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STRIP MEASURING AND MARKING APPARATUS

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2 Sheets-Sheet 1

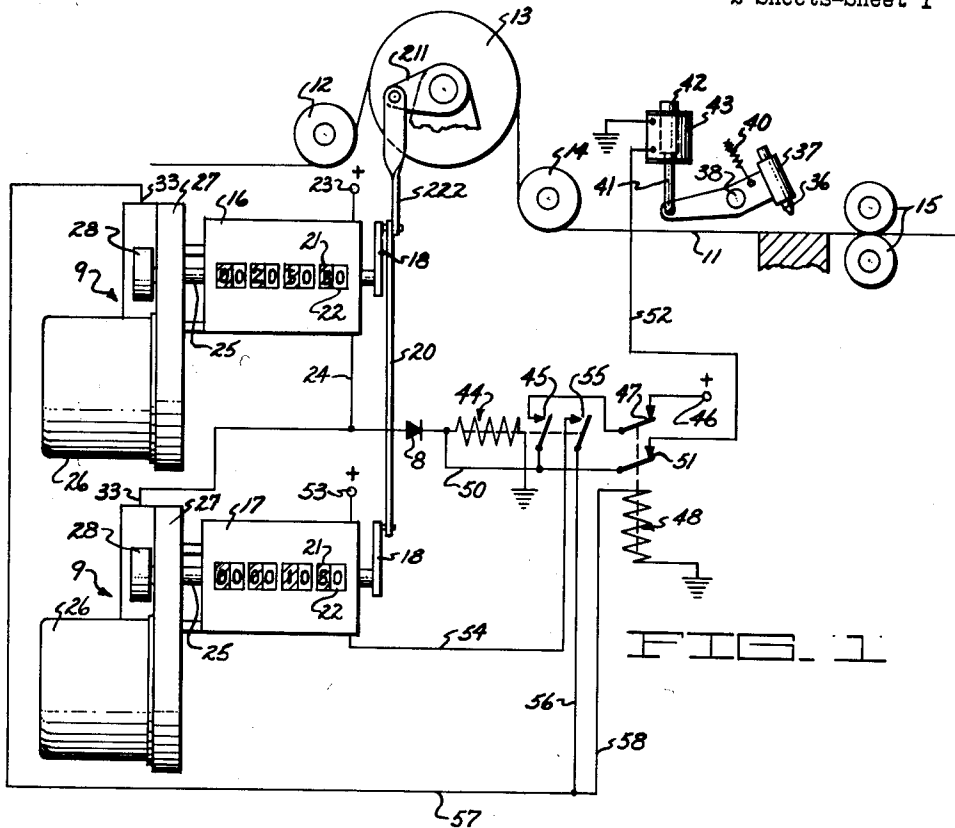


FIG. 1

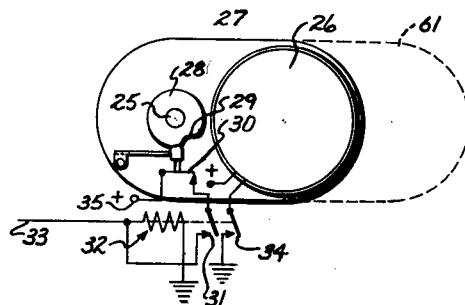


FIG. 2

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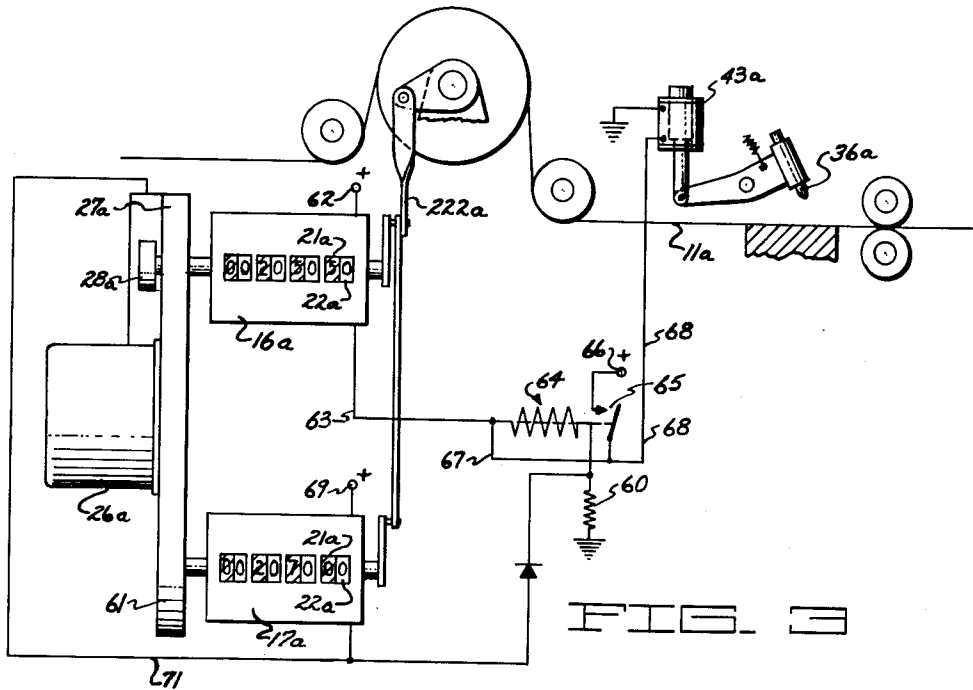
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STRIP MEASURING AND MARKING APPARATUS
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This invention relates to apparatus for measuring and marking strip or web material.

In handling strip material, as for example, during printing of continuous strip paper, it is often desirable to mark the strip in preselected lengths so that such lengths may be ultimately separated to form separate rolls or so that such lengths may be cut into sheets and stacked with a predetermined number of sheets in each stack. Due to the relatively high speed of present day continuous web printing presses and the like it has been discovered that such markings must be of considerable length in order that the press operator may readily spot them without detracting his attention unduly from other duties. For example, if a mark or stripe were made 15 feet long at the end of each length, it would readily attract the notice of the press operator as it passes through the press without requiring his continued attention.

It therefore becomes a principal object of the present invention to measure predetermined lengths of strip material and mark such lengths with a relatively long stripe adjacent the end of each length.

Another object is to provide an accurate measuring device for measuring long lengths of strip material and applying relatively long stripes at the ends of such lengths.

Another object is to provide a measuring and marking device for strip material in which the lengths of material and lengths of marks may be readily changed as desired.

A further object is to provide a simple and inexpensive measuring and marking device for strip material.

