Oct. 13, 1953 R. T. STEWART 2,655,212

WEB HANDLING MACHINE

Filed Jan. 28, 1950 2 Sheets-Sheet 1

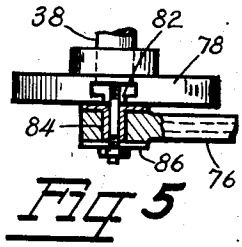


Fig. 5

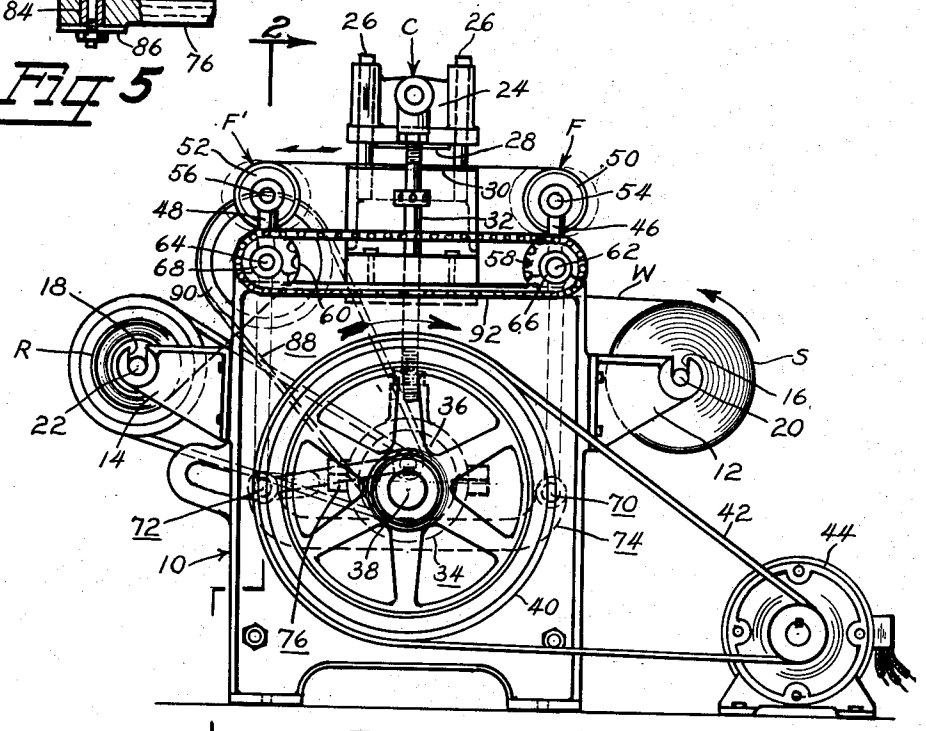


Fig. 1

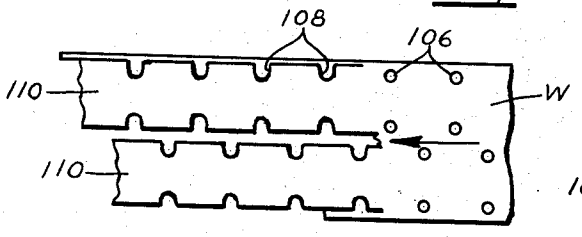


Fig. 7

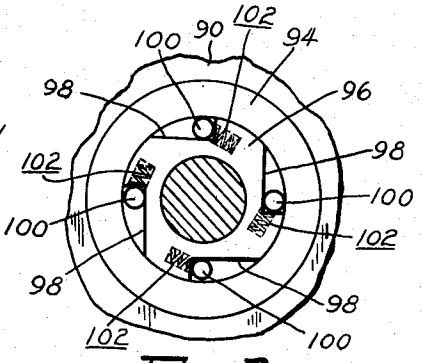


Fig. 3

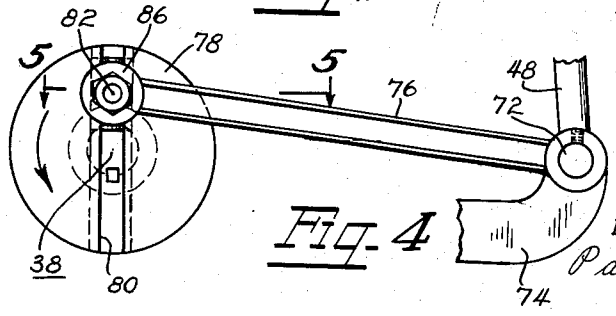


Fig. 4

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WEB HANDLING MACHINE

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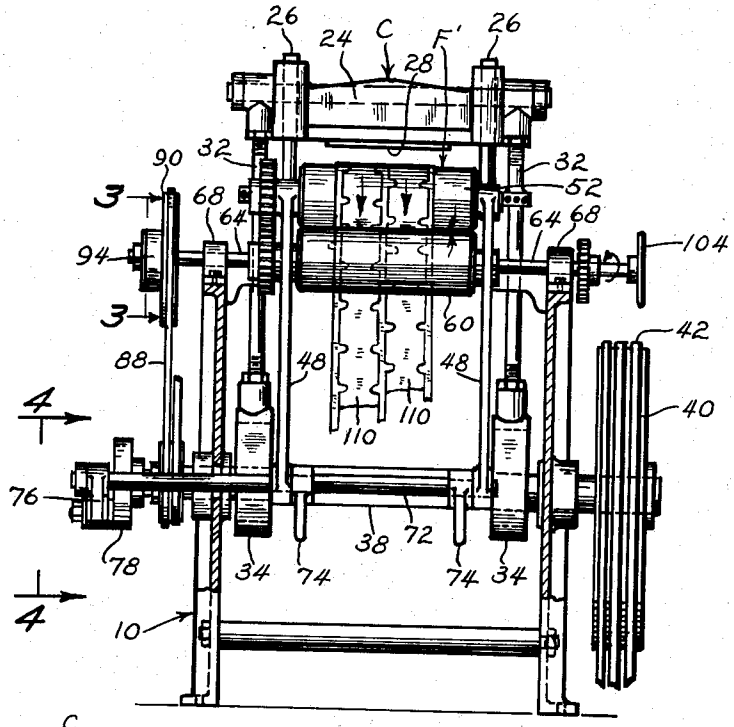


Fig. 2

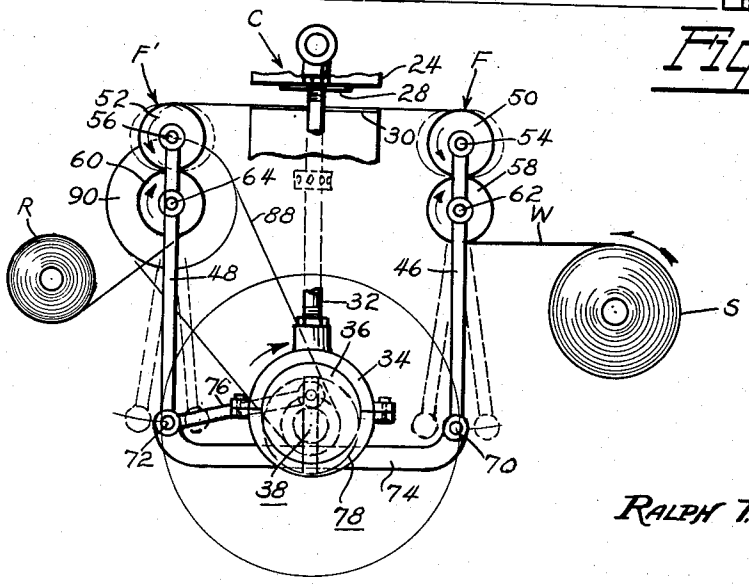


Fig. 6

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WEB HANDLING MACHINE

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7 Claims. (Cl. 164—22)

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This invention relates generally to machines for handling web materials, and more especially to a unique means by which a machine of this sort may be arranged for intermittently stopping travel of succeeding portions of continuously fed web material for a conforming operation without interrupting the continuous feeding of the web material.

The machine of the present invention is particularly well adapted for use in cutting a recurring pattern in web material, as in the formation of roll labels and the like, and for convenience the invention is illustrated and described further below in terms of an embodiment arranged for this purpose, although it will be apparent that the invention may be used to equally good advantage where other similar types of conforming operations are to be performed.

