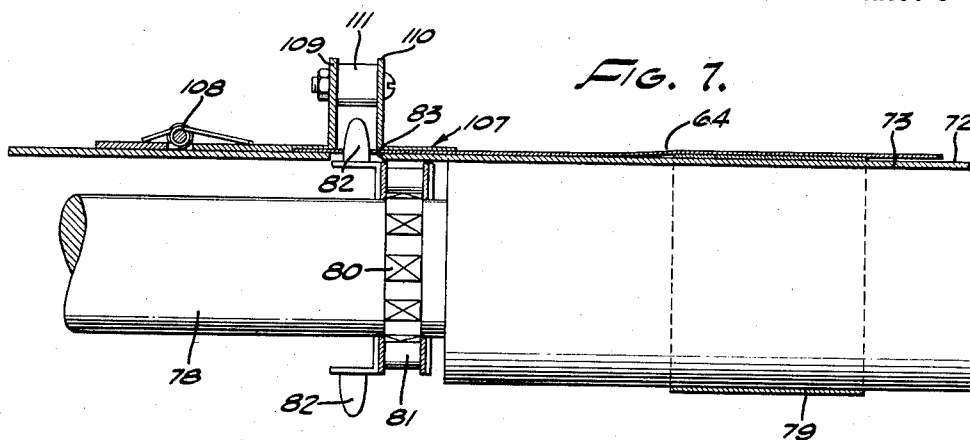


FIG. 8.

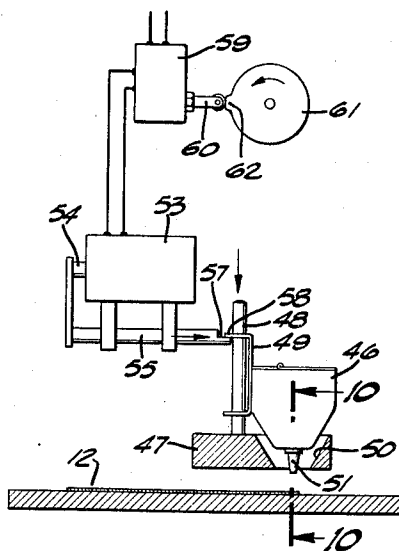


FIG. 9.

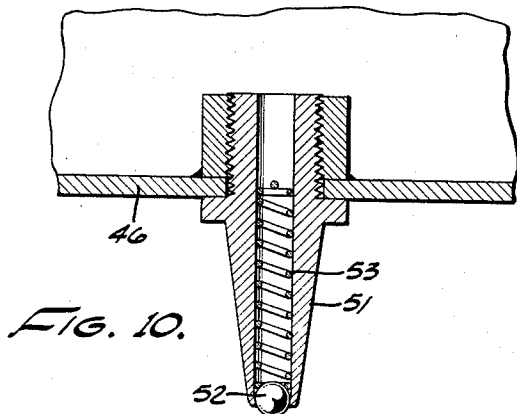


FIG. 10.

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Application April 4, 1955, Serial No. 499,072

3 Claims. (Cl. 270—58)

In the copending applications of Dusenbury et al., Serial No. 294,884 filed October 5, 1951, now Patent No. 2,816,755 issued December 17, 1957, and Serial No. 402,066 filed January 4, 1954, now Patent No. 2,816,756 issued December 17, 1957, are shown other forms of devices for making shingled strips. In those applications the shingled strips are produced from stacks of sheets. It is a feature of the present invention, on the other hand, to form the shingled strips directly from the web as it emerges from the printing press. In this way the intermediate step of stacking the printed sheets prior to forming shingled strips is eliminated. A considerable saving in handling and processing is therefore achieved. Furthermore, the device may be built as an attachment to an existing printing press so that economies in both first cost and operation are made possible.

Accordingly it is the principal object of this invention to provide an improved form of apparatus for making shingled strips directly from the web as it emerges from the printing press.

Another object is to provide such a device which is adapted to be mounted as an attachment adjacent the cut-off knife on a straight-line flat-bed printing press, and to function in cooperation therewith.

Another object is to provide such a device which receives its power from the moving parts of the printing press and need not be separately powered.

Other and more detailed objects and advantages will appear hereinafter.

In the drawings:

Figure 1 is a plan view showing a preferred embodiment of this invention.

Figure 2 is a side elevation thereof.

Figure 3 is an end view, taken substantially on the lines 3—3 as shown in Figure 2, certain parts being removed for clarity of illustration.

