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PIN-HOLE DETECTOR WITH AIR NOZZLES FOR CLEANING SCANNER WINDOW

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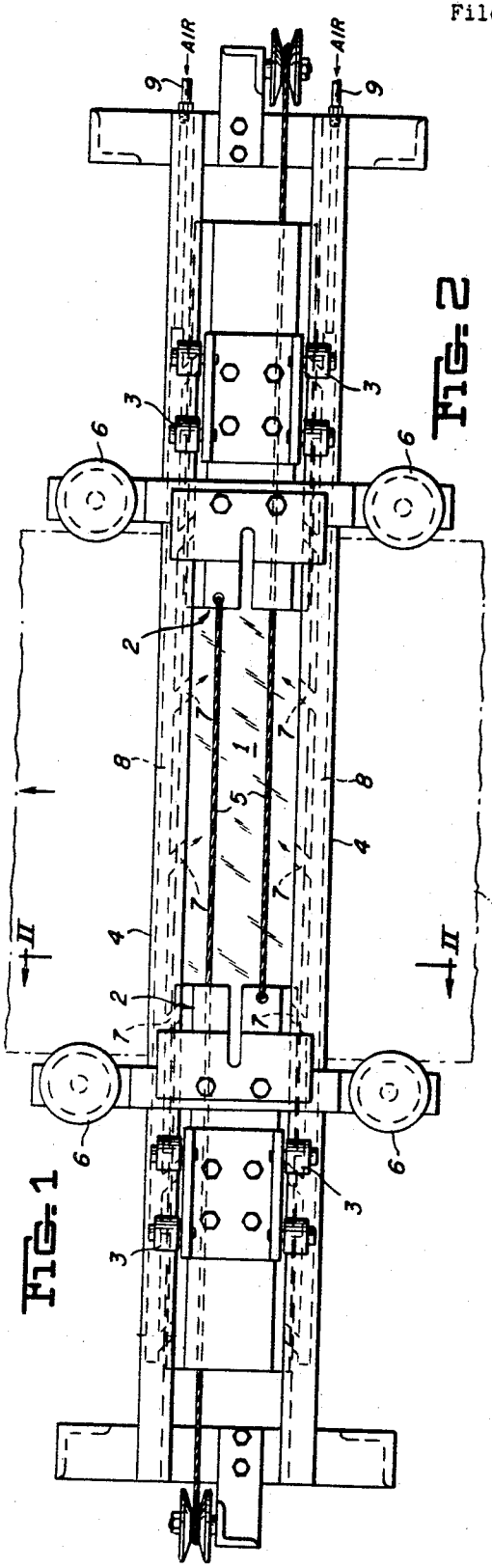

FIG. 1

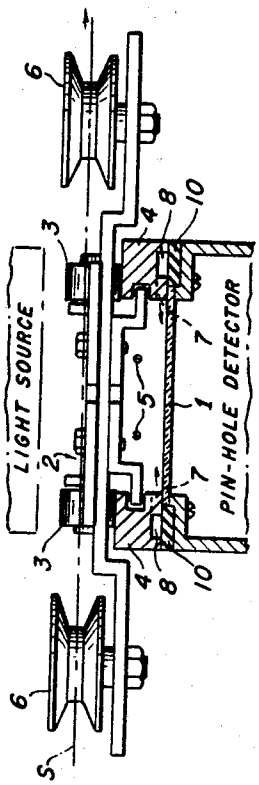

FIG. 2

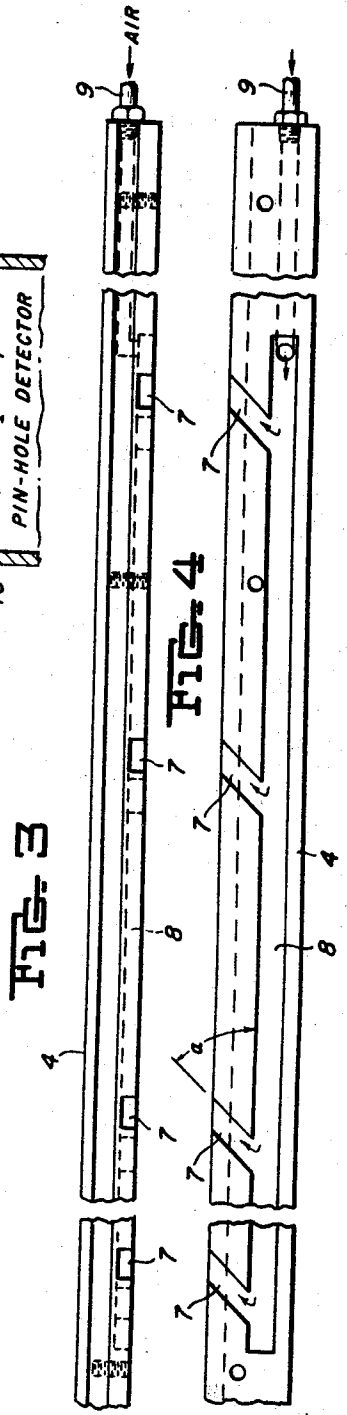

FIG. 3

FIG. 4

INVENTOR
PHILIP C. DOOLITTLE
By Donald G. Dalton
Attorney

United States Patent Office

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PIN-HOLE DETECTOR WITH AIR NOZZLES FOR CLEANING SCANNER WINDOW

Philip C. Doolittle, Valparaiso, Ind., assignor to United States Steel Corporation, a corporation of Delaware

