May 10, 1949. C. E. PHILLIMORE 2,469,608

DEVICE FOR INSPECTING FEED PERFORATED STRIPS

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Fig. 1

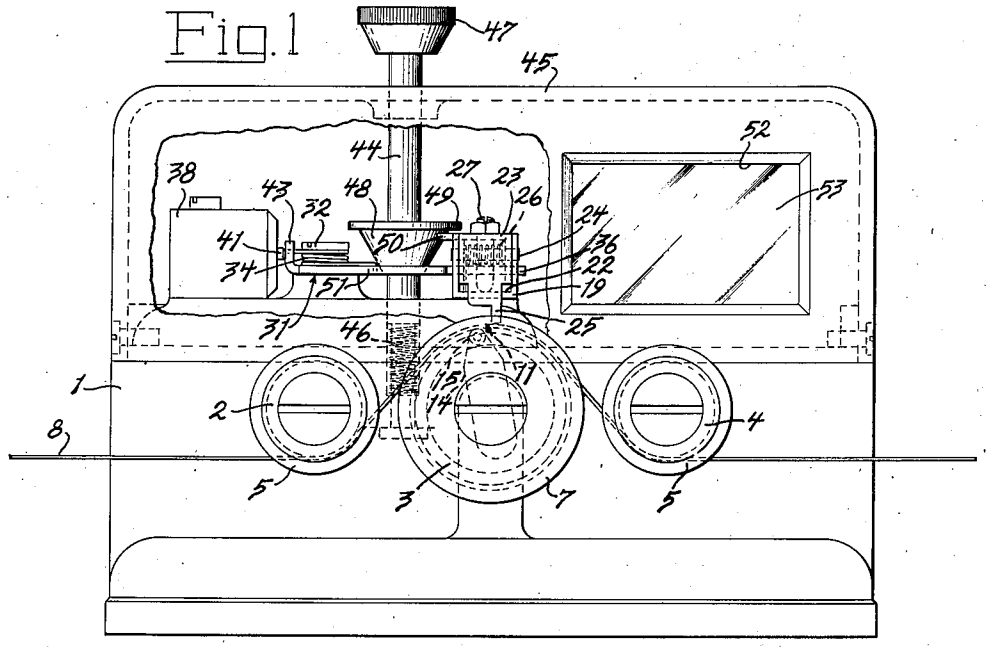
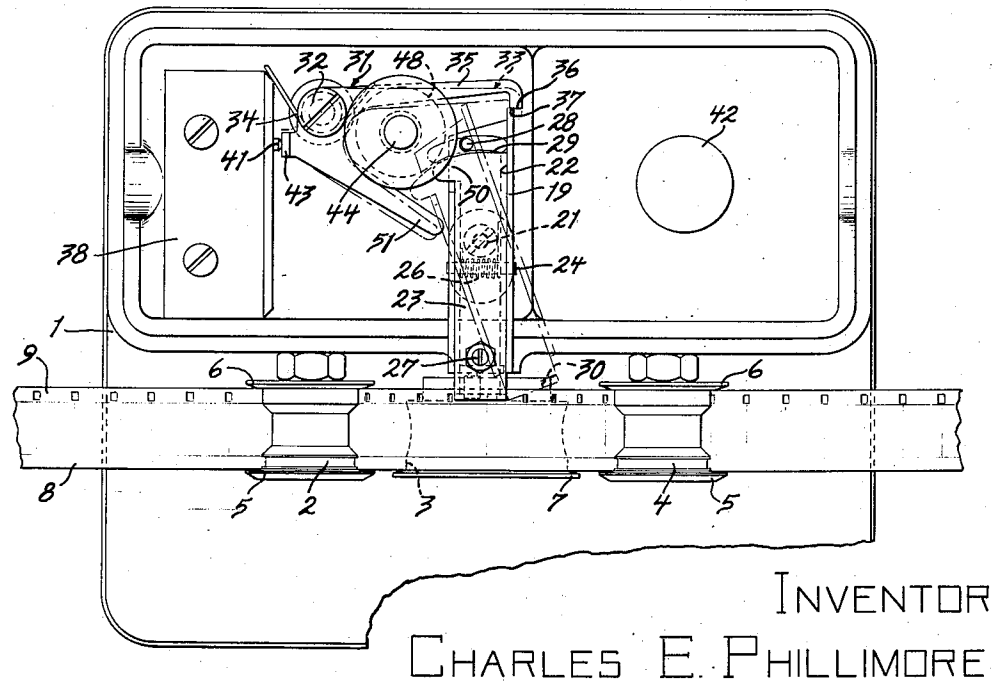