Figure 4 is a fragmentary detail taken on the lines 4—4 as shown in Figure 1 and shown on an enlarged scale.

Figure 5 is a fragmentary sectional view taken substantially on the lines 5—5 as shown in Figure 1, and illustrated on an enlarged scale.

Figure 6 is a longitudinal sectional view taken substantially on the line 6—6 as shown in Figure 1.

Figure 7 is a transverse sectional view taken substantially on the line 7—7 as shown in Figure 1 and illustrated on an enlarged scale.

Figure 8 is a sectional detail in diagrammatic form taken in the direction of the lines 8—8 as shown in Figure 2.

Figure 9 is a view similar to Figure 8 showing the parts in a different position.

Figure 10 is a sectional detail taken substantially on the lines 10—10 as shown in Figure 9.

Figure 11 is a perspective view in diagrammatic form showing the manner of accumulating a shingled strip from the individual sheets cut from the web.

Referring to the drawings:

The printing press generally designated 10 includes a

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stationary frame 11. This printing press 10 may be of the horizontal flat-bed type in which the web 12 travels intermittently in a step-by-step action in the direction of the arrow 13 as shown in Figures 1, 2, and 6. In this type of press the web remains horizontal as it travels in a straight-line from one end of the printing press to the other.

A reciprocating knife assembly generally designated 14 is provided as a part of the printing press 10 and this assembly includes the bridge 15 fixed to parallel upright posts 16. As shown particularly in Fig. 3, a reciprocating crosshead 17 carries bearing guides 18 which are slidably mounted on the parallel posts 16. The crosshead 17 is caused to reciprocate vertically by means of the parallel links 19 and bar 20. The bar 20 is pivoted to the bridge 15 by means of the pin 21. A connecting rod assembly 22 is pivotally connected to the bar 20 by means of the pin 23. The other end of the rod assembly 21 is connected to the eccentric strap 24. The eccentric 25 is provided with hubs 26 which receive the axial key 27 fixed in the rotary drive shaft 28. Turning of the shaft 28 causes the eccentric 25 to drive the connecting rod 22 and thereby oscillate the bar 20 about the pin 21. This in turn serves to reciprocate the crosshead 17 by means of the parallel links 19.

The reciprocating knife assembly 14 including the post 16, bridge 15, crosshead 17, as well as the connecting rod 22 and eccentric 25, are mounted on a support table 29 which may be adjusted along the frame 11 in a direction parallel to the longitudinal axis of the printing press. Thus as best shown in Fig. 1 the frame 11 carries the parallel racks 30 which are engaged by pinion gears 31 mounted on a common shaft 32. A larger gear 33 is fixed to one end of the shaft 32 and is engaged by the drive pinion 34 on the stub shaft 35. A handwheel 36 is fixed to the outer end of the stub shaft 35. From this description it will be understood that turning of the handwheel 36 serves to cause the pinion gears 31 to turn relative to the parallel racks 30, thereby moving the support table 29 and the reciprocating knife assembly 14 lengthwise of the web 12. Movement of the support table 29 relative to the frame 11 is necessary only for purposes of adjustment and is normally not required during operation of the machine.

Referring to Fig. 6, a reciprocating knife blade 37 is mounted on a blade holder 38 and this blade holder 38 is pivotally supported at 39 on a pair of forwardly extending ears 40 provided on the crosshead 17. The knife blade 37 may be attached to the blade holder by threaded fastenings 41 passing through the blade. Horizontal rods 42 project forwardly from the crosshead 17 through clearance openings (not shown) in the blade holder 38. A nut 43 threaded on the outer end of each of these rods 42 serves as an abutment for one of the springs 44. The springs act to swing the blade holder 38 in a clockwise direction about the pivot pins 39, as shown in Figure 6, thereby maintaining the back face of the cutting blade 37 in engagement with the table edge surface 45. The parts of the mechanism so far described are conventional and are set forth in detail only to provide a basis for describing the construction in operation of the device embodying this invention.

In accordance with this invention, means are provided for applying spots of glue or other adhesive to the printed web 12, as it approaches the knife assembly 14. As shown in the drawings, particularly Fig. 6, the adhesive applicator mechanism includes the receptacle 46 containing glue or other adhesive and this receptacle is mounted to rest on a support 47 attached to the crosshead 17. A pair of vertical pins 48 are fixed on this support 47 and a channel-shaped guide 49 fixed to the receptacle 46 is mounted to slide vertically on the pins 48. The recep-

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table 46 normally rests in the socket 50 provided in the support 47 and reciprocates vertically with the crosshead 17. As best shown in Figure 10, the bottom wall of the receptacle 46 is provided with a plurality of axially spaced nozzles 51. A ball check valve 52 is mounted at the lower extremity of each of the nozzles 51 and is maintained in closed position by means of the spring 53. When the receptacle 46 and nozzles 51 are lowered so that the ball check valve 52 rests on the outer surface of the web 12, a small amount of glue or other adhesive within the receptacle 46 passes out through the nozzle to form a spot on the web. Since there are a plurality of nozzles 51 a plurality of glue spots is formed each time the receptacle 46 moves to its lowest position.

