Jan. 6, 1959 V. J. DILLON 2,867,794

PRINTING PRESS SHEET REGISTRY INDICATOR

Filed July 18, 1955 2 Sheets-Sheet 1

Fig. 1

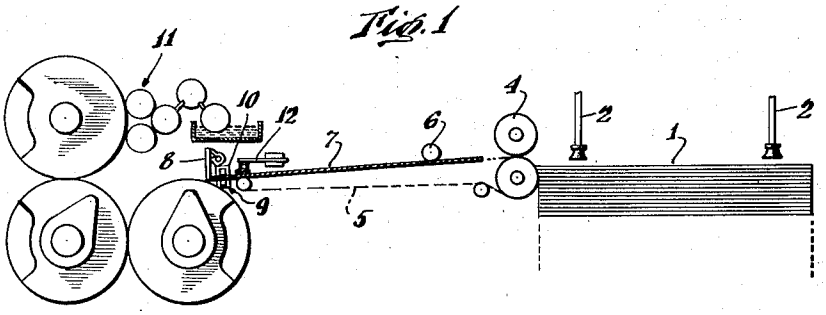
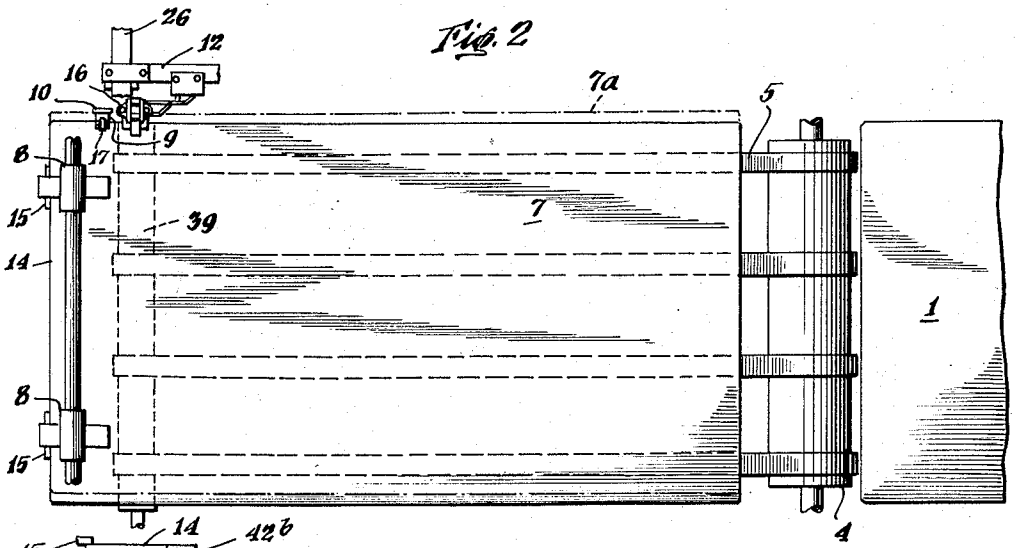