Fig. 2



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Fig. 3

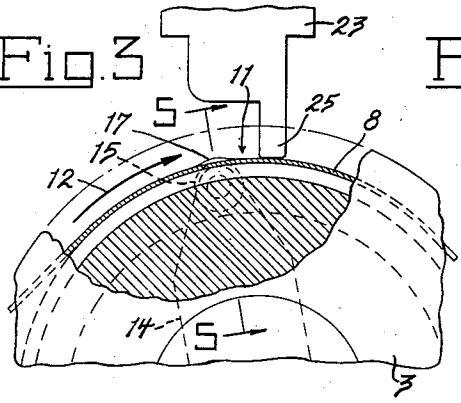


Fig. 4

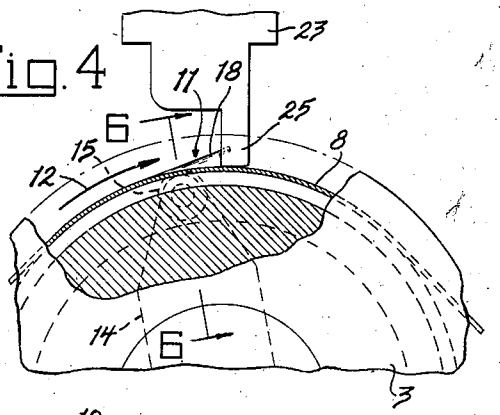


Fig. 5

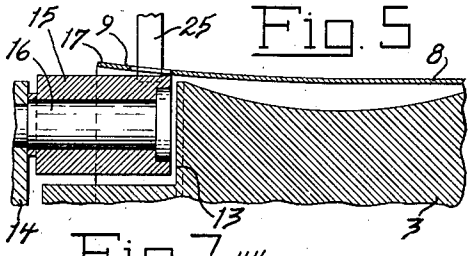


Fig. 6

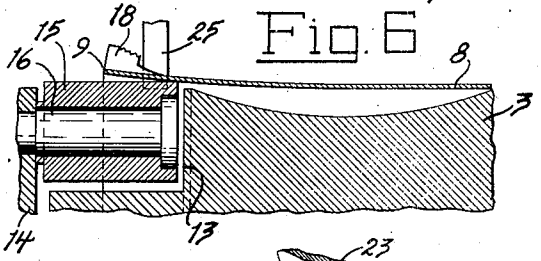


Fig. 7

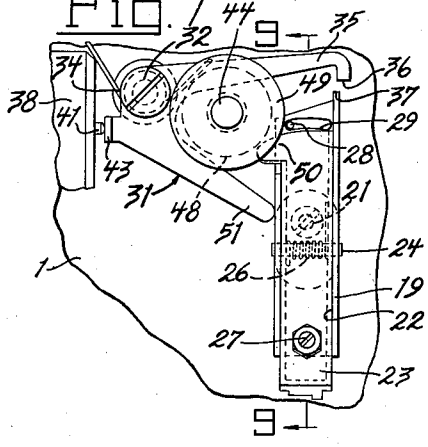


Fig. 8

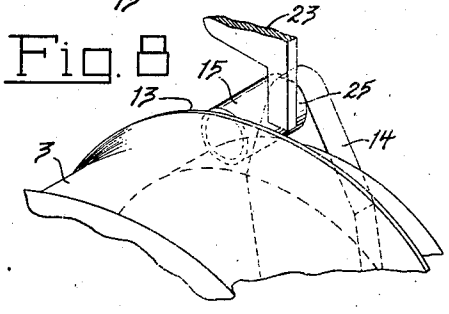


Fig. 9

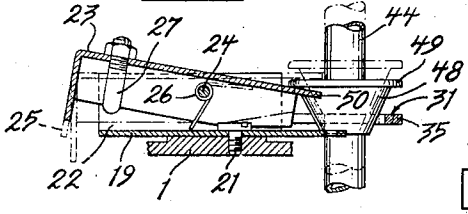
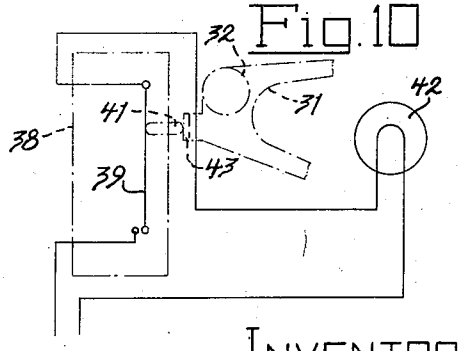