As shown in Figures 8 and 9, means are provided for periodically interrupting the delivery of glue to the web 12. This means includes the solenoid 53 having movable armature 54. A sliding bar 55 is fixed to the armature 54 by means of the plate 56. This sliding bar has a trigger portion 57 on its extending end which is adapted to engage under the lip 58 on the channel-shaped guide 49. When electrical energy is supplied to the solenoid 53, the armature 54 is retracted as shown in Figure 9 and this serves to bring the trigger 57 on the sliding bar 55 into position to engage under the lip 58 and thereby prevent descent of the receptacle 46. The support 47, which is attached to the crosshead 17 continues its downward movement, the upright pins 48 sliding through the apertures on the channel-shaped guide 49. A switch 59 actuated by the push-rod 60 delivers electric current to the solenoid 53 whenever the cam 61 turns to the position shown in Figure 9 wherein the cam nose 62 depresses the push-rod 60. The cam 61 is caused to turn by increments as the crosshead 17 reciprocates. Thus once out of each predetermined number of consecutive strokes the glue applicator mechanism is interrupted. The purpose of the interruption is to limit the length of the shingled strip produced by the machine, as will be apparent hereinafter.

Means are provided on the printing press for advancing the web intermittently between each successive stroke of the cutting knife assembly 14. This means is indicated diagrammatically by the feed rollers 63 shown in Figure 6. The extent of movement of the web 12 between each stroke of the cutting knife assembly 14 is greater than the longitudinal distance between the first and last glue nozzles 51. Each time the crosshead 17 descends the knife blade 37 severs an extending portion 64 of the printed web. This severed portion becomes one of the sheets which form a shingled strip. As shown in Figure 1, the web 12 is provided with a series of apertures 65 along one edge thereof and the glue nozzles 51 are arranged to deposit glue spots 106 on the web adjacent these apertures 65.

The web 12 is held stationary while the knife blade 37 severs the projecting sheet 64. The usual presser foot may be provided to maintain the web 12 in contact with the table surface 67 while the cutting operation is taking place. This presser foot 66 may be mounted on the lower ends of parallel rods 68 slidably mounted within projections 69 carried on the crosshead 17. Springs 70 hold the presser foot in engagement with the web 12 when the latter is stationary with respect to the table surface 67. An abutment 71 on each of the rods 68 serves to lift the presser foot 66 out of contact with the web 12 during the interval that the web is being moved forwardly relative to the table surface 67.

A collating table surface 72 (see Fig. 1) is provided by means of the sheet metal member 73 which is supported on brackets 74 and 75. These brackets are connected by means of spacer bars 76. The brackets 74 are fixed relative to the support table 29. A transverse roller shaft 77 extends between the brackets 75 and another transverse roller shaft 78 extends through the brackets 74. Endless feed tapes 79 extend between the roller shafts

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77 and 78 and the upper flight of each rests on the upper surface of the collating table 72. A sprocket 80 is fixed on the shaft 78 (see Figure 7) and an endless chain 81 passes over this sprocket. The chain carries a series of offset pins 82 and the upper flight of these pins passes through a slot 83 formed in the collating table 72. A second sprocket and idler shaft, not shown, are mounted beneath the collating table 72 at a location near the end 84 of the slot 83. As shown in Figure 6, the spacing of the pins 82 is equal to an even multiple of the spacing of the apertures 65 in the web 12.

Means are provided for turning the shaft 78 in step-by-step increments so as to drive the tapes 79 and chain pins 82 intermittently. As shown in the drawings particularly Figs. 4 and 5, this means includes the ratchet mechanisms generally designated 85 and 86. The ratchet wheel 87 (Fig. 4) is fixed to the shaft 78. This wheel is engaged by a pawl 88 mounted on pin 89. A spring 90 serves to maintain the pawl 88 in engagement with the ratchet wheel 87. The pin 89 is carried on the bell-crank 91 which is pivotally mounted on the shaft 78. The arm 92 of the bell-crank 91 is provided with a slot 93 and the pivot pin 94 is adapted to be adjustably fixed along the length of the slot 93. A connecting rod 95 is connected to the pin 94 at one end and is connected by pin 96 to the bracket 97. The bracket 97 is fixed to the vertically moving bearing guide 18 which forms a part of the reciprocating crosshead 17. For each stroke of the bearing guide 18, the ratchet wheel 87 is caused to turn an angular distance equal to the spacing of its peripheral notches.

