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1,978,589

WEB DETECTOR FOR PRINTING PRESSES

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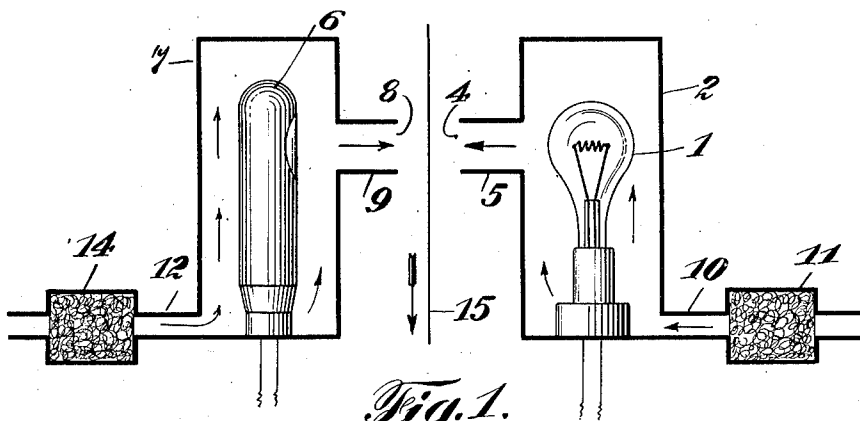


Fig. 1.

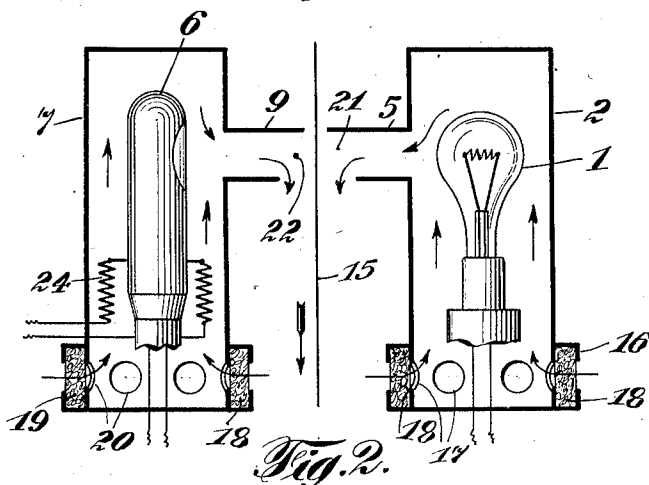


Fig. 2.

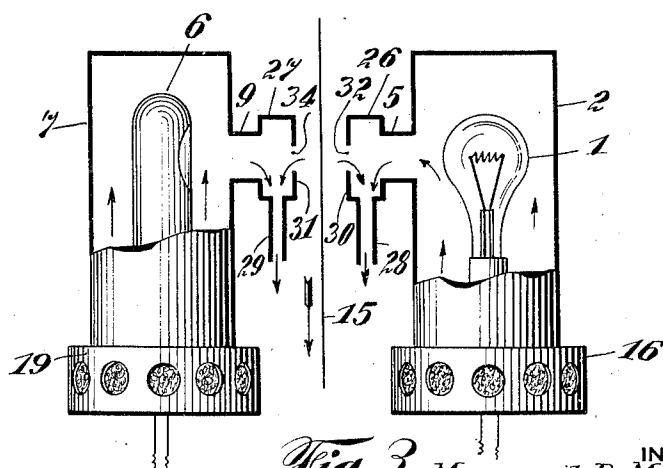


Fig. 3. INVENTOR-
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WEB DETECTOR FOR PRINTING PRESSES

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1 Claim. (Cl. 250—41.5)

The present invention relates broadly to photo-electric devices and more especially to an improved operating device and method for the utilization of photo-electric cells.

One of the uses of photo-electric cells is in the printing art, more especially with high speed printing presses of the type used by newspapers. In connection with a high speed newspaper press, the web of paper through the press occasionally breaks and it becomes important to cut the web adjacent the printing cylinder immediately after the break to obviate the possibility of the web wrapping around the cylinder and causing injury to the press or otherwise. Photo-electric cells have been proposed for the purpose of detecting a break in the web. In practical use, it has been found, however, that a serious difficulty is encountered in that around a high speed press there is always a fine mist of printers' ink as well as paper dust created by the use of the paper in the plant. This fine mist of ink settles both on the exciting lamps and on the photo-electric cells and in a short time greatly impairs the efficient operation of the detecting mechanism and may reduce the efficiency of the operation to such a point that it ceases to properly function. This liability is so great that photo-electric devices heretofore proposed for this purpose have been discarded as unreliable. A safety device of this kind must be fully capable of operating at all times and an unreliable safety device is worse than none at all.

While a newspaper high speed printing press has been referred to as one of the problems to which the present invention is directed, it is to be understood that the invention is applicable to any situation wherein the exciting lamp or the photo-electric cell is liable to be contaminated by fluid borne particles.