Fig. 10



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DEVICE FOR INSPECTING FEED PERFORATED STRIPS

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Application July 29, 1946, Serial No. 686,967

4 Claims. (Cl. 73—157)

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My invention relates particularly to a device for inspecting feed perforated motion picture film to detect damaged feed perforation portions thereof.

Objects of the invention reside in the provision of a novel and desirable device for expeditiously detecting damaged feed perforation portions of feed perforated strips as they are fed through the device, which is reliable in detecting such damaged portions, which is convenient in use, which is not liable to cause damage to the strips as they are being inspected, which provides adequate indication of the detection of such damaged portions, and which is conveniently reset after a damaged portion has been detected and indicated preparatory to a subsequent detecting and indicating operation, all with a view toward facilitating the inspection and repair of the strips.

The invention will be better understood by reference to the accompanying drawing forming a part hereof and in which—

Figure 1 is view in front elevation of a motion picture film inspecting device embodying my invention and having a portion of the enclosing casing thereof broken away;

Figure 2 is a top plan view of the same with the closure and the push rod knob thereof, hereinafter described, removed;

Figures 3 and 4 are enlarged partial views in front elevation and partially in section and respectively showing an undamaged portion of a motion picture film passing the detecting station of the device and a damaged feed perforation portion of the film passing the detecting station;

Figures 5 and 6 are partial sectional views respectively taken substantially on the line 5—5 of Figure 3 and the line 6—6 of Figure 4;

Figure 7 is a partial top plan view showing parts in different positions than those in which they are shown in Figure 2;

Figure 8 is a partial perspective view of the detecting station region of the device;

Figure 9 is a partial sectional view taken substantially on the line 9—9 of Figure 7; and

Figure 10 is a diagrammatic view illustrating the electrical circuit connections of the device.

Referring to the drawing, a base is designated at 1, see Figures 1 and 2, and three guide rollers 2, 3 and 4 are rotatably mounted in a suitable manner on the base and are disposed forwardly of the front face of the main portion of the base in horizontally spaced parallel relation. The end rollers 2 and 4 are provided with front guide flanges 5 and with rear guide flanges 6, and the

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middle roller 3, which is of a larger diameter than the rollers 2 and 4, is provided with a front guide flange 7. A marginally feed perforated motion picture film strip 8 is trained under the rollers 2 and 4 between the guide flanges 5 and 6 and over the roller 3 at the rear of the guide flange 7 with the marginal feed perforated portion 9 of the film at the rear, and the film, as it is fed longitudinally, is thus guided past a detecting station at the top of the roller 3 and indicated at 11 in Figures 1, 3 and 4. In the operation of the device, the film is fed in the direction of the arrow 12 in Figures 3 and 4 and is preferably drawn from a feed reel not shown at the left of the roller 2 and is taken up on a take up reel not shown at the right of the roller 4, the take up reel being rotated to feed the film.

The film 8, being trained about the roller 3 at the detecting station 11, is guided in a curved path past the detecting station, and the marginal feed perforated portion 9 of the film overhangs the rear end 13 of the roller 3, see Figures 5 and 6. An arm 14 is secured with the base at the rear of the roller 3 and, extending radially of this roller, has a deflecting roller 15 rotatably mounted, as designated at 16, on the upper end thereof. The roller 15 is disposed slightly in advance of the detecting station 11 with reference to the direction of feed of the film and projects a slight distance outwardly beyond the periphery of the roller 3 and engages the internal curved face of the film outwardly beyond the rear end 13 of the roller 3 and thus effects a slight bulge, as designated at 17 in Figures 3 and 5, in the feed perforated portion 9 of the film outwardly from the periphery of this roller and slightly in advance of the detecting station with reference to the direction of feed of the film. As a result of effecting this bulge, the roller 15 deflects a damaged feed perforation portion, designated at 18 in Figures 4 and 6 and such as results from the feed perforated portion 9 being torn transversely, outwardly of the external curved face of the strip as the damaged portion passes the detecting station 11.

