April 12, 1960 J. B. CAMP 2,932,747

SELF-CLEANING LIGHT RECEIVER FOR PIN HOLE DETECTOR

Filed July 23, 1957 2 Sheets-Sheet 1

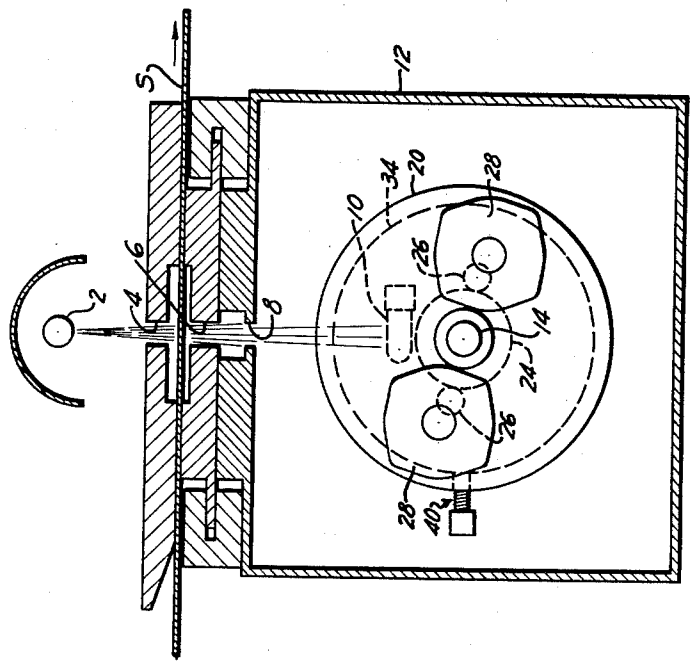


Fig. 1

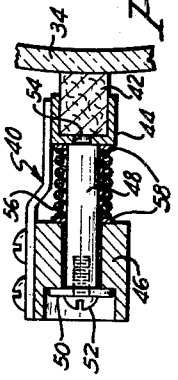


Fig. 5

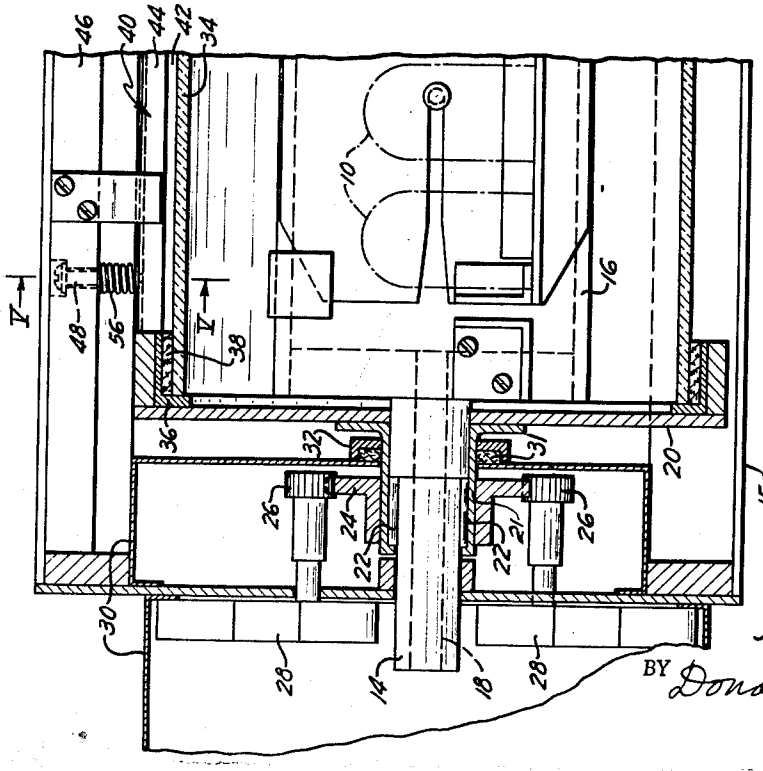


Fig. 4

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SELF-CLEANING LIGHT RECEIVER FOR PIN HOLE DETECTOR

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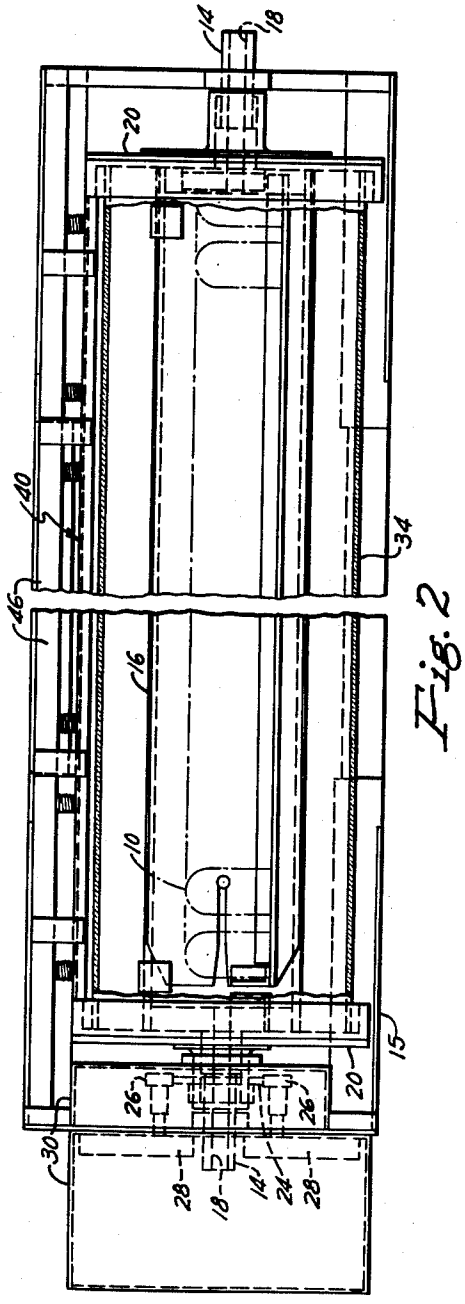


Fig. 2

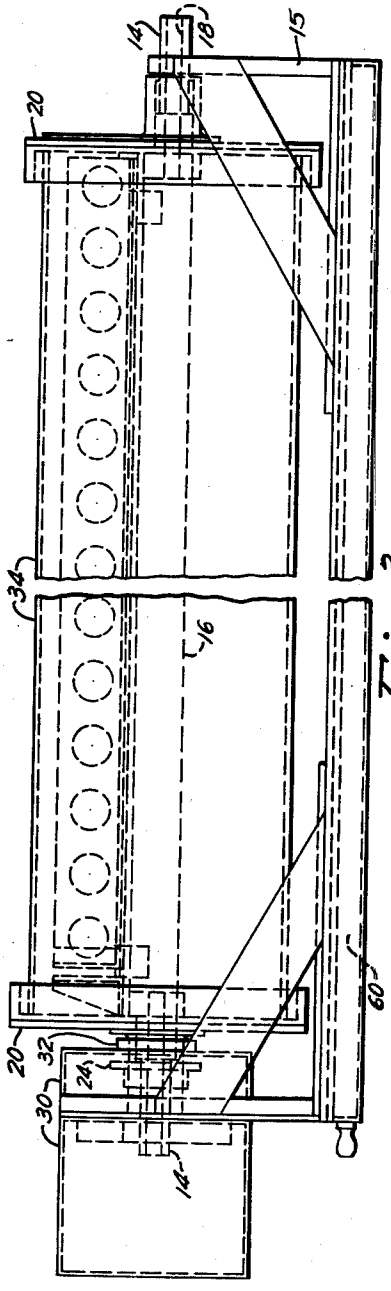


Fig. 3

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2,932,747

SELF-CLEANING LIGHT RECEIVER FOR PIN HOLE DETECTOR

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Application July 23, 1957, Serial No. 673,734

2 Claims. (Cl. 250—239)

This invention relates to a self-cleaning light receiver for a pin hole detector and more particularly to apparatus for preventing dirt from accumulating on the phototubes of a pin hole detector such as shown in Chamberlin et al. Patent No. 2,229,638, dated January 28, 1941, and Hags Patent No. 2,395,181, dated February 19, 1946. 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 are shown in the above mentioned patents and utilize phototubes for detecting light that passes through a pin hole. Other types of inspecting devices also utilize phototubes. If such devices are to operate satisfactorily it is necessary that the phototubes be kept clean so that it will be able to detect any light directed thereon. Since detectors are generally used in mills where dust, dirt, scale, oil, grease and the like are present, the problem of keeping the phototubes clean is a very serious one. In those devices now in use it is necessary to clean the phototubes at frequent intervals. In some cases this requires stopping the processing line and in some instances it is even necessary to cut the strip being inspected.

