

Jan. 30, 1934.

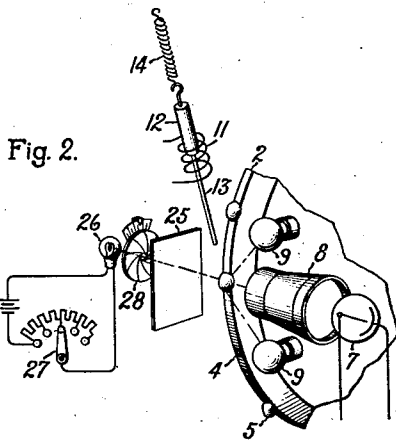
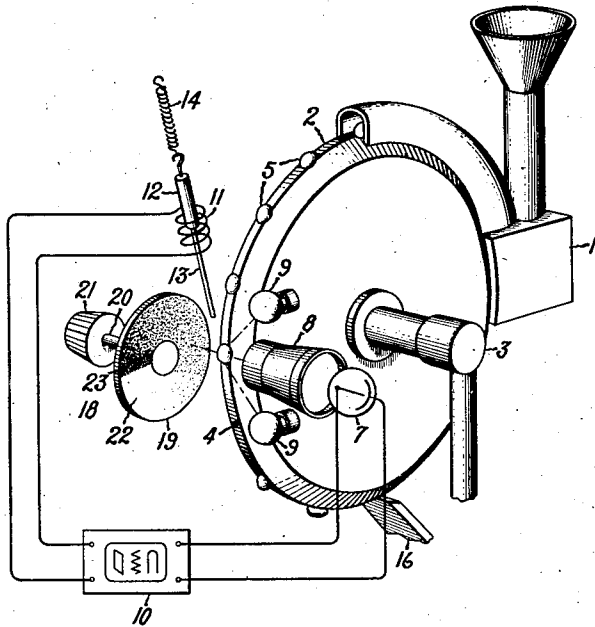
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1,945,395

SORTING APPARATUS

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Fig. 1.



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SORTING APPARATUS

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5 Claims. (Cl. 209—111)

My invention relates to sorting apparatus and particularly that which sorts with respect to the color of the articles being sorted. In certain forms of sorting apparatus of this character heretofore constructed a wheel or disk was used successively to move the articles to be sorted past a point at which each in turn is viewed by a photo-electric device. The response made by the device to the light received from the successive articles controlled the operation of the sorting means employed. The photo-electric device viewed not only each successive article but also viewed an adjacent portion of the supporting wheel. For this reason the surface of the wheel was made to have approximately the same color as that of the articles being sorted whose color made them acceptable. Difficulty has been experienced in maintaining the desired color of the wheel due to the presence of dust, dirt and scratches. Moreover when articles having a different color were to be sorted requiring a different color standard the color of the wheel could not easily be changed to correspond therewith. It is the object of my invention to provide an improved sorting apparatus whereby these difficulties are overcome. Briefly my invention comprises a sorting apparatus having an adjustable background at the point at which the successive articles are observed by the photo-electric device. My invention will be better understood from the following description taken in connection with the accompanying drawing, and its scope will be pointed out in the appended claims.

Referring to the drawing, Fig. 1 is a combined circuit diagram and perspective view of a preferred form of apparatus embodying my invention; and Fig. 2 shows a detail of a modification thereof.

In illustrating my invention I have chosen to show a sorting apparatus of the character described and claimed in the copending application of Walter R. Horsfield, Serial No. 432,225, filed February 28, 1930, and the copending application of Pieter Juchter, Serial No. 562,720, filed September 14, 1931, both assigned to the same assignee as the present application.

The articles to be sorted, such for example as beans, are poured into the hopper 1 through which passes the periphery of the wheel or disk 2 which is slowly rotated by means not shown. The disk has a number of peripheral openings spaced at regular intervals which are somewhat smaller than the articles to be sorted and which connect at the hub portion of the disk with the pipe 3 which leads to a suitable suction device.