A carrier member 19 is mounted on the base 1, as designated at 21, for pivotal movement longitudinally and laterally of the film 8 on an axis disposed laterally of the detecting station 11 outwardly beyond the rearward edge of the film which overhangs the rear end of the roller 3. The carrier member is provided with a channel formation 22 extending diametrically of its pivotal axis, and a detecting member 23 extends longitudinally within this channel formation and

is thus fixed with the carrier member angularly of the pivotal axis thereof and is mounted intermediately thereof on the carrier member as designated at 24, for pivotal movement facewise of the film 8. The forward end of the detecting member is provided with a downwardly projecting detecting finger 25 which is arranged in overlying relation with the external curved face of the film at the roller 3. As the detecting member is so mounted, the detecting member and its finger are mounted, by reason of the pivotal mounting 21 of the carrier member 19, for pivotal movement longitudinally and laterally of the film and are also mounted, by reason of the pivotal mounting 24 of the detecting member on the carrier member, for pivotal movement facewise of the film for purposes hereinafter appearing. The detecting member and its finger are normally positioned facewise of the film with the finger in closely adjacent overlying relation with the external curved face of the film at the roller 3 by means of a torsion spring 26 associated with the pivotal mounting 24 and operative between the carrier and detecting members to yieldably urge the detecting member and its finger toward the film and an adjustable stop 27 operative between the carrier and detecting members to limit movement of the detecting member and its finger toward the film.

In its pivotal movement with the carrier member 19 longitudinally and laterally of the film, the detecting member 23 and its detecting finger 25 are movable from a normal or non-detecting position in which the detecting finger is disposed at the beginning of the detecting station 11 as respects the direction of feed of the film, as shown in Figures 1 to 7 inclusive, to a detecting position in which the detecting finger is disposed at the end of the detecting station as respects the direction of feed of the film as shown in dot and dash lines in Figure 2, a stop pin 28, mounted on the base 1 and extending into an arcuate slot 29 of the carrier member, serving to limit movement of the carrier and detecting members longitudinally and laterally of the film by engagement with the ends of this slot.

When the detecting member is in its normal position, the detecting finger 25 overlies the feed perforated portion 9 of the film, and when, as the film is fed in the direction of the arrow 12 of Figures 3 and 4, a damaged feed perforation portion 18 of the film passes the detecting station 11, it is deflected by the deflecting roller 15 and engages against the detecting finger 25 and thereby moves the detecting and carrier members into detecting position so that the damaged portion of the film is conveniently detected and located, the feed of the film being thereupon stopped, the damaged portion being cut out of the film, and the film spliced, whereupon the detecting and carrier members are moved back to normal position and inspection of the film is resumed. By reason of the detecting member being movable laterally of the film as well as longitudinally thereof, the detecting finger 25 is moved out of the path of the film and consequently out of engagement with a damaged feed perforation portion 18 of the film as it is moved into detecting position, as indicated at 30 in Figure 2, so that continued movement of the film after a damaged portion thereof is detected does not cause further damage to the film.

The detecting operation is effected while the detecting member 23 is positioned facewise of the film with the detecting finger 25 in closely adjacent overlying relation with the film, which position is normally maintained by the cooperation of the spring 26 and stop 27, as heretofore described. However, while the detecting member is moved from its detecting position to its normal position preparatory to a subsequent detecting operation, the detecting member and its detecting finger are moved on the pivotal mounting 24, facewise and away from the film out of engaging relation with a damaged portion 18 of the film, see Figure 9, so that in case a damaged portion is at the detecting station 11, the detecting member may be moved to normal position without interference or causing further damage to the film.

A bell crank 31 forms an indicating member and is pivotally mounted at its apex on the base 1, as indicated at 32, on an axis parallel to the axis of the pivotal mounting 21 of the carrier member, which latter axis is the axis on which the detecting member is mounted for pivotal movement with the carrier member longitudinally and laterally of the film. See Figures 1, 2 and 7. The bell crank 31 is thus mounted for pivotal movement from a normal position as shown in full lines in Figure 2 to an indicating position as shown in dot and dash lines and indicated at 33 in this figure. A torsion spring 34, associated with the pivotal mounting 32, yieldably urges the bell crank into indicating position.

