March 5, 1940. R. L. SMITH 2,192,819

STOP MOTION MECHANISM

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FIG. 1.

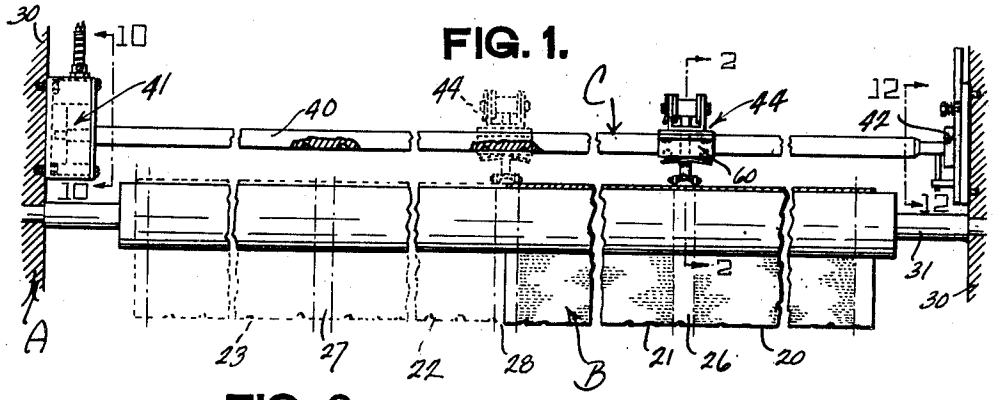


FIG. 2.

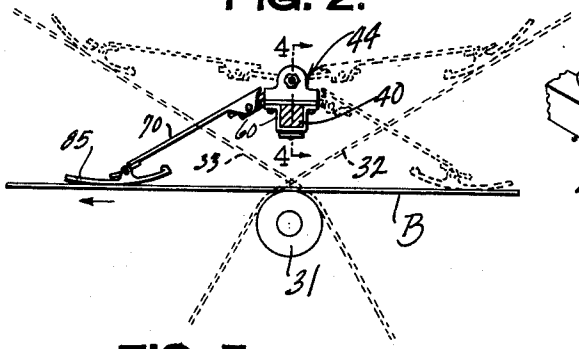


FIG. 3.

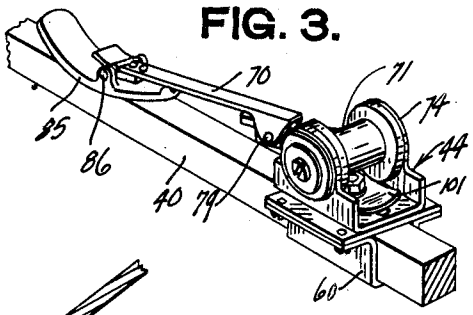


FIG. 5.

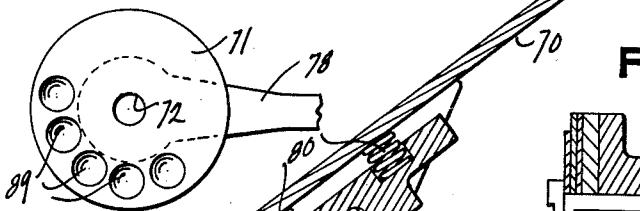


FIG. 4.