Fig. 2



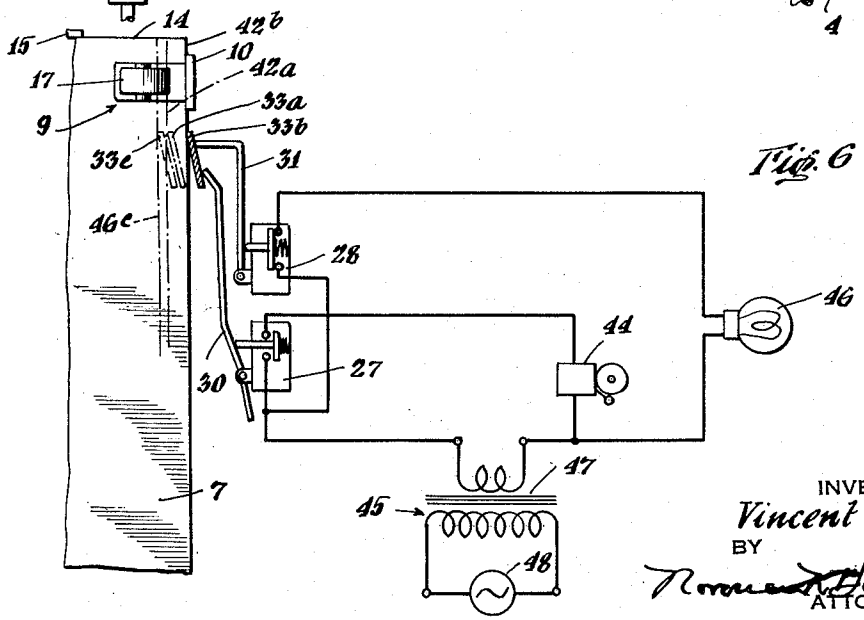


Fig. 6

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Fig. 3

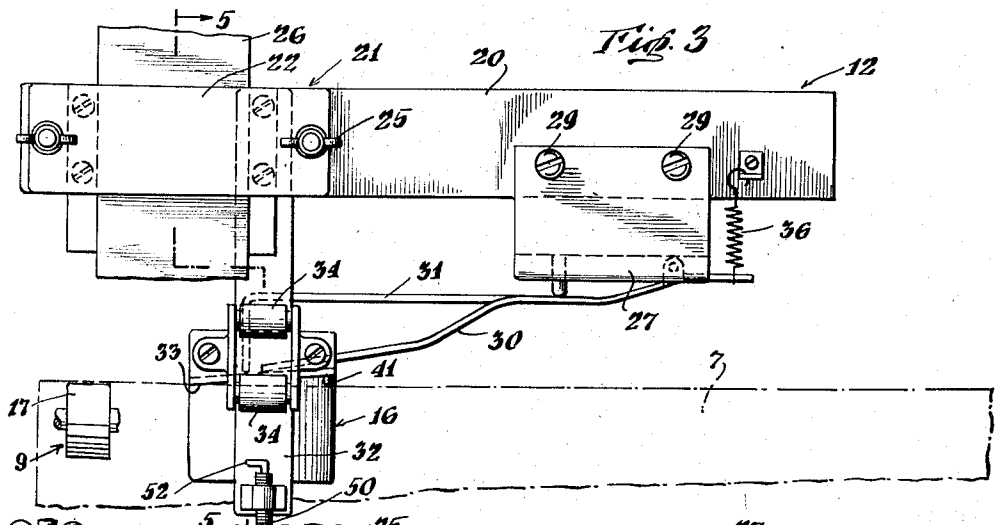


Fig. 4

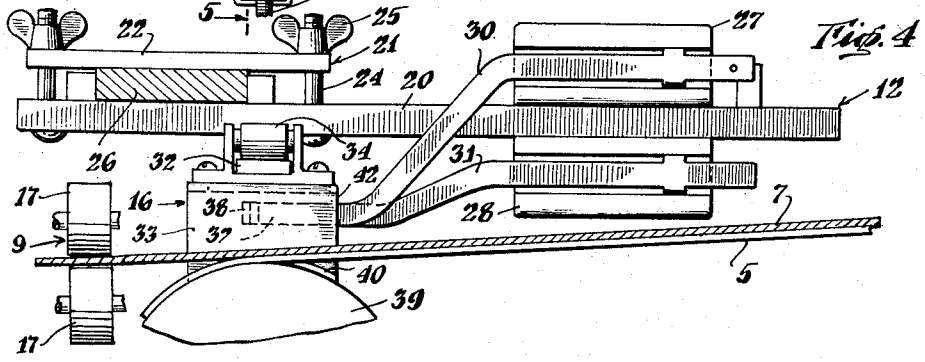
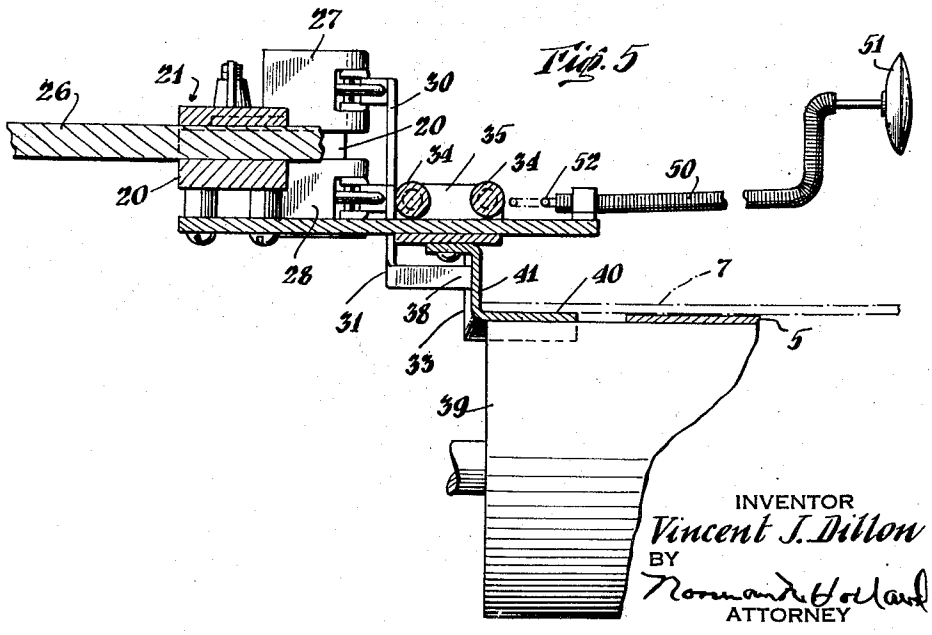


Fig. 5



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PRINTING PRESS SHEET REGISTRY INDICATOR

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Application July 18, 1955, Serial No. 522,637

7 Claims. (Cl. 340—259)

The present invention relates to a position indicator and more particularly to a registry indicator for a printing press paper feeder mechanism.

Automatically fed presses of all types have positioning devices to align the paper exactly before it enters the press. Such positioning devices are particularly important on color presses where the same paper is passed through the press a number of times so that one or more different colors are applied during each pass. Each color must be exactly superimposed on the preceding color and therefore the paper must be aligned in exactly the same position for each pass. This careful positioning of the paper sheets to an exact position is called registering. As long as the positioning or registering mechanisms are operating properly, the press will be printing the paper in the desired position with the colors correctly superimposed. When the registering mechanisms fail to operate correctly, blurred copies will be printed due to the failure of the colors to be properly superimposed with respect to one another. Often the failure of the registering mechanisms is due to tears or folds in the paper delivered to the presses. The tears or folds prevent the registering mechanisms from gripping the edges of the sheets. Other registry failures occur due to the shifting of the sheets in the stack during shipping or handling. Thus, portions of the stack may shift so that the sheets are out of contact with the regisering mechanisms when the sheet is moved onto the press feeder. Such a failure of the registering mechanisms may occur on presently used machines without the press operator knowing of the trouble until an inspection is made of the printed material. This results in considerable time and material waste, since some time may elapse before the failure is discovered. Other times the failures will be intermittent and the imperfectly printed sheets will be scattered throughout an otherwise correctly printed stack of paper. In this case a cumbersome and expensive checking and sorting job is necessary through the thick stacks of printed sheets.

Accordingly, an object of the present invention is to provide a registry indicator which will instantly alert the press operator to a failure of the registering mechanism.

Another object of the present invention is to provide a registry indicator which will give a distinctive signal indicating that the registering mechanism is operating correctly.

Another object of the present invention is to provide a relatively simple and rugged registry indicator which is adapted for use with all types of presently used presses.