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This invention relates, in general, to pin-hole detectors and more particularly to a pneumatic method for preventing dirt from accumulating on the scanner window of the detecting apparatus. The scanner window is interposed between the path of the material under observation and the light responsive means.

In the production of sheet metal products such as black plate, tin plate, galvanized strip and the like, it is necessary to inspect the sheets or strip for defects such as pin holes. Detectors for this purpose utilize phototubes for detecting light that passes through a pin hole. It is apparent that if such devices are to operate satisfactorily it is necessary that the scanner window be kept clean. Since detectors are generally used in mills where dust, dirt, scale and the like are present, the problem of keeping the scanner window clean is a very serious one.

It is therefore an object of the present invention to overcome the difficulties of previously known methods or apparatus by providing, in combination with the shutter guide rails of a conventional detector, a path to be traversed by forced air to produce the cleaning operation of the scanner window in a continuous manner.

Relevant apparatus is shown in Camp Patent No. 2,932,747 dated Apr. 12, 1960, Chamberlin Patent No. 2,229,638, dated Jan. 28, 1941, and Hags Patent No. 2,395,181, dated Feb. 19, 1946.

The Camp patent stresses the need for cleanliness in the scanner window, and offers one approach to the cleaning problem. The Chamberlin and Hags patents are additionally illustrative of the art to which the invention appertains.

In general, the photosensitive elements are protected from extraneous light by blinder-like light shielding elements. Those protecting the strip edges are generally arranged on pairs of parallel track-like guide elements, disposed transversely to the path of the strip material being inspected. The blinders are between the strip and the scanner window, and the tracks on which the blinders are adjustably mounted are in immediate proximity to the edges of the scanner window. FIGURE 3, for example, of the Hags patent is illustrative of one arrangement to which the present invention is applied, wherein an automatic adjustment to compensate for varying strip width is provided. However, the invention is applicable to track constructions without this automatic feature.

The nature of the invention will become more apparent by referral to the drawing and accompanying description.

FIGURE 1 is a plan view of the scanner window and rail-riding blinder;

FIGURE 2 is a cross section taken along the line II—II of FIGURE 1;

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FIGURE 3 is a fragmentary side elevational view of one of the rails; and

FIGURE 4 is a bottom view of the rail shown in FIGURE 3.

Elements closely related to a detailed understanding of the invention are identified by numbers on the drawing.

The scanner window 1 is the member of the pin-hole detector it is desired to keep clean.

The blinders 2, having rollers 3, are supported and guided by tracks 4. The blinders are urged into proximity to the edge of the strip being inspected by cords 5 which are attached to counterweights, not shown. The direction of strip S travel is indicated by an arrow in FIGURE 1. Guide wheels 6 preclude excessive sidewise movement of the strip.

The invention is characterized by the provision of diagonally disposed air nozzles 7, arranged in a herringbone pattern in the tracks. These nozzles are adapted to blow inwardly from the tracks, across the face of the scanner window. The nozzles are fed by longitudinal header lines 8 which receive compressed air through ports 9.

The header lines and nozzles are conveniently fabricated by forming grooves in the undersides of the rails, and providing sealing strips 10 to complete gas-tight flow lines.

In an application of the invention to a pin-hole detector having a track separation of abotu 4 inches, nozzles were spaced at intervals approximating the distance between the tracks. The nozzles were about 3/8 inch wide and 1/4 inch deep, and were directed at an angle *a* of about 45°. Sixty p.s.i. air was fed to the headers.

The foregoing description provides a specific example to facilitate ready practice of the invention, but it is not intended to preclude such modifications as will be apparent to one skilled in the art to which the invention appertains.

I claim:

1. A pin-hole detector with air nozzles for cleaning the scanner window thereof, said detector being provided with guide rails for adjustable blinders, said rails having incorporated therein air nozzles adapted to direct a forceful flow of air across the surface of said scanner window.

2. The device of claim 1 in which the nozzles are situated in a diagonal direction, relative to the tracks, whereby a herringbone flow pattern is produced.

3. The device of claim 2 in which the nozzles are grooves on the underside of the rails, which grooves are covered, except at the outlet, by sealing strips.

References Cited

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JAMES W. LAWRENCE, *Primary Examiner.*

V. LAFRANCHI, *Assistant Examiner.*