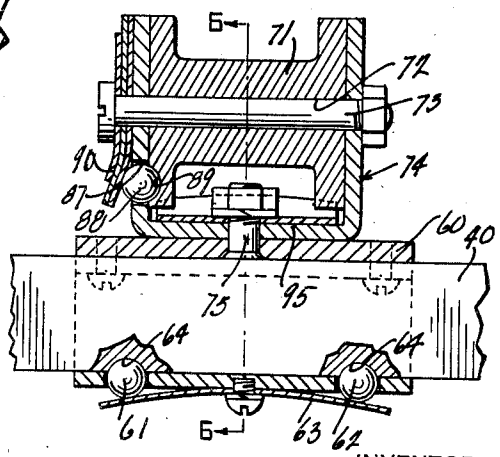
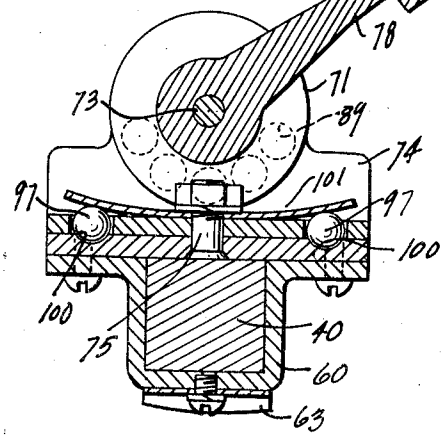


FIG. 6.



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FIG. 8.

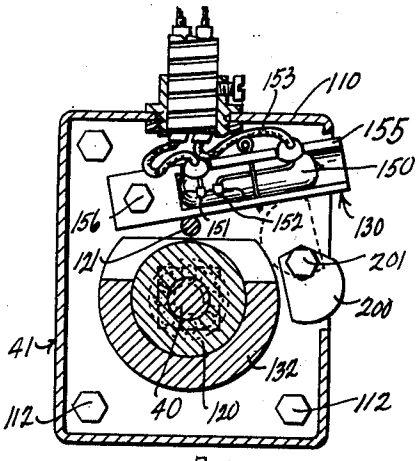


FIG. 9.

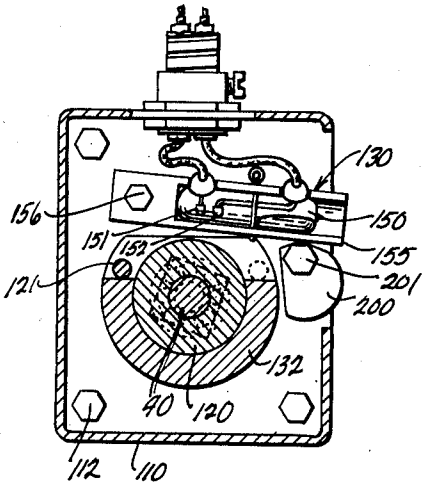


FIG. 7.

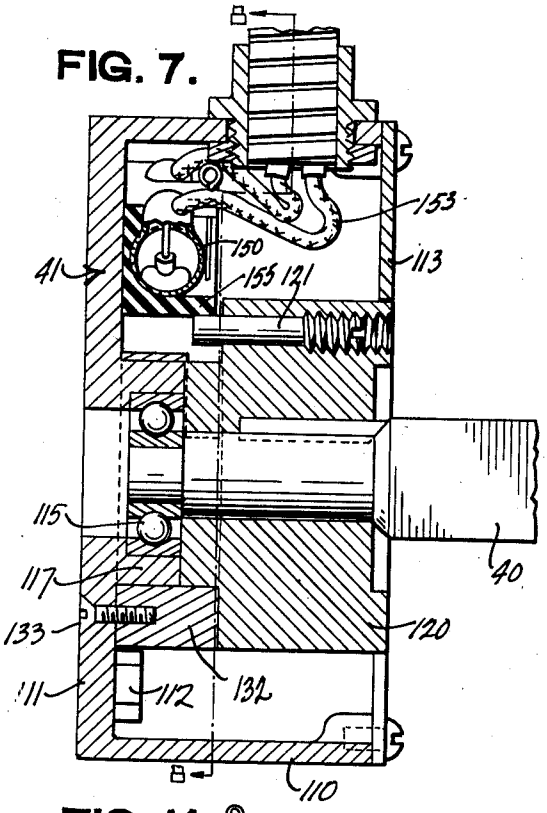


FIG. 10.