It is therefore an object of my invention to provide apparatus for automatically keeping clean the light receiver of a detecting device.

This and other objects will be more apparent after referring to the following specification and attached drawings, in which:

Figure 1 is a transverse sectional view of my device in a pin hole detector;

Figure 2 is a plan view of my cleaning device with the protecting box removed and other parts broken away;

Figure 3 is a side elevation of Figure 2;

Figure 4 is an enlarged horizontal sectional view of one end of the device of Figure 2; and

Figure 5 is an enlarged sectional view taken on the line V—V of Figure 4.

Referring more particularly to Figure 1 of the drawings, the reference numeral 2 indicates a light source from which light passes through slots 4, 6 and 8 to a series of photoelectric tubes 10 arranged transversely of a strip S which is being inspected for pin holes. The apparatus so far described is generally conventional. The slot 8 is located in the top wall of a protecting box 12. As best shown in Figure 4 a stationary shaft 14 is mounted on a support 15 within the box 12 at each end thereof. The shafts 14 support a rack 16 which carries the photoelectric tubes 10. One or both of the shafts 14 has an axial opening 18 therethrough so that wires from the photoelectric tubes 10 may pass therethrough to an indicator and/or control. An end plate 20 is mounted on each of the shafts 14 for rotation therearound. The end plates 20 have hubs 21 which are supported on roller bearings 22 mounted on shafts 14. A

gear 24 is secured to one of the hubs 21 for rotation therewith. Two pinions 26 are in mesh with the gear 24. The pinions 26 are rotated by two small speed synchronous motors 28. A cover 30 surrounds the motors 28, pinions 26 and gear 24. A felt dust seal 31 surrounds the end plate 20 adjacent the dust cover 30 and is held in place by means of a retainer 32. A transparent cylinder 34 is supported by end plates 20 and is held in place by means of a brass cap 36 and cork seal 38. A wiper 40 is held in place against the cylinder 34. The wiper 40 is supported within the box 12 in any suitable manner and consists of a felt wiping member 42 which extends the length of the cylinder 34 within a channel shaped member 44. A wiper bar 46 carried by support 15 has a plurality of rods 48 mounted thereon. Each of the rods 48 has a washer 50 secured to its outer end by means of a screw 52. The rods 48 extend through the bar 46 into openings 54 in U-shaped member 44. A spring 56 surrounds each rod 48 between the members 44 and 46 and preferably bears against washers 58 at each end thereof.

In operation the transparent cylinder 34 is rotated at a slow speed; for example, one revolution in five minutes. The felt 42 is forced against the rotating cylinder by the springs 56 with the springs maintaining even pressure between the felt 42 and the cylinder 34 across the full width thereof. The contact of the cylinder 34 with the felt 42 removes all foreign material from the cylinder and the foreign material falls to the bottom of the box 12. A dust pan 60 is preferably provided at the bottom of the box 12 to receive the dirt.

While one embodiment of my invention has been shown and described it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. Apparatus for protecting the light responsive element of an inspecting device from dirt accumulations comprising means completely enclosing and sealing said light responsive element including a rotatable transparent cylinder, means mounting said light responsive element within said cylinder, means for rotating said cylinder around said light responsive element, a wiper extending longitudinally of the cylinder and bearing against the outside thereof, and means biasing said wiper against said cylinder.

2. Apparatus for protecting the light responsive element of an inspecting device from dirt accumulations comprising a rotatable transparent cylinder, means mounting said light responsive element within said cylinder, means for rotating said cylinder around said light responsive element, and a wiper bearing against the outside of said cylinder, said wiper including a felt wiping member, a channel member supporting said felt wiping member, a wiper bar spaced from and arranged generally parallel to said channel member, a plurality of spaced rods extending between said wiper bar and channel member and a spring surrounding each of said rods between said wiper bar and channel member.

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