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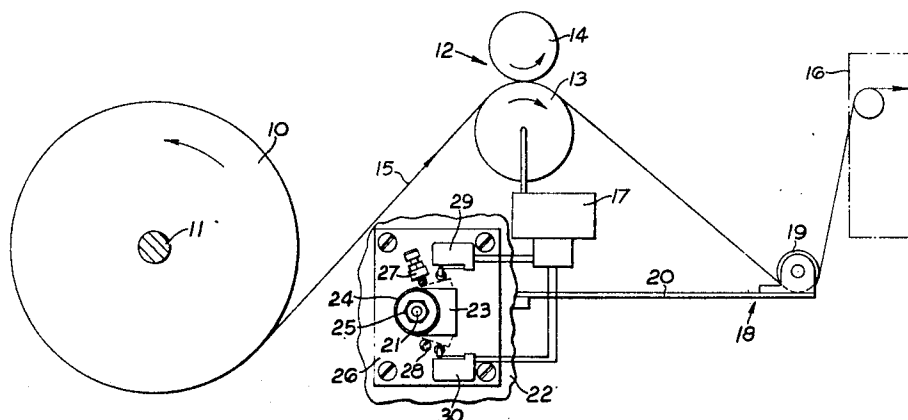
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[54] **WEB FEEDING DEVICES**
10 Claims, 3 Drawing Figs.

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 200/61.18, 226/44
 [51] Int. Cl. B65h 25/04
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ABSTRACT: Web-feeding device, particularly for a rotogravure-printing press has means for feeding web whose speed of operation is regulated by the position of a control roller around which a loop of the web passes between the feed means and the input side of the press, the roller being mounted on pivoted arms for angular movement in response to changes in loop length and an actuating member being non-positively connected through a friction pad to the arms for angular movement therewith between fixed stops. Microswitches adjacent each stop position are actuated by the actuating member to increase the speed of feed if the loop length is reduced below a certain level, or reduce said speed if the length increases beyond a second level.