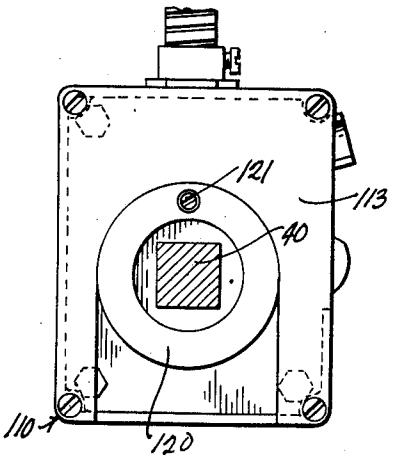
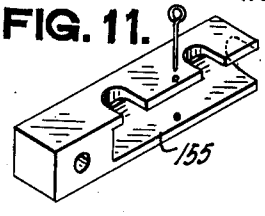


FIG. 11.



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FIG. 12.

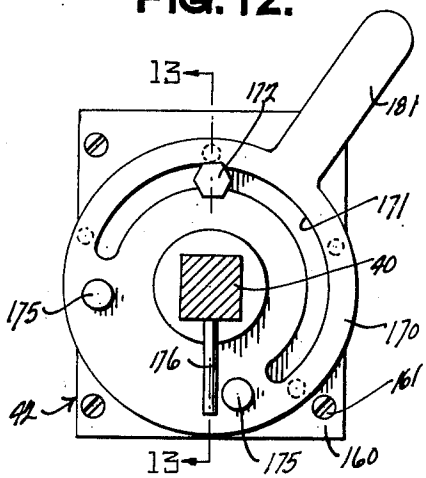


FIG. 13.

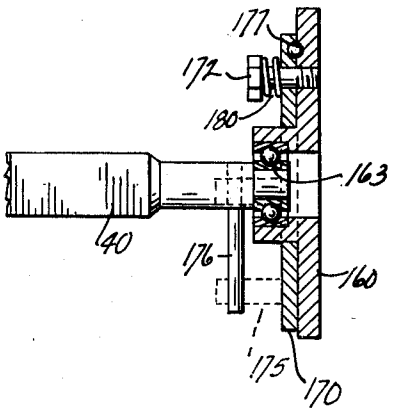


FIG. 14.

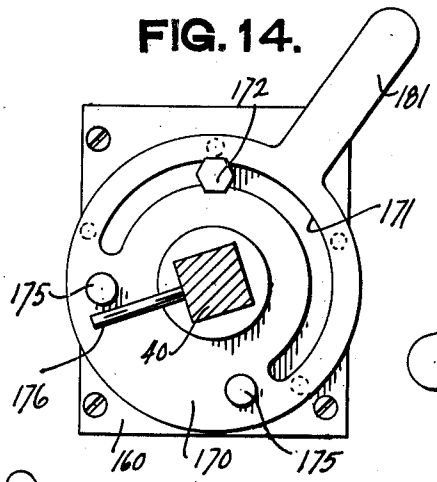


FIG. 15.

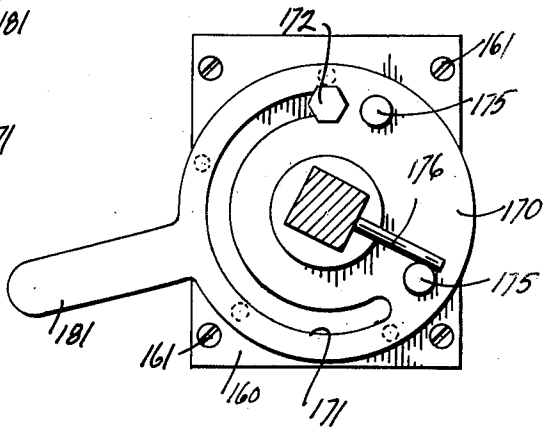
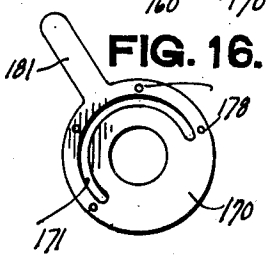


FIG. 16.