Briefly characterized, the present invention contemplates incorporating in a web handling machine first and second pairs of web material feeding rolls disposed in spaced relation and arranged as substantially vertical stands for allowing the web material to be trained through the nip of each of these pairs of rolls with a web portion extending between the roll pairs over the top roll of each pair, and means for intermittently displacing at least the top roll of each pair of rolls in a direction opposite to the direction of travel of the web material between the pairs of rolls and at a speed equal to the feeding speed of the web material. By this arrangement, the web material can be fed continuously at high speed and still stopped intermittently for a conforming operation as will appear more fully below from the detailed description of the present invention in connection with the accompanying drawings, in which:

Fig. 1 is a side elevation of a web handling machine arranged in accordance with the present invention;

Fig. 2 is an end elevation, partly in section, taken substantially from the position indicated at 2—2 in Fig. 1;

Fig. 3 is a sectional detail taken substantially on the line 3—3 in Fig. 2;

Fig. 4 is an enlarged detail of the crank mechanism associated with the pairs of web feeding rolls, and taken substantially from the position indicated at 4—4 in Fig. 2;

Fig. 5 is a sectional detail taken substantially on the line 5—5 in Fig. 4;

Fig. 6 is a diagrammatic illustration of the operating arrangement of the pairs of web feeding rolls; and

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Fig. 7 is a fragmentary plan view of a web in which roll labels have been cut in accordance with the present invention.

Referring now in detal to the drawings, and more particularly at first to Figs. 1 and 2, the web handling machine shown comprises a frame structure, as indicated generally by the reference numeral 10, which is fitted with means for disposing a web supply roll S so that a web W may be withdrawn for continuous feeding through the machine and for rewinding into rolls as at R. The means for disposing the supply roll S, as well as the rewound rolls R, on the frame structure 10 may take any conventional form such as support brackets as at 12 and 14 formed with open ended slots 16 and 18 to receive the mandrels or core shafts 20 and 22 provided for carrying the supply roll S and the rewound rolls R.

The frame structure 10 is also arranged for supporting an intermittently operating conforming unit as indicated generally at C, which in the embodiment illustrated takes the form of a die head 24 positioned by guide pins 26 and carrying a cutting die face 28 for operation against a platen 30 in the usual manner. The die head 24 is intermittently operated through connecting rods 32 which run from eccentric straps 34 fitted over eccentrics 36 carried on a driven shaft 38 that is powered at a driving wheel 40 by a belt drive 42 running from an electric motor or the like as at 44.

The previously mentioned pairs of web material feeding rolls are disposed on the frame structure 10 in relation to the conforming unit C, the first pair of rolls being arranged in advance of the conforming unit C as at F, and the second pair of rolls beyond this unit as at F'. Both rolls of each of these pairs of rolls F and F' are preferably rubber covered, and each pair of rolls is disposed on the frame structure 10 in lever arms as at 46 and 48, the top rolls 50 and 52 of each pair being mounted for rotation in the lever arms 46 and 48 on journal portions as at 54 and 56, and the bottom rolls 58 and 60 of each pair having journal portions 62 and 64 which extend through the lever arms 46 and 48 and are mounted for rotation in bearing units 66 and 68 carried on the frame structure 10, so that the lever arms 46 and 48 are fulcrumed on the frame structure 10 for rocking motion about axes, respectively, of the bottom rolls 58 and 60.

The lever arms 46 and 48 are fitted at their lower ends with crossbars 70 and 72 which in turn are joined by yoke members 74, so that the

lever arms 46 and 48 are connected for movement together whenever they are rocked about their fulcrum points. Rocking motion is imparted to the lever arms 46 and 48 by means of a connecting rod 76 which as shown in the drawings, runs from an extended portion of the crossbar 72 to a crank plate 78 that is carried on the previously mentioned driven shaft 38. This crank plate 78 is formed with a diametric T-slot 80, as shown best in Figs. 4 and 5, and a T-headed bolt fitted with a bushing 84 and a washer 86 is arranged for clamping the connecting rod 76 to the crank plate 78 at a properly adjusted position for obtaining the throw required to provide the desired rocking motion for the lever arms 46 and 48.