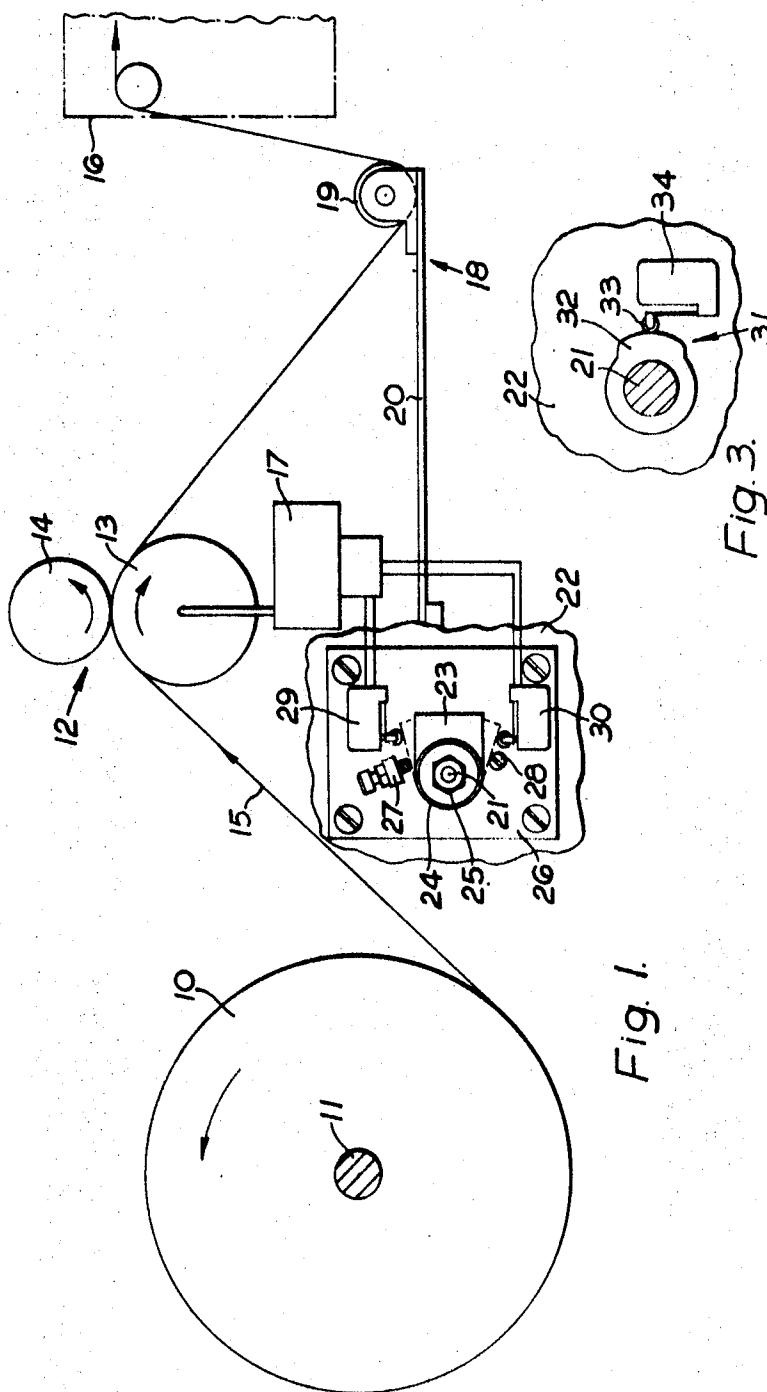


Fig. 1.

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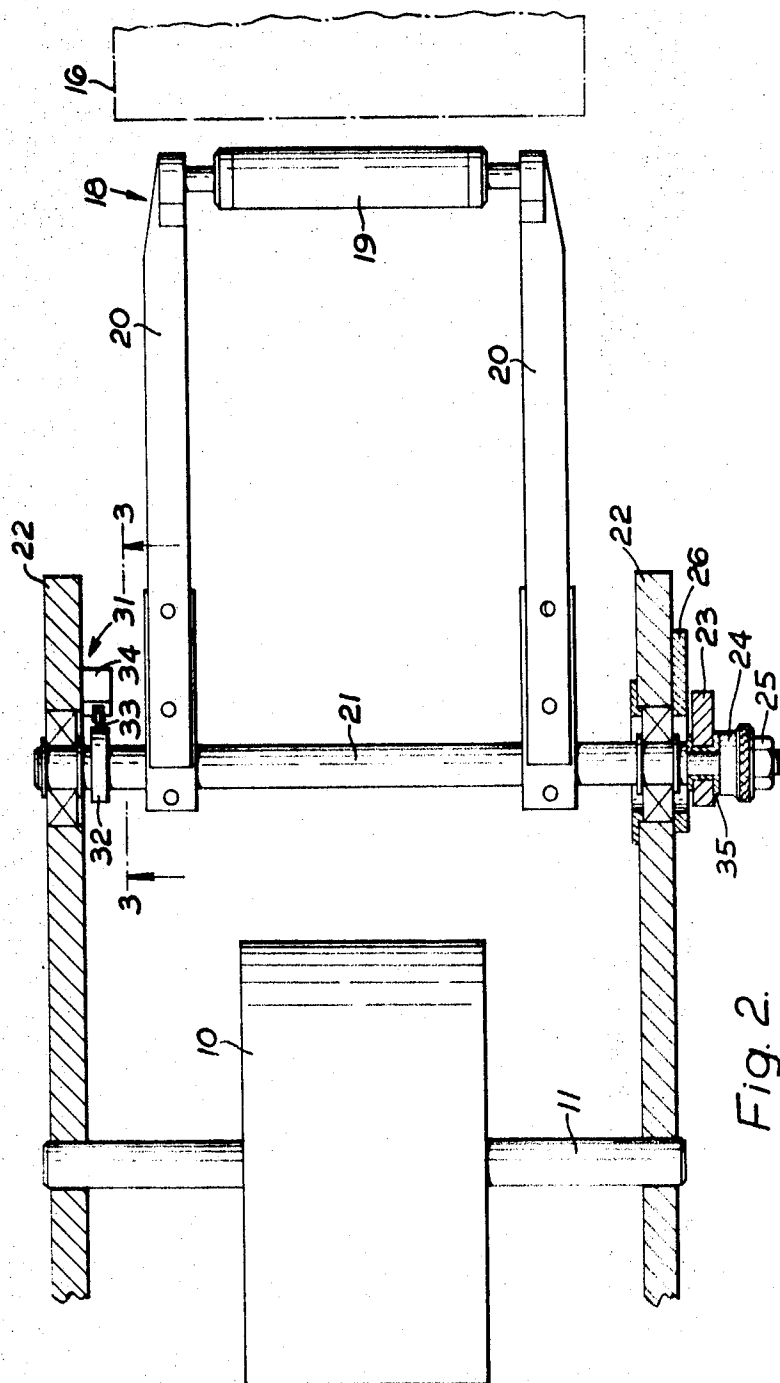