The ratchet assembly 86 (Fig. 5) serves to prevent reverse rotation of the shaft 78. The ratchet wheel 98 is fixed on the shaft 78 and is engaged by the pawl 99. The pin 100 supports the pawl 99 on the bell-crank 101 and the spring 102 serves to maintain the pawl 99 in engagement with the teeth of the ratchet wheel 98. The bell-crank 101 is pivotally mounted with respect to the shaft 78 but is held against rotation by means of the connecting rod 103. This connecting rod 103 is attached to the stationary pin 104. The threaded connections at the opposing ends of the rod 103 provide the means for adjusting the angular position of the bell-crank 101. The step-by-step intermittent turning movement of the shaft 78 serves to bring the chain pins 82 into proper position to receive each sheet 64 in a sequential overlapping relation as it is cut from the end of the web 12 by means of the knife blade 37. Between each stroke of the knife blade 37 the web advances a distance equal to the width of each sheet 64. The pins 82 are caused to move a much shorter distance however and this distance is equal to the spacing of each sheet 64 with respect to the neighboring sheets in the shingled strip, generally designated 105. As clearly shown in Figure 11, the individual sheets 64 are stacked in echelon position to produce the shingled strip 105. Each of the sheets extends beyond its neighboring sheet by an amount equal to the spacing of the aperture 65, or an even multiple thereof. The spots of glue 106 serve to hold the sheets in assembled relationship.

A guide shoe 107 (Figs. 1 and 7) is mounted on the collating table 72 and is attached thereto by means of a longitudinal extended piano hinge 108. This shoe 107 includes parallel elements 109 and 110 connected by spacers 111. The clearance space between the parallel members 109 and 110 is provided to receive the projecting portions of the chain pins 82. The shoe 107 may be swung to an inoperative position when desired by moving it about the axis of the piano hinge 108 in a counterclockwise direction as viewed in Figure 7.

Means are provided for moving each severed sheet 64 positively into engagement with chain pins 82 and, as shown in the drawings, this means includes the foot plate 112 (Fig. 6) disposed over the surface of the collating table which has longitudinally spaced apertures 113 to receive the underlying chain pins 82. This foot plate 112 is carried on the member 114 mounted at the lower end

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of the upright bar 115. This bar operates through a guide 116 carried on the blade holder 38. The upper end of the bar 115 is attached to the armature of the solenoid 117 mounted on the blade holder 38. A spring 118 rests on the guide 116 and acts in a direction to raise the bar 115. When the solenoid 117 is energized it acts to move the bar 115 downward against the action of the spring 118. A micro-switch 119 (see Figs. 2 and 3) is mounted on the support table 29 by means of bracket 120. A contact element 121 is adjustably mounted on the bracket 122 carried on the bearing guide 18. When the bearing guide 18 descends, the contact element 121 engages the switch button and causes the delivery of electric energy to the solenoid 117, thereby depressing the foot plate 112 against the severed sheet 64. The severed sheet is thereby positively moved into engagement with the underlying pins, with the apertures 113 of foot plate 112 and apertures 65 of the severed sheets received by the pins. This insures that the sheet shall be engaged with the chain pins 82 and thus held in proper position with respect to the other sheets previously deposited on the collating table 72. Spring wires 123 (Fig. 3) may be mounted on a common rod 124 carried on the blade holder 38 for the purpose of holding the severed sheet 64 against the collating table.

A counting mechanism generally designated 125 may be mounted on the stationary bridge 15 by means of a supporting bracket 126. The actuating lever 127 of the counting mechanism 125 is connected by means of a rod 128 to one of the links 19. The rod 128 slides within the aperture guide 129 on the link 19. A stop collar 130 is provided on the rod 128 and a spring 131 is positioned between the stop collar 130 and the apertured guide 129. Reciprocating movement of the link 19 serves to oscillate the lever 127 and thereby count the number of strokes of the crosshead 17 and knife 37. A rearwardly extending shaft 132 projects from the counting mechanism 125 and is connected by coupling 133 to drive the cam 61 by way of the gear box 134. From this description it will be understood that the cam 61 is turned in step-by-step rotary movement with timed relation with reciprocation of the crosshead 17 and knife 37.