The manner in which the above and other objects of the invention are accomplished will be readily understood on reference to the following specification when read in conjunction with the accompanying drawings, wherein:

FIG. 1 is a schematic view illustrating a measuring and marking device embodying a preferred form of the present invention.

FIG. 2 is an end view of one of the counters and is taken in the direction of the arrow 2 in FIG. 1.

FIG. 3 is a schematic view illustrating a modified form of the invention.

The device of the present invention is specifically intended for use in connection with a continuous web printing press wherein a paper strip or web is run at a constant speed through the press. However, it is to be understood that the device can be equally well applied to other types of continuous web handling equipment or it can be used per se to measure and mark lengths of web or strip material.

Referring to the drawings, a paper web 11 is guided from a suitable supply roll (not shown) around various rollers i.e. 12, 13 and 14 and between a pair of drive rollers 15 from whence it passes through one or more printing units (not shown). The roller 13 is preferably driven in time with the drive rollers 15 and other paper feeding devices of the press although such roller 13 may, if desired, be driven by the web itself.

A pair of identical predetermining counters 16 and 17 are provided for measuring the length of the web passing through the press and for controlling the length of a mark or stripe applied to the web at the end of each predetermined length, respectively. Although any of a large variety of predetermining counters may be used for this purpose, the particular counter construction adopted in the present embodiment is similar to that dis-

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closed in the expired Patent No. 2,040,026 issued to H. L. Spaunburg on May 5, 1936. Accordingly, for the sake of brevity, the details of each counter will not be described herein.