Fig. 2.

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WEB FEEDING DEVICES

This invention relates to improvements in web-feeding devices, and particularly but not exclusively to the regulation of devices for feeding a web of paper or like material to a processing machine which consumes the web intermittently, and/or at varying speeds during a processing cycle, and/or which consumes a varying amount of web per cycle.

The object of the invention is to provide a web-feeding device which is responsive to variations in the rate of consumption of the web by a processing machine, while keeping the web correctly tensioned to minimize possible damage by stretching or tearing.

According to the invention a web-feeding device including means for feeding the web at an adjustable rate towards the input side of an apparatus which consumes the web in use, and a control member mounted for movement in response to changes in length of a loop of the web between said feeding means and said input side, caused by differences between the rate of feed from said feeding means and the rate of consumption of the web; is characterized by an actuating member connected nonpositively to the control member so as to be moved thereby between predetermined limits, said connection permitting movement of the control member relative to the actuating member beyond said limits; and limit sensors actuable by the actuating member in the vicinity of the predetermined limits to adjust the rate of feed of said feeding means in the direction of reduced difference between said rate and the rate of consumption.

A preferred embodiment of the invention is now described with reference to the accompanying drawings wherein:

FIG. 1 is a diagrammatic side elevation of a web-feeding device according to the invention;

FIG. 2 is a diagrammatic plan view of the device shown in FIG. 1; and

FIG. 3 is a sectional view on line 3-3 of FIG. 2.

Referring to the drawings a stock of web in the form of a reel 10 is rotatably mounted in use on a horizontal arbor 11. Feeding means 12, (not shown in FIG. 2), consisting of a power driven feed roller 13 and an idle pressure roller 14 between which the web 15 is nipped in use, is operable to draw the web from the reel 10 towards a web-processing machine indicated generally at 16. Feed roller 13 is driven through an electrically controlled variable speed gear box 17 enabling the rate at which web 15 is passed through feed means 12 to be adjusted.

Between the output side of the feed means 12 and the input to the web-processing machine 16 is a control member 18 comprising a loop roller 19 rotatably journaled at one end of a pair of parallel arms 20 formed from resilient strip metal. The other ends of the arms are attached to a horizontal shaft 21 pivoted for angular movement in sideplates 22 of the device. In use the web is led in a loop from feed roller 13 below loop roller 19 and upwards towards the machine 16 so that the arms 20 are substantially horizontal when at their mean position.

One end of shaft 21 extends through one of the sideplates 22 and carries an actuating member 23 in the form of a block axially located on the shaft by means of a collar 24 and a nut 25. Between a radial face of collar 24 and the member 23 is an annular friction pad 35 which serves as a nonpositive connection between shaft 21 and member 23 so that the latter is angularly movable with the shaft but can move angularly under pressure relative to the shaft.

A mounting panel 26 on the axially outer face of the adjacent sideplate 22 carries a pair of limit stops 27, 28 to limit angular movement of actuating member 23. Upper stop 27 is adjustable, lower stop 28 is fixed. Adjacent each stop is a sensor in the form of a respective upper and lower limit switch 29, 30 actuable by a respective face of the actuating member 23 as it reaches either of its limit positions. Switches 29 and 30 are connected in circuit in known manner to control the gear box 17 so that actuation of upper switch 29 increases the rate of feed of the web from roller 13 whereas actuation of lower switch 30 decreases said rate.