One arm 35 of the bell crank 31 is provided at its free end with a forwardly facing abutment 36, and the rear end of the carrier member 19 is provided with a rearwardly facing abutment 37, and these abutments, respectively on the carrier and bell crank, are movable therewith in respect to transversely disposed paths and are opposedly engageable when the detecting member is in its normal position, as shown in Figure 2, to retain the bell crank in its normal position against the influence of the spring 34, and are disengageable with movement of the detecting member to detecting position to permit movement of the bell crank into indicating position under the influence of the spring 34 and thus indicate the detection of a damaged portion 18 of the film.

A suitable electric switch, preferably of the snap action type and generally designated at 38, see Figures 1, 2 and 10, is secured on the base 1. The contact arm 39 of this switch is yieldably urged in a usual manner into open circuit position as shown in Figure 10, and the switch is provided with a push plunger 41 by means of which the contact arm may be actuated into closed circuit position. An electric indicating lamp 42 is mounted on the base 1, and this lamp, the switch 38 and a source of electricity not shown are connected in series as indicated in Figure 10 so that the lamp is energized and de-energized respectively with closing and opening of the switch. A lug 43 on the bell crank 31 is engageable against the push plunger 41 to close the switch 38 when the bell crank is moved to indicating position and permits the switch to open under the yieldable urge on the contact arm 39 when the bell crank is in normal position, so that energization of the lamp indicates the detection of a damaged portion 18 of the film.

The normal positions of the detecting and carrier members 23 and 19 and the indicating member or bell crank 31 are shown in full lines in Figure 2, in which positions the abutments 36 and 37 are engaged to maintain the bell crank in

normal position in which the lamp 42 is deenergized. When a damaged portion 18 of the fed film engages the detecting finger 25, the detecting and carrier members are moved to detecting position and the abutments 36 and 37 are disengaged which results in the bell crank benig moved to indicating position and in the lamp being energized, as shown in dot and dash lines in Figure 2.

In order that the detecting and carrier members and the bell crank may be conveniently reset in their normal positions with the indicating lamp deenergized preparatory to a subsequent detecting and indicating operation, a resetting means is provided which will now be described. See Figures 1, 2, 7 and 9.

A vertically disposed push rod 44 is mounted for longitudinal movement parallel to the pivotal axes of the carrier member 19 and the bell crank 31 and is so mounted on the base 1 and a closure 45 detachably mounted on the base and enclosing the major portion of the detecting and indicating mechanism, the switch 38 and the indicating lamp 42. The push rod is yieldably urged upwardly into a normal upper position by a spring 46, and extending above the closure, the push rod is provided at its upper end with a knob 47 by means of which it may be manually pushed downwardly. A cam 48 in the form of a frustum is secured on the push rod in coaxial relation therewith and has its large end disposed upwardly and overlies the arm 35 of the bell crank for engagement with this arm to move the bell crank from indicating position into and slightly beyond its normal position, as shown in Figure 7, when the push rod is pushed downwardly. The cam 48 is provided at its large or upper end with a circumferential abutment flange 49 which overlies the rearward end 50 of the detecting member 23 for engagement therewith to move the detecting member and its detecting finger 25 on the pivotal mounting 24 and facewise and away from the film out of engaging relation with a damaged portion 18 of the film when the push rod is pushed downwardly, as shown in Figure 9. The other arm 51 of the bell crank 31 is engageable against a side of the carrier member 19 to move the carrier member and the detecting member 23 from detecting position into normal position with movement of the bell crank into and slightly beyond its normal position as shown in Figure 7, and release of the push rod and resulting movement thereof into its upper position under the influence of the spring 46, releases the bell crank for engagement of the abutments 36 and 37 and releases the detecting member and the detecting finger 25 for movement facewise and toward the film into engaging relation with a damaged portion 18 of the film, so that the detecting and indicating mechanism is reset preparatory to a subsequent detecting and indicating operation.

It will be observed that the resetting means just described is operative to concurrently actuate the detecting and indicating members from their detecting and indicating positions to their normal abutment engaged positions preparatory to a subsequent detecting and indicating operation and comprises means operative to position the detecting member and its detecting finger out of engaging relation with a damaged portion of the film during actuation thereof to normal position.

The indicating lamp 42, being desirably enclosed within the closure 45, the closure is provided with a front opening 52 having a transparent member 53 extending thereacross, as shown in Figure 1, so that light from the lamp may be observed.