The counters incorporate oscillatory actuating arms 18 connected together by a link 20. Also, the arm 18 of the counter 16 is connected by a link 222 to a crank arm 211 on the shaft of roller 13. Thus, during each revolution of the roller 13 the arms 18 will be actuated to advance each counter one step.

The roller 13 is preferably formed of such a diameter that its circumference measures exactly one foot so that as the counters are actuated they will indicate directly the length of the web passing through the press.

As described in detail in the above Spaunburg patent, each counter comprises a pair of juxtaposed dials 21 and 22 in each denominational order. The leftmost dials 21 in the different orders are manually presettable to any desired predetermining value whereas the righthand dials 22 are counting dials which directly count from zero.

As each footage counter is actuated by its arm 18, the right hand counter dials 22 count toward the number initially preset in the dials 21 while the dials 21 count down toward zeros. Upon reaching the predetermined count, i.e. as the dials 21 reach zero registration, switch contacts (not shown) are closed to complete the circuit from a plus voltage supply source, i.e. 23, to a line, i.e. 24.

For example, the left hand counter dials 21 of counter 16 may be preset to read 255 as shown in FIG. 1 while the dials 22 will be preset at zeros so that upon repetitive actuation of the arm 18 dials 22 will count toward the number 255 initially preset in the dials 21, while the dials 21 will count down toward zero. Upon reaching the predetermined count the dials 21 will read zeros while the dials 22 will read 255 and through means to be later described activate other control mechanism.

Each counter comprises a reset shaft 25 which, when turned 360 degrees, resets the right hand dials 22 to zero and resets the left hand dials 21 to the preset number. However, in lieu of the manual resetting wing nut disclosed in the Spaunburg patent, a reset motor drive unit 9 is provided for each counter comprising an electric motor 26, the latter being connected through a speed reducing unit 27 to the reset shaft 25. A disc 28 having a single depression 29 therein is mounted on the reset shaft 25 and is engaged by the actuating arm of a switch 30. The switch is connected in series with the normally open contacts 31 of a two pole, normally open relay 32.

When a momentary signal is applied to an input lead 33 of the reset motor unit 9, relay 32 will be energized, closing its contacts 31 which now establish a holding circuit for the relay 32 from a plus voltage supply source 35 through the now closed switch 30, contacts 31 and the coil of relay 32 to ground. A second set of relay contacts 34 are now held closed, establishing a power circuit through the motor 26 to effect a resetting operation. Toward the end of the 360 degrees of rotation of the reset shaft 25, the depression 29 in the disc 28 will allow the switch 30 to open thus dropping the relay 32 to de-energize the motor 26. The motor will now coast sufficiently to cause the disc 28 to again close the switch 30.

For the purpose of marking a stripe along the web 11 after a predetermined length has passed through the press, a marking pen 36 is provided, the latter being carried by an arm 37 pivotally supported at 38 and normally held out of marking engagement with the web by tension spring 40. The arm 37 is connected by a link 41 to the armature 42 of a solenoid 43.

During operation of the device and after a predetermined length of web, as measured by the footage counter 16, has passed through the device, the counter will momen-

tarly complete a circuit from the voltage supply source 23 through a line 24 to the input lead 33 of the reset unit of counter 17, causing the latter to be reset to its preset condition. Concurrently, a circuit will be completed through the coil of a two pole normally open relay 44. As the latter is energized one of its contacts 45 established a holding circuit from a voltage supply source 46 through normally closed contacts 47 of a relay 48 and thence through the energizing coil of relay 44 to ground. Concurrently, an additional circuit is established over line 50, normally closed contacts 51 of relay 48 and line 52 to solenoid 43 thereby causing the solenoid to move the pen 36 into marking engagement with the web 11. Due to the locking action of relay 44, the solenoid will be maintained energized causing the pen 36 to mark a continuous stripe along the web.

It should be noted that a diode 8 is positioned in the line 33 between line 24 and relay 44 to prevent energization of the line 33 from the current flow in line 50.