The present invention overcomes the difficulties heretofore encountered by protecting the exciting light or lamp and the photo-electric cell from contact with contaminated air or fluids. The preferred device comprises enclosing the exciting lamp and the photo-electric cell in closed housings through which uncontaminated air or fluid is circulated in such manner that a draft of air through the housings prevents the entrance of the contaminated air carrying the deleterious particles.

The present invention may be carried out in various ways, the preferred form being a construction wherein filtered air is forced into the housings in such manner as to exit through the light path tubes and thereby prevent entrance

of particles into the tubes. The same results may be obtained by utilization of suction adjacent the ends of the light passage tubes or by natural draft through the tubes due to thermal or other conditions established within the tube.

It is realized that the present invention may be embodied and practiced by utilization of structures other than those herewith specifically disclosed, and, therefore, the present disclosure is to be understood as illustrative and not in the limiting sense.

Fig. 1 is a diagrammatic view of a preferred form of the invention wherein compressed air is formed through the apparatus.

Fig. 2 illustrates diagrammatically another form of the invention in which the movement of a high speed sheet of material causes suction of air through the device. Fig. 2 also illustrates a thermal arrangement for causing air movement in the device.

Fig. 3 diagrammatically illustrates a suction arrangement causing the movement of air through the apparatus.

Referring to the drawing and more especially to Fig. 1, the exciting lamp 1 is enclosed in a housing 2 which is sealed with the exception of the open end 4 of the light tube 5. The photo-electric cell 6 is also enclosed in a similar housing 7 which is likewise sealed with the exception of the open end 8 of the light tube 9. A conduit 10 leads from an air filter 11 into the housing 2, and a similar conduit 12 leads from an air filter 14 into the housing 7. Compressed air is forced through the air filters 11 and 14 and into the housings 2 and 7 in such manner that pure filtered air issues from the light tube 5 and the light tube 9. A web of fast moving material, for example, a paper web 15, runs between the light tubes 5 and 9. By this arrangement, an exciting lamp 1 and the photo-electric cell 6 are thoroughly protected from contamination in the air in which these members are mounted so that when the web 15 breaks, the full light from the exciting lamp 1 falls upon the clear surface of the photo-electric cell 6 and immediate response through the photo-electric cell occurs.

Fig. 2 is similar, in a general way, to the disclosure in Fig. 1 with the exception that an air filter 16 is provided around the base of the housing 2 for the exciting lamp, which base is provided with openings 17 through which filtered air may enter the housing. The air filter material may be simple in form and may comprise a mass 18 of cotton wool, or other material capable of removing the deleterious particles from

the surrounding air. A similar air filter 19 is provided around the base of the housing 7 which is likewise provided with air openings 20 so that filtered air may enter the housing 7 around the photo-electric cell 6. In this construction, preferably, the light tubes 5 and 9 extend close to the fast moving web 15 and the ends of the light tubes 5 and 9 are bevelled at 21 and 22 respectively. The fast moving web 15 carries with it a certain volume of surface air which causes a suction to occur past the bevelled ends 21 and 22 of the light tubes. This tends to draw air from the interior of the housings 2 and 7. The movement of air through the housings 2 and 7 is further facilitated by thermal action. The exciting lamp 1, preferably, an ordinary incandescent lamp, heats the air in the housing 2 and the heated air rising in the housing tends to draw in cold air through the air filter 16. The photo-electric cell, in its operation, does not produce sufficient heat to cause the thermal air circulation in the housing 7, therefore, the thermal action may be obtained by providing a heating coil 24 which is located within the housing and heats the air therein so that the heated air rises and cool air comes through the air filter 19 to replace the heated air which has moved upward.

Fig. 3 illustrates a device similar in construction to that shown in Fig. 2 with the exception that the bevelled ends of the light tubes are replaced by suction chambers 26 and 27 to which suction conduits 28 and 29 are attached. Preferably, the outer walls 30 and 31 of the suction chambers are provided with openings 32 and 34 which are of considerably less area than the cross-sectional area of the light tubes 5 and 9 so that

the major movement of air through the suction chamber comes from the light tube and this air has been filtered through the filters 16 and 19 provided at the base of the housing. The small percentage of contaminated air drawn in through the openings 32 and 34 is immediately drawn out through the suction conduits 28 and 29 and does not pass within the housings 2 and 7.

From the foregoing, it will be observed that the present invention provides a simple arrangement for preventing contaminated air coming in contact with the operative elements of a photo-electric safety system and permits the utilization of such a system under conditions which ordinarily would be prohibitive.

What I claim is:

A safety device for high speed printing presses consisting of a paper web detector comprising a photo-electric unit, an exciter unit in the form of an electric lamp for activating said photo-electric unit, said units being arranged in opposed relation on opposite sides of a paper web threaded through the printing press, housings for said units to enclose the same against contaminated atmosphere surrounding said units, opposed open conduits leading into said housings to provide a passageway for a beam of rays of light from said lamp to said photo-electric unit when the paper between said units is broken, and means to lead compressed air into said housings to cause a flow of uncontaminated atmosphere around said units and out of said conduits to prevent the contaminated atmosphere from depositing deleterious material on said units which would interfere with the proper activation of said photo-electric unit by said exciter unit.

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