Another object of the present invention is to provide a registry indicator which is easily adjusted and controlled by the press operator.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred

to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings, forming a part of the specification, wherein:

Fig. 1 is a diagrammatic view of the feeder mechanism for a press having a registry indicator of the present invention installed thereon;

Fig. 2 is a plan view of the feeder mechanism for a press showing a registry indicator according to the present invention installed thereon;

Fig. 3 is a plan view of the registry indicator of the invention;

Fig. 4 is a side view of the registry indicator of Fig. 3;

Fig. 5 is a sectional view of the registry indicator taken along the line 5—5 of Fig. 3; and

Fig. 6 is a schematic diagram of the electrical circuit of the registry indicator.

The registry indicator will be described in connection with its use to indicate the functioning of a side guiding registering mechanism for an offset press sheet feeder used for multicolor printing, although it is clear that the indicator may be used on front guides or side guides on offset, printing and all other types of sheet-fed presses.

The feeding and registering mechanism of a typical press will first be described generally and then the registry indicator of the present invention and its operation with the feeder and registering mechanism will be described in detail.

Fig. 1 is a diagrammatic side view of a typical press feeder mechanism. A pile of paper sheets is indicated at 1. The top sheet of the pile is lifted by suckers 2 and is fed thereby to forwarding rollers 4 which forward the sheet onto conveyor 5 with the aid of an auxiliary conveyor roller 6. The conveyor 5 carries the sheet 7 forward until the front edge of the sheet 7 strikes front guides 8 at the front side of the feeder to register or position the front edge of sheet 7. The front guides 8 hold the sheet against further forward movement by the conveyor 5 while a conventional side guide 9 moves the sheet 7 laterally against a side stop 10 to laterally register or position the sheet 7.

When the sheet 7 has been side-guided by the side guide 9 against side stop 10, it is positioned or registered correctly against the front guides 8 and the side guide stop 10 for entry into the press indicated at 11. Front guides 8 swing upwardly clear of the sheet 7 to release it and to allow conveyor 5 and suitable grippers to move the sheet 7 into the press 11. As seen in Fig. 2 a sheet is first moved from pile 1 to the left on the conveyors 5 to the position of the sheet 7 with its front edge 14 against stops 15 of the front guides 8. The side guide 9 is now energized so that the sheet 7 is gripped between the rollers 17 of the side guide 9 and is carried by the rollers 17 against the side guide stop 10 to the position of the sheet 7*a* indicated by the dash-dot lines in Fig. 2. The sheet 7*a* is now positioned for its entry into the press. The sheets may be fed so that one sheet is on the feeder at a time or the sheets may be fed so that the front of one overlaps the back of the preceding sheet on the feeder.

The registry indicator of the present invention is indicated at 12 where it is shown mounted at the side of the side guide 9.

During the feeding and registering of the sheets as described above, a sheet-edge sensing means comprising a contact shoe 16 reciprocally mounted on indicator 12 contacts the side of the sheet 7 to indicate its position, as will be more fully described below.

The registry indicator 12 is shown in detail in Figs. 3–5.

A mounting bar 20 has a clamp 21 at one end comprising clamping bar 22 adjustably held on bolts 24 by wing nuts 25. The clamp 21 is used to fasten the registry indicator 12 to a suitable portion of the feeder mechanism such as the bar 26. Bar 26 is preferably one running laterally across the feeder mechanism to allow lateral adjustment of the registry indicator 12. The shape of the clamping bar 22 and its position on the mounting bar 20 may be suitably changed, as necessary, to mount the registry indicator 12 on various forms of press feeder mechanisms. Switches 27 and 28 are mounted on the mounting bar 20 by suitable screws or other fasteners 29. These switches control the indicator circuit and are operated by the contact shoe 16 through the intermediation of hinged switch arms 30 and 31 pivotally mounted at one end on the switches 27 and 28, respectively, and contacting the contact shoe 16 with their opposite ends 37 and 38.