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UNITED STATES PATENT OFFICE

2,192,819

STOP MOTION MECHANISM

Ross L. Smith, Washington, D. C.

Application January 12, 1938, Serial No. 184,693

8 Claims. (Cl. 200—52)

This invention relates to improvements in stop motion mechanism particularly well adapted for use upon high speed printing presses.

The primary object of the invention is the provision of means to stop the operation of high speed newspaper printing presses when a tear occurs in the web; the movement stopping mechanism being of a nature which will readily adapt itself to various directions and positions of movement of the web.

A further object of this invention is the provision of an improved mercury switch operated stop motion mechanism.

Other objects and advantages of the invention will be apparent during the course of the following detailed description.

In the accompanying drawings, forming a part of this specification, and wherein similar reference characters designate corresponding parts throughout the several views,

Figure 1 is a fragmentary view, partly in section, showing the assemblage of the improved stop motion mechanism over a web supporting roller of a high speed printing press.

Figure 2 is a cross sectional view taken substantially on the line 2—2 of Figure 1, and in dotted lines showing the various positions and directions of movements which the web may assume in the press.

Figure 3 is a fragmentary perspective view of the improved detector.

Figure 4 is an enlarged sectional view taken substantially on the line 4—4 of Figure 2.

Figure 5 is an end elevation of the hub of the detector finger.

Figure 6 is an enlarged sectional view taken substantially on the line 6—6 of Figure 4.

Figure 7 is a vertical sectional view taken through the mercury switch construction and the end bearing of the shaft on which the detector construction is mounted.

Figure 8 is a sectional view taken substantially on the line 8—8 of Figure 7 and showing the mercury switch in circuit closing position.

Figure 9 is a sectional view similar to Figure 8 but showing the mercury switch in a circuit opening position.

Figure 10 is an end view of the mercury switch and shaft supporting construction shown in Figure 7.

Figure 11 is a perspective view showing the mercury switch tube supporting case.

Figure 12 is a sectional view taken substantially on the line 12—12 of Figure 1 and more particularly showing an end support for the detector mounting shaft.

Figure 13 is a sectional view taken substantially on the line 13—13 of Figure 12.

Figure 14 is a view similar to Figure 12 but showing the detector shaft in position with the switch off.

Figure 15 is a view of the switch control member in the switch throw-off position, such as it will assume while the press is being re-threaded.

Figure 16 is a view of the inside surface of the detector shaft control member.

In the drawings, wherein for the purpose of illustration is shown only a preferred embodiment of the invention, the letter A may generally designate a high speed printing press, thru which the paper web B moves in the usual manner. The improved stop motion mechanism C is associated therewith.

The printing press A may be of the high speed type, upon which webs of various widths may be accommodated. As is shown in Figure 1 the press may accommodate a four-page web strip. These pages are designated at 20, 21, 22, and 23. The folding margins are designated at 26 and 27 and the margin 28 at the center of the web is the cutting margin where the double pages are severed.

The press A includes the frame 30 having the web supporting shaft 31 rotatably mounted thereon, and over which the web B may pass in horizontal position, as shown in the full lines in Figure 2, or in the inclined positions as shown at 32 and 33 in Figure 2. The web B may be moved in either direction thru the press.

The stop motion mechanism C comprises a squared shaft 40 mounted on the frame 30 of the printing press at one end by a combination bearing and mercury switch construction 41, and at the opposite end on the frame 30 by a combination switch position limiting and bearing construction 42.

The shaft 40 is mounted by the bearing constructions 41 and 42 horizontally over the web supporting roller 31. It is preferably polygonal or squared in cross section and supports the detector mechanism 44 which is adjustable therealong and also reversible at either side of the shaft.