As the wheel slowly rotates in a counter-clockwise direction as viewed in Fig. 1, the beans in the hopper are drawn to the openings 4 so that as each opening emerges from the hopper it is covered by a bean as shown at 5. The photo-electric device 7, for example a photo-electric tube, is arranged at one side of the disk, and by means of the optical system 8 views each successive bean as it passes a given point, at which point the light from lamps 9 is reflected by the bean and focused by the optical system 8 on the window of the photo-electric tube. Connected with the photo-electric tube is a suitable amplifying device illustrated at 10 whose output circuit connects with the solenoid 11 having plunger 12 for mechanically displacing a bean from the disk. The plunger 12 is shown provided with an extension rod 13 which by suitable means not shown is guided so as to strike the bean when the solenoid is energized, the plunger being normally held in a withdrawn position by a coil spring 14. If the color of the successive beans is such as to render the beans acceptable the response made by the photo-electric tube is such that the plunger 12 is not actuated and the beans pass on until they may fall into a suitable receptacle, not shown, placed thereunder. If however the color of a bean is such as to render it unacceptable, the photo-electric tube will cause the actuation of the plunger 12 and the bean will be knocked from the disk whence it may fall into a separate receptacle, not shown, provided for the defective beans.

Arranged behind and at the point at which the successive beans are viewed by the photo-electric tube, I have provided the adjustable background member 18 which as shown in Fig. 1 comprises the rotatable disk 19 having the shaft 20 upon which is mounted the knob 21. The face of the disk 19 has variable light reflecting power being angularly graded from white as shown at 22 to dark grey as shown at 23. The tube 7 and optical system 8 are so arranged that the tube receives the light reflected from a bean on the disk but receives none or at least a negligible amount of light from the adjacent portion of the disk. The field of view, however, is slightly larger than a bean and hence includes a small part of the background disk 19. In the use of the apparatus the knob 21 will be turned one way or the other until that part of the disk included in the field of view corresponds in its effect on the photo-electric tube with that of a bean having the acceptable color. The disk 19 is not apt

to become soiled or scratched and in the event that beans of a different color are to be sorted the operator merely has to turn the disk to the proper position for using the apparatus with beans of the different color.

In the modified form of my invention illustrated by Fig. 2 the variable background is shown in the form of a light source, as for example the translucent screen 25 behind which is arranged a small electric lamp 26 connected in series with the controlling rheostat 27. By varying the position of the rheostat the degree of illumination of the lamp and hence the light transmitted through the screen to the photo-electric tube may be varied. As a further means of varying the illumination of the screen I have shown the diaphragm 28 which may be readily varied to control the illumination of the screen.

I have chosen the particular embodiments described above as illustrative of my invention, and it will be apparent that various other modifications may be made without departing from the spirit and scope of my invention which modifications I aim to cover by the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. Sorting apparatus comprising means for moving each of a plurality of similar articles to be sorted successively past a given point, a photo-electric device arranged to view each article as it passes said point, sorting means responsive to said device and a background member at said point having means by which the amount of light received therefrom by the device may be varied in accordance with the reflecting power of the articles.

2. Sorting apparatus comprising means for moving each of a plurality of similar articles to be sorted successively past a given point, a photo-electric device arranged to view each article as it passes said point, sorting means responsive to said device and an adjustable background member at said point arranged to direct a variable amount of light into said device.

3. Sorting apparatus comprising means for moving each of a plurality of similar articles to be sorted successively past a given point, a photo-electric device arranged to view each article as it passes said point, sorting means responsive to said device and an adjustable background member at said point having a variable light reflecting surface.

4. Sorting apparatus comprising means for moving each of a plurality of similar articles to be sorted successively past a given point, a photo-electric device arranged to view each article as it passes said point, sorting means responsive to said device, a background member at said point having a graded light reflecting surface and means for moving the member to vary the amount of light reflected into said device.

5. Sorting apparatus comprising a rotatable disk having means for holding articles to be sorted on its periphery, a photo-electric tube arranged to observe the successive articles as they pass a given point, sorting means responsive to said tube, a background member arranged behind the articles as they pass said point, said member comprising a rotatably mounted disk having an angularly graded light reflecting surface and means for turning the background disk.

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