The web material W is trained from the supply roll S through the machine so that it is led under the bottom roll 58 of the first roll pair F, then back through the nip of this roll pair F to extend over the top roll 50 to the top roll 52 of the second roll pair F' and back through the nip of this roll pair F', and then under the bottom roll 60 of the second roll pair F' to be taken up on the rewound rolls R, which are suitably driven through a belt drive 80 running from the driven shaft 38. It will accordingly be seen that the web material W extends through the nip of each roll pair F and F' in a manner such that a web portion extends between the roll pairs F and F' over the top rolls 50 and 52 of each pair. The roll pairs F and F' are arranged as substantially vertical stands so that the web portion extending between them in this manner is disposed over the platen 30 of the conforming unit C (compare Fig. 6).

The roll pairs F and F' are driven for feeding the web material W from the previously mentioned driven shaft 38 by means of a belt drive 88 running from the shaft 38 to a driving wheel 90 carried on the shaft 64 of the bottom roll 60 for roll pair F'. The roll pairs F and F' are connected to be driven together by a sprocket chain drive 92, and, as seen in Fig. 2, the rolls of each pair are geared for rotation together in opposite directions with each roll pair driven so that the rolls rotate at the nip thereof in a direction opposite to the direction of web travel through the conforming unit (compare Fig. 6).

In order to adjust the pitch or phase of the web material W for proper registration in relation to the intermittent operation of the conforming unit C, the driving wheel 90 carried on the bottom roll shaft 64 is formed with a mounting hub 94 containing a slip-clutch unit as shown in Fig. 3. This slip-clutch unit consists of a spider member 96 which is disposed inside the mounting hub 94 and fixed on the bottom roll shaft 64, and which is formed with spaced peripheral recesses as at 98 in which balls or rollers 100 are positioned by springs 102 to grip the hub 94 and thereby provide normally for rotation of the shaft 64 from the driving wheel 90.

The opposite end of the bottom roll shaft 64, however, is fitted with a handwheel 104 which may be employed to restrain rotation of the shaft 64 whenever desired, in which event it will be seen that the balls or rollers 100 would be forced to a retracted position in the recesses 98 of the spider member 96 and thereby free the hub portion 94 on the shaft 64 to allow for pitch or phase adjustment of the roll pairs F and F' to obtain proper registration of the web material W with the conforming unit C. Slip-clutch arrangements of this sort are conventional and well known, and it will be recognized that other devices commonly employed for the same purpose might be used instead, such as a worm adjusted differential (not shown) interposed between the driving wheel 90 and the shaft 64.

A fragmentary illustration of a portion of web material W such as might be processed on the web handling machine illustrated in the drawings, is shown in Fig. 7. The circle marks indicated by the reference numeral 106 on the web W represent registration indicia, such as might be included in a printed design on the web material, or might be added specially for the sole purpose of maintaining registration. The notches indicated by the reference numeral 108 are shown to represent a type of recurring pattern such as might be cut in the web material W to form one or more strips of roll labels or the like as at 110. The waste produced by this cutting operation will in many cases fall clear of the strips 110 as they are rewound to form the rolls R; an arrangement of stripper bars (not shown) may be used to direct the waste away from the strips 110 if desired.

I claim:

1. A machine of the character described comprising means for disposing a web for continuous feeding through said machine, an intermittently operating conforming unit, and means for stopping travel of said web intermittently at said conforming unit while still allowing continuous feeding of said web, said last mentioned means comprising a first pair of web feeding rolls disposed ahead of said conforming unit, a second pair of web feeding rolls disposed beyond said conforming unit, both of said pairs of feeding rolls being driven continuously with the rolls of each pair rotating at the nip thereof in a direction opposite to the direction of web travel through said conforming unit whereby said web may be trained through the nip of each roll pair with a web portion extending between the roll pairs over one roll of each pair, and means for oscillating said pairs of feeding rolls about the axis of the other roll of each pair whereby the portion of said web extended between said pairs of feeding rolls is displaced intermittently in a direction opposite to the direction of travel of said web and at a speed equal to the feeding speed of said web.