It will of course be understood that the stop motion detector construction 44 controls the angular position of the shaft 40, and when the detector mechanism is supported on the web B as it passes through the press the mercury switch, to be subsequently detailed, will close the circuit for

operating the press. If the web breaks, the detector mechanism will not be supported by the web and will be permitted to turn the shaft C for the purpose of throwing the mercury switch open and thus breaking the circuit in order to stop the press.

The web break detector mechanism **44** comprises a support **60** which is of box-shape formation, comprising a U-shaped channel and a table or platform therefor which embraces the shaft **40** and is slidable therealong. This supporting case **60** is adapted to position the detector arm and shoe at definite locations along the shaft, where the margins **26**, **27** and **28** of the web occur; the position of the detector mechanism at these folds being governed entirely by the width of the web traveling through the press. In order to hold the position of the detector on the shaft **40**, the case **60** is provided with detent balls **61** and **62** spring urged at **63** into position so that they will drop into the detent recesses **64** provided in the under-surface of the shaft **40** at the desired locations aforesaid.

On the supporting case the detector arm and shoe construction of the mechanism **40** is mounted for a compound movement in order to position the detector arm at either side of the horizontal axis of the shaft **40**, in a horizontal or vertically inclined position.

The detector construction includes the arm **70** which is attached in a manner to be subsequently described to a hub **71** so that it may be moved into horizontal position or inclined at an angle. The hub construction **71**, as shown in Figures 3, 4, and 6 of the drawings, is flanged at its ends and provided with a passageway **72** therethrough, thru which a pivot pin **73** is disposed; the latter mounting the hub in the channel-shaped casing **74** which is pivoted at **75** upon a vertical axis on the top plate of the detector mounting casing **60** above described. The hub construction **71** has a radial extension arm or stub **78**, and it is upon the outer end of this that the arm **70** is pivoted at **79**, shown in Figure 6 of the drawings. Short springs **80**, under compression hold the arm **70** in balance upon the stub arm **78** of the hub; these springs **80** being located at each side of the shaft **79**, and permitting very limited tipping movement of the arm **70** upon the pivot pin **79** to account for slight irregularities in the surfacing of the web as it passes through the press.

The arm **70** at its outer end has a detector shoe **85** pivoted thereon at **86**. The pivoting movement of this shoe **85** is free, and it is provided with a convex surface which contacts the web B, as shown in Figure 2.

In order that the position of the arm **70** may be held horizontal or inclined, in any of the various positions shown in Figure 2, depending upon the position of web travel, one flange of the channel-shaped casing **74** supporting the hub of the arm is apertured at **87** and therein is disposed a detent ball **88** which operates in any of a series of depressions **89** centered in an arc about the axis of horizontal movement of the shaft, as is shown in Figure 5 of the drawings. A spring **90** is held in position by the bolt **73** against the ball **88** in order that it may be yieldably urged against the end face of the hub **71**, as will be obvious from Figure 4 of the drawings.

As above mentioned, the entire detent arm construction and casing **74** is mounted on the slide case **60** for movement about a vertical axis. This vertical axis is defined by the pivot pin **75** mounted on the top plate of the case **60** and extended through the base **95** of the casing **74**, as shown in Figure 4. Thus, the detent arm **70** may be swung on a vertical axis together with its case **74** to position the detector arm at either side of the shaft **40**. In order to hold the position of the detector arm at the desired side of the shaft **40** detent balls **97** are positioned in openings of the base **95** of the detector arm hub case **74** operating in depressions **100** formed in the top surface of the plate of the case **60**, as shown in Figure 6. A spring **101** held in position by the pin or bolt **75** urges the detents **97** into position. From this it is apparent that the detector arm construction is universally mounted and provided with detent means so that it may be swung to either side of the longitudinal axis of the shaft **40**; either in the full line position shown in Figure 2, or in the right hand dotted position, depending upon the horizontal travel of the web B.