The counter 17 will now count down from its present condition and upon reaching zero it will complete a circuit from a voltage supply source 53 through line 54, now closed contacts 55 of relay 44, line 56 and line 57 to the input lead 33 of the reset unit for counter 16. At the same time, a circuit will be completed through line 58 to the relay 48, causing the contacts of the latter to open and thus de-energize the solenoid 43, permitting the pen 36 to be removed from the web 11 and dropping the relay 44.

The presetting of the counters is such that if an operator desires, for example, 270 running feet of web with the mark occurring during the last 15 feet thereof, he presets the dials 21 of counter 16 at 270 minus 15 or 255 as shown in FIG. 1, and presets the dials 21 of counter 17 at 15.

During operation, as the dials 21 of counter 16 reach zeros and therefore dials 22 reach 255 a pulse is sent to engage the pen 36 with the web, and concurrently to reset the counter 17 so its dials 21 read 15 and the dials 22 read zeros.

When the dials 21 of the counter 17 reach zero after being reset, a pulse is set to disengage the pen from the web, and to concurrently reset the footage counter to its predetermined footage count, whereby the foregoing procedure will be repeated to measure and mark a new length or section of web 11.

It will be noted that the measured lengths of the web sections and the lengths of the adjoining marked stripes may be readily changed as desired by merely changing the settings of the predetermining dials 21 of the two counters 16 and 17.

A modified form of the invention is shown in FIG. 3 wherein a link 222a driven in the same manner as link 222 actuates counters 16a and 17a to control the circuitry of a solenoid 43a to engage a pen 36 with a paper web 11a.

A single reset motor 26a is provided for resetting the counters 16a and 17a through speed reducing units 27a and 61 wherein the unit 27a resets counter 16a while the unit 61, shown in dotted lines in FIG. 2, operating from the same motor resets counter 17a.

The arrangement is such that the counter 16a is preset to a number representing the length of web 11a unmarked, for example, 255 feet, while the counter 17a is preset to a number representing the overall length of the web, including the marked area, such as 270 feet.

As the counter 16a reaches the count 255, a circuit is completed as aforesaid, from a plus voltage supply 62, to a line 63, through a coil of a normally open relay 64 and resistor 60 to ground, thereby closing contacts 65 of the relay.

The closure of contacts 65 completes a circuit from a positive power supply 66 to ground through a line 67 and the coil of the relay 64 thereby holding said relay contacts closed. Concurrently, a circuit is completed

over a line 68 to the solenoid 43 to maintain it energized causing the pen 36 to mark the web.

As the counter 17a reaches the count 270 a circuit is completed from a positive power supply 69 to a point intermediate the relay 64 and the resistor 60 so that the positive power supply 66 seeing the positive power supply 69 will drop the relay 64, de-energizing the magnet 43a to retract the pen 36 concurrently, a pulse is sent over a line 71 to reset motor unit 26a to reset the counters through respective units 27a and 61 for the succeeding operation.

Although the invention has been described in detail and certain specific terms and languages have been used, it is to be understood that the present disclosure is illustrative rather than restrictive and that changes and modifications may be made without departing from the spirit or scope of the invention as set forth in the claims appended hereto.

Having thus described the invention, what is desired to be secured by United States Letters Patent is:

1. Apparatus for measuring and marking a strip comprising the combination of first and second strip length measuring devices, a strip marking device, means operable in time with movement of said strip past said marking device for actuating both said measuring devices, means responsive to said first measuring device upon reaching a predetermined count for rendering said marking device effective to apply a mark to said strip, means responsive to said second measuring device upon reaching a predetermined count for rendering said marking device ineffective, and means for resetting said measuring devices.

2. Apparatus for measuring and marking a moving strip comprising the combination of a marking device, first and second predetermining counters, resetting means for said counters, means operable in time with movement of said strip past said marking device for concurrently actuating said counters, means responsive to said first counter upon reaching a predetermined count for rendering said marking device effective to apply a mark to said strip, means responsive to said second counter upon reaching a predetermined count for rendering said marking device ineffective, and means upon reaching said last mentioned predetermined count for actuating said resetting means.