2. In a web handling machine, means for intermittently stopping travel of succeeding portions of said web without interrupting continuous feeding of said web through said machine, said means comprising a first pair of web feeding rolls, a second pair of web feeding rolls spaced therefrom, both of said pairs of web feeding rolls being disposed as a substantially vertical stand, and means for oscillating each of said pairs of web feeding rolls respectively about the axis of the bottom roll of each pair whereby when said web is trained through the nip of each of said pairs of rolls and over the top roll of each pair, the portion of said web extending between said pairs of rolls may be displaced intermittently in a direction opposite to the direction of travel of said web and at a speed equal to the feeding speed of said web.

3. In a web handling machine, means for intermittently stopping travel of succeeding portions of said web without interrupting continuous feeding of said web through said machine, said means comprising first and second pairs of web feeding rolls disposed in spaced relation, both

of said pairs of feeding rolls being driven continuously with the rolls of each pair rotating at the nip thereof in a direction opposite to the direction of web travel between said roll pairs, whereby said web may be trained through the nip of each of said pairs of rolls with a web portion extending between said pairs of rolls over one roll of each pair, and means for intermittently displacing at least said one roll of each of said pairs in a direction opposite to the direction of travel of said web between said roll pairs at a speed equal to the feeding speed of said web.

4. A machine for cutting a recurring pattern in web material while feeding said web material continuously comprising means for disposing siad web material for continuous feeding through said machine, first and second pairs of feeding rolls disposed in spaced relation, means for continuously driving both of said pairs of feeding rolls with the rolls of each pair rotating at the nip thereof in a direction opposite to the direction of web travel between said roll pairs, whereby said web material may be trained through the nip of each of said pairs of rolls with a web portion extending between said pairs of rolls over one roll of each pair, an intermittently operating pattern cutting unit disposed between said pairs of rolls in relation to the web portion extending between them, and means for intermittently displacing at least said one roll of each of said pairs of rolls in a direction opposite to the direction of travel of said web portion between said roll pairs and at a speed equal to the feeding speed of said web material, whereby travel of succeeding portions of said web material between said pairs of rolls is intermittently stopped at said pattern cutting unit but without interrupting continuous feeding of said web material.

5. A machine as defined in claim 4 and further characterized in that said means for intermittently displacing at least one roll of each of said pairs of rolls comprises a crank mechanism synchronized with said intermittently operating pattern cutting unit.

6. A web handling machine comprising a frame structure, means carried by said frame structure for disposing a web for continuous feeding through said machine, an intermittently operating conforming unit mounted on said frame structure, a first pair of web feeding rolls disposed on said frame structure in advance of said conforming unit, a second pair of web feeding rolls disposed on said frame structure beyond said conforming unit, means for continuously driving both of said pairs of feeding rolls with the rolls of each pair rotating at the nip thereof in a direction opposite to the direction of web travel between said roll pairs whereby said web may be trained through the nip of each roll pair with a web portion extending between the roll pairs over one roll of each pair, and a crank mechanism carried by said frame structure for intermittently displacing at least said one roll of each of said pairs of rolls in a direction opposite to the direction of travel of said web between said roll pairs and at a speed equal to the feeding speed of said web, whereby travel of succeeding portions of said web between said pairs of rolls may be intermittently stopped at said conforming unit but without interrupting continuous feeding of said web.

7. A web handling machine comprising a frame structure, means carried by said frame structure for disposing a web for continuous feeding through said machine, first and second pairs of web feeding rolls disposed in spaced relation on said frame structure, said roll pairs being arranged as substantially vertical stands for allowing said web to be trained through the nip of each roll pair with a web portion extending between the roll pairs over the top roll of each pair, and said roll pairs each being disposed on said frame structure in lever arms, the top rolls of each pair being mounted for rotation in the lever arms and the bottom rolls of each pair being assembled for rotation in the lever arms but being mounted for rotation on the frame structure and thereby arranging the lever arms for rocking motion about their axes as a fulcrum, an intermittently operating conforming unit disposed on said frame structure between said roll pairs in relation to the web portions extending between said roll pairs, and a crank mechanism arranged on said frame structure for rocking said lever arms and thereby intermittently displacing the top rolls of each of said roll pairs in a direction opposite to the direction of travel of said web between said roll pairs and at a speed equal to the feeding speed of said web.

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