A safety device 31 comprises a cam 32 mounted on shaft 21 for angular movement therewith, and a cam follower 33 in the form of an actuating plunger of a microswitch 34. In normal operation of the feeding device the cam surface engages follower 33 and keeps the circuit including the microswitch 34 closed, but should the shaft 21 move beyond limits set for safe operation cam 32 will allow said switch to open, breaking the circuit of the feed roller motor to halt feed roller 13.

In operation web 15 is fed to machine 16 at a rate approximating to the rate at which the latter consumes the web; or in the case of intermittent or variable consumption the mean consumption over a succession of working cycles, the loop in the web and the resilient nature of arms 20 serving to absorb any snatches or jerks as the web is taken up. Should the rate of consumption exceed the rate of feed from feed means 12 the length of web forming the loop will decrease so raising roller 19 and angularly moving shaft 21 and member 23. When member 23 reaches stop 27 it actuates upper limit switch 29 to increase the rate of feed of the web. Similarly if the rate of feed exceeds the rate of consumption lengthening of the loop allows roller 19 to fall causing member 23 to actuate the lower switch 30 to slow down the feed rate.

The nonpositive connection of member 23 with shaft 21 allows angular movement of the shaft to continue after the stops have been reached avoiding sudden strain on the web loop. The web loop quickly begins to enlarge or decrease on actuation of the appropriate switch and such excess movement is not large.

Should there be a fault in the feeding device causing violent over or under correction of feed rate, or should the roller 19 lose contact with the loop due to web breakage for example, cam 32 will be displaced angularly to allow switch 34 to open stopping the web-feeding means 12 and/or the processing machine 16 until the fault can be corrected.

Instead of friction pad 25 other forms of nonpositive connection between member 23 and shaft 21 may be used, for example a magnetic coupling. Loop roller 19 may be oscillatable on a rectilinear path instead of being mounted on angularly movable arms 20, and other forms of sensor, for example pressurized fluid control valves or mechanical controls may be substituted for the switches 29, 30 and/or for switch 34.

I claim:

1. A web-feeding device including means for feeding web at an adjustable rate towards the input side of an apparatus which consumes the web in use, and a control member mounted for movement in response to changes in length of a loop of the web between said feeding means and said input side caused by differences between the rate of feed from said feeding means and the rate of consumption of the web; characterized by an actuating member (23) connected nonpositively with the control member (18) so as to be moved thereby between predetermined limits (27, 28), said connection permitting movement of the control member relative to the actuating member beyond said limits; and limit sensors (29, 30) actuable by the actuating member in the vicinity of the predetermined limits to adjust the rate of feed of said feeding means (12) in the direction of reduced difference between said rate and the rate of consumption.

2. A web-feeding device according to claim 1 characterized in that the control member (18) includes a resiliently mounted roller (19) by which the loop of web (15) is tensioned, said roller being movable in response to changes in size of the loop.

3. A web-feeding device according to claim 2 characterized in that the resilient mounting of the roller (19) comprises a pair of parallel arms (20) pivotally mounted for angular movement.

4. A web-feeding device according to claim 3 characterized in that the actuating member (23) is located on a shaft (21) forming the pivotal mounting of the arms (20).

5. A web-feeding device according to claim 3 characterized in that the arms (20) are flexible spring strips.

6. A web-feeding device according to claim 1 characterized in that the nonpositive connection of the actuating member (23) to the control member (18) includes a friction pad (25).

7. A web-feeding device according to claim 1 characterized in that the limit sensors (29, 30) are switches forming part of an electrically operable circuit controlling the rate of feed of the web.

8. A web-feeding device according to claim 1 characterized by a safety device (31) responsive to an excessive movement of the control member (18) caused by a malfunction of the feeding device or of the apparatus (16) which consumes the web.

9. A web-feeding device according to claim 8 characterized in that the safety device (31) includes a cam (32) connected for angular movement in response to movement of the control member (18), and a cam follower (33) for actuating an emergency signal or control.

10. A rotogravure-printing press characterized in that it includes a web-feeding device according to claim 1.

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