In operation the printing press rollers 63 advance the web 12 in an intermediate step-by-step fashion. The support table 29 is positioned on the frame 11 so that the reciprocating knife blade 37 is properly positioned with respect to the indicia printing on the web 12. The rotary drive shaft 28 turns continuously and causes the crosshead 17 and knife blade 37 to reciprocate. Each time the crosshead 17 descends, the glue applicator nozzles 51 deposit drops 106 of glue on the web adjacent the apertures 65. Each stroke of the crosshead 17 also serves to advance the pins 82 and feed tapes 79 by an increment equal to the lateral spacing of the individual sheet 64 in the shingled strip 105. The action of the solenoid 117 is timed so that upon completion of the severing action by the knife blade 37, the solenoid operates to cause the foot plate 112 to move the severed sheet positively into engagement with the upright chain pins 82.

When a predetermined number of sheets have been deposited to form a shingled strip, for example, twenty-five sheets, the nose 62 of the cam 61 operates the push-bar 60 to close the switch 59. This serves to energize the solenoid 53 to interrupt the action of the glue applicator mechanism for one stroke. This serves to limit the number of sheets in the shingled strip to a preselected number, in this case, twenty-five. The shingled strips are removed from the collating table 72 by hand or by any convenient means.

Having fully described our invention, it is to be understood that we do not wish to be limited to the details herein set forth but our invention is of the full scope of the appended claims.

We claim:

1. Apparatus for forming shingled sheets from a continuous web comprising: means for feeding a continuous

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apertured web, a knife including actuating means therefor for severing the apertured web into sheets, a collating table having a surface thereof positioned to receive each sheet as it is severed from the web, a series of advanceable pins carried by said collating table, a transfer member disposed over the surface of the collating table receiving the severed sheets with certain of said pins underlying said transfer member, means operative in timed relation to the actuation of the knife for reciprocating said transfer member against a severed sheet to move same into engagement with said underlying pins and to cause the apertures of same to be received by said underlying pins, and means for advancing said series of pins in timed relation to the actuation of the knife for receiving and maintaining the severed sheets in sequential, overlapping relation.

2. Apparatus for forming shingled sheets from a continuous web comprising: means for intermittently feeding a continuous apertured web, a knife including reciprocating means therefor for severing the apertured web into sheets, an adhesive applicator operated by the knife reciprocating means for applying adhesive to the web at a location in advance of the knife during reciprocations of the knife, a collating table having a surface thereof positioned to receive each sheet as it is severed from the web, a series of advanceable pins carried by said collating table, a transfer member disposed over the surface of the collating table receiving the severed sheets with certain of said pins underlying said transfer member, means operative in timed relation to the reciprocation of the knife for reciprocating said transfer member against a severed sheet to move same into engagement with said underlying pins and to cause the apertures of same to be received by said underlying pins, and means for advancing said series of pins in timed relation to the reciprocation of the knife for receiving and maintaining the severed sheets in sequential, overlapping relation.

3. Apparatus for forming shingled sheets from a continuous web comprising: means for intermittently feeding a continuous apertured web, a knife including reciprocating means therefor for severing the apertured web into sheets, an adhesive applicator mounted on the knife reciprocating means at a location in advance of the knife for applying adhesive to the web during reciprocations of the knife, a collating table having a surface thereof positioned to receive each sheet as it is severed from the web, a series of advanceable pins carried by said collating table, a transfer member disposed over the surface of the collating table receiving the severed sheets with certain of said pins underlying said transfer member, said transfer member including an apertured plate adapted to receive said underlying pins through the apertures thereof, means operative in timed relation to the reciprocation of the knife for depressing said apertured plate of the transfer member against a severed sheet to move the severed sheet into engagement with said underlying pins with the apertures of both said apertured plate and said severed sheet received by said underlying pins, means for raising said apertured plate out of engagement with said underlying pins, and means for advancing said series of pins in timed relation to the reciprocation of the knife for receiving and maintaining the severed sheets in sequential, overlapping relation.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,873,115

February 10, 1959

Theodore P. Dusenbury et al.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, above line 15, insert the following paragraph:

This invention relates to improvements in sheet handling and collating apparatus and is particularly directed to a novel device for making shingled strips.

Signed and sealed this 2nd day of June 1959.

(SEAL)

Attest:

KARL H. AXLINE

Attesting Officer

ROBERT C. WATSON
Commissioner of Patents