Referring to the mercury switch and bearing construction **41**, the same is best detailed in Figures 1 and 8 to 11 of the drawings, and includes a box-shaped casing **110**, having a rear wall **111** which may be bolted at **112** to the frame **40** at one side of the press. This casing **110** has top, bottom, and side walls, and a detachable end plate **113** facing the shaft **40**.

The shaft **40** is supported by an anti-friction bearing **115** in the end wall **111** of the casing **110**, as is shown in Figure 7 of the drawings. This anti-friction bearing is supported in a hub **117** fixed on the inner surface of the wall **111**. Keyed on the shaft **40** is a pin supporting hub **120** which has a detachable pin **121** therein positioned in facing relation with the wall **111** for moving the mercury switch **130** into circuit making or breaking positions. A segmental movement limiting member **132** is supported at **133** upon the wall **111** of the switch case around the anti-friction hub **117** having the upper portion thereof removed so that the extension of the pin **121** may travel back and forth through a limited arc; the end of the pin **121** engaging against the ends of the segment **132** in order to limit the angular travel of the shaft **40**. When the pin **121** engages either end of the segment **132**, as shown in the full and dotted lines in Figure 9, the switch **130** will be in circuit breaking position. Of course, as shown in Figure 8, when the pin is uppermost midway between the end surfaces of the segment **132** the switch will be held in circuit making position.

The mercury switch includes a bulb **150** in which the mercury is contained. Contacts **151** and **152** are disposed in the bulb having wires **153** extending therefrom and leading through the switch casing and in circuit with the press operating motor. The bulb **150** is mounted in a channel-shaped casing **155**, for endwise removal; the casing **155** being pivoted at **156** on the housing **110**, so that movement of the pin **121** will throw the casing **155** upwardly or downwardly for making and breaking a circuit, as shown in the various positions indicated in Figures 8 and 9.

The bearing construction **42** at the opposite end of the shaft **40** includes a bearing hub **160** secured at **161** to the frame **30** of the machine and supporting an anti-friction bearing **163** for the shaft **40**, as shown in Figure 13.

A switch control member is provided for regulating the position of the shaft **40** and holding it in switch closing position, such as is necessary during re-threading of the press. This member comprises a circular plate or ring **170** pivoted on the hub extension of the bearing support **160**, and having an arcuate slot **171** therein struck

from the axis of the shaft 40 as a center. A bolt 172 attached in the shaft support 160 holds the member 170 in position; said bolt 172 extending into the slot 171. The plate 170 has transverse pins 175 thereon adapted to cooperate with a radial extending pin 176 on the shaft 40 holding and movement limiting the position of the shaft 40. A detent ball 177 is mounted on the shaft support 160, adapted to cooperate in any of a series of depressions 178, shown in Figure 16, provided on the outer face of the movement limiting member 179. A spring 180 urges the plate 170 into position so that the detent ball 177 will hold the position of the plate 170. The latter is provided with a radially extending handle 181.

In the position of the member 170 shown in Figure 12 the pin 176 may move between the two pins 175 of the member 170 when the detector arm is in the dotted position shown in Figure 2 for horizontal travel of the web. The position of Figure 12 shows the shaft 40 in placement for a closing of the circuit through the mercury switch, and the position in Figure 14 shows the shaft 40 in position for the opening of the mercury switch and the breaking of the circuit through the controlling motor of the press. Should the travel of the web be in the direction shown in Figure 2, with the detector arm in the full line position therein shown, the operator 170 through the handle 181 would move the member 170 a quarter turn to the left which would position the pins 175 properly.

When it is desired to re-thread the web in the press the mercury switch must be held with the circuit open. To that end the operator through the handle 181 throws the member 170 into the position shown in Figure 15, and through the pins 175 the position of the shaft pin 176 will be limited to a movement where the mercury switch is always open and the circuit through the motor broken.

An auxiliary switch control member 200, shown in Figures 8 and 9 is pivoted at 201 on the case 110 and may be moved to hold the switch 130 in closed position at all times independent of movement of the shaft 40.