While I have thus described my invention, I do not wish to be limited to the precise details described, as changes may be readily made without departing from the spirit of my invention, but having thus described my invention, I claim as new and desire to secure by Letters Patent the following:

1. In a device of the character described, the combination with guide means for longitudinally guiding a marginally feed perforated strip comprising a guide roller about which said strip is trained for guiding said strip in a curved path past a detecting station with the feed perforated portion of said strip overhanging an end of said roller, of a deflecting member engageable with the internal curved face of said strip outwardly beyond said roller end and operative to deflect a damaged feed perforation portion of said strip outwardly of the external curved face of said strip as said damaged portion passes said detecting station, and a detecting member arranged in overlying relation with the external curved face of said strip and engageable with said damaged portion as said damaged portion passes said detecting station and mounted for movement longitudinally of said strip responsive to said engagement to detect said damaged portion.

2. In a device of the character described, the combination with guide means for longitudinally guiding a marginally feed perforated strip comprising a guide roller about which said strip is trained for guiding said strip in a curved path past a detecting station with the feed perforated portion of said strip overhanging an end of said roller, of a deflecting member engageable with the internal curved face of said strip outwardly beyond said roller end and operative to deflect a damaged feed perforation portion of said strip outwardly of the external curved face of said strip as said damaged portion passes said detecting station, and a detecting member arranged in overlying relation with the external curved face of said strip and engageable with said damaged portion as said damaged portion passes said detecting station and mounted for pivotal movement longitudinally and laterally of said strip responsive to said engagement to detect said damaged portion and to disengage therefrom on an axis disposed laterally of said detecting station outwardly beyond the edge of said strip which overhangs said roller end and also mounted for movement facewise of said strip into and out of engaging relation with said damaged portion.

3. In a device of the character described, the combination with guide means for longitudinally guiding a feed perforated strip past a detecting station, of a deflecting member operative to deflect a damaged feed perforation portion of said strip facewise thereof as said damaged portion passes said detecting station, a detecting member engageable with said damaged portion as said damaged portion passes said detecting station and mounted for pivotal movement longitudinally and laterally of said strip responsive to said engagement from a normal position to a detecting position and to disengage from said damaged portion on an axis disposed laterally of said detecting station outwardly beyond an edge of said strip, an indicating member mounted for pivotal movement from a normal position to an indicating position on an axis parallel to said detecting member axis and yieldably urged into indicating position, abutments respectively associated with

said detecting and indicating members and movable therewith in respect to transversely disposed paths and opposedly engageable when said detecting member is in its normal position to retain said indicating member in its normal position and disengageable with movement of said detecting member to detecting position, and resetting means operative between said detecting and indicating members to actuate said detecting member from its detecting position to its normal position with actuation of said indicating member from its indicating position to its normal position and to effect engagement of said abutments preparatory to a subsequent detecting and indicating operation.

4. In a device of the character described, the combination with guide means for longitudinally guiding a feed perforated strip past a detecting station, of a deflecting member operative to deflect a damaged feed perforation portion of said strip facewise thereof as said damaged portion passes said deflecting station, a carrier member mounted for pivotal movement longitudinally and laterally of said strip on an axis disposed laterally of said detecting station outwardly beyond an edge of said strip, a detecting member engageable with said damaged portion as said damaged portion passes said detecting station and mounted on said carrier member in fixed relation therewith angularly of said axis for pivotal movement therewith longitudinally and laterally of said strip responsive to said engagement from a normal position to a detecting position and to disengage from said damaged portion and also mounted on said carrier member for movement relative thereto facewise of said strip into and out of engaging relation with said damaged portion and yieldably urged into said engaging relation, an indicating member mounted for pivotal

movement from a normal position to an indicating position on an axis parallel to said carrier and detecting member axis and yieldably urged into indicating position, abutments respectively on said carrier and indicating members and movable therewith in respect to transversely disposed paths and opposedly engageable when said detecting member is in its normal position to retain said indicating member in its normal position and disengageable with movement of said detecting member to detecting position, and resetting means operative to concurrently actuate said detecting and indicating members from their detecting and indicating positions to their normal abutment engaged positions preparatory to a subsequent detecting and indicating operation and comprising a cam mounted for reciprocation parallel to said axes and operative to actuate said indicating member to its normal position with actuation of said cam in one direction, an arm on said indicating member and operative to actuate said detecting member into its normal position with actuation of said indicating member into its normal position, and an abutment fixed with said cam for reciprocation therewith and operative to position said detecting member out of said engaging relation during actuation theerof to its normal position.

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