The contact shoe 16 has a contact plate 33 to make sliding contact with the edge of the sheet of paper 7 as the sheet 7 is positioned or registered on the feeder mechanism. The contact shoe 16 is mounted for lateral motion with respect to the sheet 7 on a track member 32. In the preferred embodiment, the mounting comprises rollers 34 rotatably connected to bracket 35 so that the lower edges of rollers 34 roll on the upper surface of the track member 32. The ends 37 and 38 of switch arms 30 and 31, respectively, are resiliently held against the contact plate 33 by the normal spring mechanism (not shown) within the switches. An additional biasing spring 36 is connected to the short end of switch arm 30 to cause switch arm 30 to hold the roller mounted shoe 16 against the edge of sheet 7.

The typical feeder mechanism has a conveyor roller 39 located adjacent to the side guide 9 at the position where it is preferred to locate the shoe 16. In the preferred embodiment, the contact plate 33 has a foot 40 which is given an arcuate cross section so that it may be centered directly above the roller 39. The vertical portion 41 of contact plate 33 is slanted away from the edge of sheet 7 with its rear edge 42 spaced from the edge of the sheet 7 so that the sheet 7 will strike contact plate 33 obliquely intermediate its front and rear edges and will slide it laterally as the sheet 7 moves along the feeder mechanism. A control cable 50 is used to roll the contact shoe 16 to the left (Fig. 5) and clear of the sheets on the feeder when the registry indicator is not in use. A knob 51 is positioned at a convenient location for the press operator. The end 52 of cable 50 provides a stop to limit the lateral movement of the shoe 16 on track 32. Other suitable adjustable stop means may be provided for the shoe in place of cable end 52.

The indicator circuit and its operation will be described with particular reference to Figs. 2 and 6.

When the feeder mechanism is operating properly, the sheet 7 is moved against the front stops 15 of the front guides 8 with its side edge positioned as indicated at 42*a*. The contact plate 33 of the registry indicator 12 will be moved to the position indicated by 33*a* in Fig. 6 by the edge of sheet 7. In this position, the switch arm 30 holds the switch 27 open so that indicator or signal bell 44 connected through the switch 27 and across a suitable power source 45 does not sound. The sheet 7 is next drawn sideways by the side guide 9 against the side guide stop 10. This casues the edge of sheet 7 to move to the position indicated at 42*b* and the contact plate to be also moved by the edge of sheet 7 to the position indicated at 33*b*. At this position the switch arm 31 closes switch 28, thereby connecting the voltage source 45 across indicator or signal lamp 46 to light it to indicate that sheet 7 has been properly side-guided. Thus when the sheet 7 is being fed correctly by the feed mechanism, the lamp 46 will flash on and off and the bell 44 will remain silent.

In the preferred embodiment, the voltage source is a standard A. C. outlet 48 stepped down by a step-down transformer 47 to allow the use of low-voltage lamps or bells. Other A. C. or D. C. voltage sources may be used.

When the sheet 7 is fed onto the feeder mechanism so that its edge 46 is to the left of its normal position (Fig. 6) as indicated at 46*c*, the contact plate 33 will be forced by switch arm 30 to the position indicated at 33*c*. Switch arm 30 closes the switch 27 at this point to sound the bell 44. The bell 44 will ring until the side guide 9 draws the sheet 7 toward the stop 10 to open switch 27. Thus, the ringing of the bell 44 indicates that the sheet is being fed onto the feeder mechanism too far from the stop 10. Intermittent ringing indicates that the side guide 9 is operating to draw the sheet toward stop 10. Continuous ringing indicates that the sheets are not being fed at all or are being fed so far from the stop 10 that they are being side-guided only slightly, if at all. To summarize: when the sheets are being properly fed, the operator observes the regular flashing of the lamp 46. When the sheet 7 is being fed too far from the stop 10 but is still being correctly side-guided, the operator hears an intermittent ringing of the bell and sees a flashing of the light. A continuous ringing of the bell indicates the feeding of the sheet too far from stop 10 so that the sheets are not being side-guided. Failure of the lamp to light indicates that the sheets are not reaching the stop 10 during the side-guiding.