3. Apparatus for measuring and marking a moving strip comprising the combination of a marking device, electromagnetic means for actuating said marking device to apply a mark to said strip, first and second strip length measuring devices, means operable in time with movement of said strip past said marking device for causing said devices to measure the length of said strip, resetting means for said measuring devices, means including a holding relay for energizing said electromagnetic means; means controlled by said first measuring device upon measuring a predetermined length of said strip for energizing said holding relay, and means controlled by said second measuring device upon measuring a predetermined length of said strip for releasing said holding relay and for actuating said resetting means.

4. Apparatus for measuring and marking a strip comprising the combination of first and second strip length measuring devices, means for causing said devices to concurrently measure the length of said strip, a strip marking device, means responsive to said first measuring device upon measuring a predetermined length of said strip for rendering said marking device effective and for resetting said second measuring device, and means responsive to said second measuring device upon measuring a predetermined length of said strip for rendering said marking device ineffective and for resetting said first measuring device.

5. Apparatus for measuring and marking a strip comprising the combination of first and second strip length measuring devices, means for causing said devices to

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concurrently measure the length of said strip, a strip marking device, a first resetting device for said first measuring device, a second resetting device for said second measuring device, means responsive to said first measuring device upon measuring a predetermined length of said strip for rendering said marking device effective and for actuating said first resetting device, and means responsive to said second measuring device upon measuring a predetermined length of said strip for rendering said marking device ineffective and for actuating said second resetting device.

6. Apparatus for measuring and marking a moving strip comprising the combination of a marking device, first and second counters, means operable in time with movement of said strip past said marking device for concurrently actuating both said counters, means responsive to said first counter upon reaching a predetermined count for rendering said marking device effective to apply a mark to said strip and for resetting said second counter, and means responsive to said second counter upon reaching a predetermined count for rendering said marking device ineffective.

7. Apparatus for measuring and marking a moving strip comprising the combination of a marking device, first and second predetermining counters, a first resetting device for said first counter, a second resetting device for said second counter, means operable in time with movement of said strip past said marking device for concurrently actuating said counters, means responsive to said first counter upon reaching a predetermined count for rendering said marking device effective to apply a mark to said strip, means responsive to said counter upon reaching said predetermined count for actuating said second resetting device, means responsive to said second counter upon reaching a predetermined count for rendering said marking device ineffective, and means responsive to said second counter upon reaching said last mentioned predetermined count for actuating said first resetting device.

8. Apparatus for measuring and marking a strip comprising the combination of first and second strip length measuring devices, means for causing said devices to concurrently measure the length of said strip, a strip marking device, a first resetting device for said first measuring device, a second resetting device for said second

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measuring device, control means responsive to said first measuring device upon measuring a predetermined length of said strip for rendering said marking device effective and for actuating said second resetting device, means responsive to said second measuring device upon measuring a predetermined length of said strip for rendering said marking device ineffective and for actuating said first resetting device, and means for preventing operation of said last mentioned means until after operation of said control means.

9. Apparatus for measuring and marking a moving strip comprising the combination of a marking device, first and second predetermining counters, means operable in time with movement of said strip past said marking device for concurrently actuating said counters, a first resetting device for said first counter, a second resetting device for said second counter, means responsive to said first counter upon reaching a predetermined count for rendering said marking device effective to apply a mark to said strip and for resetting said second counter, normally ineffective means responsive to said second counter upon reaching a predetermined count for rendering said marking device ineffective and for actuating said first resetting device, and means responsive to said first counter upon reaching said predetermined count thereof for rendering said normally ineffective means effective.

10. Apparatus for measuring and marking a moving strip comprising the combination of a marking device, electromagnetic means for actuating said marking device to apply a mark to said strip, first and second counters, means operable in time with movement of said strip past said marking device for concurrently actuating said counters, a first resetting device for said first counter, a second resetting device for said second counter, means including a holding relay for energizing said electromagnetic means; means controlled by said first counter upon reaching a predetermined count for energizing said holding relay, means controlled by said first counter upon reaching said predetermined count for actuating said second resetting device, means controlled by said second counter upon reaching a predetermined count for releasing said holding relay, and means controlled by said second counter upon reaching said predetermined count thereof for actuating said first resetting device.

No references cited.