Various changes in the shape, size, and arrangement of parts may be made to the form of invention shown and described, without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In a stop motion mechanism for printing presses and the like wherein a web of material is adapted to travel in opposite directions the combination of a detector finger, and means associated with the detector finger for control of movement of a web of material, and including a member having a given operating position, said member being movable in opposite directions from said given operating position toward spaced-apart non-operating positions, said detector finger being reversible so as to co-act with said web of material when the same is moving in either direction and normally holding said member in its operating position, whereby upon the occurrence of a defect in said web, said member will be moved to one or the other of said non-operating positions dependent on the setting of said reversible finger.

2. In a printing press adapted to support a web of paper for travel in opposite directions, a movable detector finger, means associated with the detector finger for controlling movement of the web, and including a member having a given operating position, said member being movable in opposite directions from said given operating position toward spaced-apart non-operating positions, said detector finger being reversible so as to co-act with said web of material when the same is moving in either direction and normally holding said member in its operating position, whereby upon the occurrence of a defect in said web, said member will be moved to one or the other of said non-operating positions dependent on the setting of said reversible finger, and means limiting movement of said member between said given operating position and a selected one of said non-operating positions to correspond with the setting of said reversible finger.

3. In a stop motion mechanism for printing presses wherein a web of paper is adapted to travel thru the press in any of a plurality of different positions and directions and wherein the web may comprise a plurality of printed sheets transversely across the web with defined margins therebetween, a detector member, means associated with the detector member for stopping the movement of the web upon break of the web, universal joint means mounting the detector member for movement to any of a plurality of positions in accordance with the position of travel and direction of travel of the web, and detent means associated with said universal joint means for holding the detector member in a selected position.

4. In a stop motion mechanism for printing presses wherein a web of paper is adapted to travel thru the press in any of a plurality of different positions and directions and wherein the web may comprise a plurality of printed sheets transversely across the web with defined margins therebetween, a detector member, means associated with the detector member for stopping the movement of the web upon break of the web, universal joint means mounting the detector member for movement to any of a plurality of positions in accordance with the position of travel and direction of travel of the web, means mounting the detector member for bodily movement transversely of the web to any of a plurality of margins between adjacent pages printed on the web, and detent means associated with said universal joint means and said means mounting the detector member for bodily movement, for holding the detector member in a selected position.

5. In a stop motion mechanism for printing presses wherein a web is adapted to travel in one direction or the other longitudinally thereof and which web may comprise a plurality of different sections transversely thereacross, a detector member, a circuit controlled by the detector member, universal joint means mounting said detector member for movement to any of a plurality of positions in accordance with the direction of travel of the web, means mounting the detector member for bodily movement transversely across the web to position it in accordance with the number and relation of the sections printed on the web, and releasable detent means associated with each of said mounting means for holding the detector member in a selected position.

6. In a detector construction for stop motion mechanism the combination of a support, a detector arm, a hub pivoted on said support, releasable detent means fixing said hub in pivotally

adjusted relation to said support, means connecting the arm upon said hub for limited movement thereon and compensating spring means acting between the arm and hub to normally position the arm between the limits of said movement and tending to neutralize the effects of irregularities in the web of the machine with which the stop motion mechanism is associated.

7. In a detector mechanism for stop motion mechanism the combination of a tiltable supporting shaft, a support slidable along the shaft, a member pivoted on said support on an axis transverse to the axis of the shaft, detent means associated with said member and said support, a detector arm pivoted upon said member on an axis transverse to the pivot axis of said member, and detent means associated with said arm and said member.

8. In a stop motion mechanism for detecting breaks and ruptures in a web of material the combination of a detector member, universal joint means mounting the detector member for movement to any of a plurality of different positions in accordance with the direction and angular travel of the web, detent means associated with the universal joint means for holding the detector member in a selected position, and means mounting said universal joint means for bodily movement transversely of the web.

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