The forms of the indicators may be changed as desired; thus a lamp may be substituted for the bell 44 or a bell or buzzer for the lamp 46 or other combinations as desired. The off and on sequences may be changed as desired. For example, the switch 28 may be arranged to open when the sheet 7 is correctly side-guided rather than close so that correct side-guiding is occurring when the lamp is extinguished.

It will be seen that the present invention provides an improved registry indicator which keeps the operator of a press constantly informed regarding the registry of the sheets being fed into the press. The signal is adaptable for a clear visual or audio presentation as desired so that the press operator may attend to other duties while needing to give only casual attention to the registering mechanism, since the signals will alert the operator to any registry trouble. The registry indicator, while providing a simple and clear signal, also is adapted to indicate a number of various conditions on the registering mechanism. Thus, for example, intermittent ringing of the bell will indicate that the sheets are incorrectly positioned during their initial feed, although no immediate adjustment is required as long as the lamp continues to flash, showing that the sheets are being correctly side-guided in spite of the initial misplacement. The press operator is thus alerted that a feeder adjustment should be made as soon as possible, although the run need not be interrupted.

The registry indicator is relatively simple and rugged so that trouble-free operation is insured. It is also adaptable for easy mounting and adjustment so that it may be used with various types of presently used presses.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. A sheet registry indicator for a printing press sheet feeder comprising a mounting bar, a mounting means thereon to adjustably attach the indicator to the sheet feeder, a sheet edge contacting shoe, an elongated support for said contacting shoe on said mounting bar, roller means mounting said contacting shoe on said support for reciprocal motion thereon, a resilient means urging said contacting shoe in one direction toward a sheet edge, a stop means providing a limit to the motion of the shoe under the urging of said resilient means, switch means

on said mounting bar operatively connected to said contacting shoe for operation thereby, and a signal device connected to said switch means.

2. The indicator as claimed in claim 1 in which said stop means is adjustable to move the shoe in the opposite direction from which it is urged by said resilient means to make the indicator inoperative.

3. The indicator as claimed in claim 1 in which said switch means comprises a plurality of switches each operatively connected to said contacting shoe to be operated thereby at a predetermined position of said contacting shoe on said support.

4. In combination a printing press sheet feeder having a side guiding mechanism to move sheets intermittently and laterally of the feeder from an initial position to a registered position on the feeder, a sheet registry indicator comprising a switch mounting means, a mounting means to adjustably attach the indicator to the sheet feeder, a sheet-edge contacting shoe reciprocally attached to said switch mounting means for motion laterally of the feeder, a resilient means urging said contacting shoe laterally of the feed in one direction against a sheet edge, and a plurality of switches on said switch mounting means each operatively connected to said contacting shoe for operation by said shoe when said shoe is at a predetermined position on said mounting means and each switch adapted for connection to an indicator means.

5. The combination as claimed in claim 4 in which the operative connection between said contacting shoe and a first switch is adjusted to operate said first switch when a sheet is positioned beyond a given distance laterally of the feeder from the indicator in its initial position, and the operative connection between said contacting shoe and a second switch is adjusted to operate said second switch when the sheet feeder guiding mechanism has moved a sheet to the said registered position.

6. The combination as claimed in claim 5 in which said first switch operates an audible warning signal and said second switch operates a visual indicator.

7. The indicator as claimed in claim 1 in which said plurality of switches comprises two switches, said first switch being positioned to operate when said sheet edge contacting shoe contacts the sheets beyond a predetermined distance in said one direction, and said second switch being positioned to operate when the sheet moves said edge contacting shoe a predetermined distance in the opposite direction.

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