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TRANSPORT PATH COMPRISING SIGNAL DEVICES

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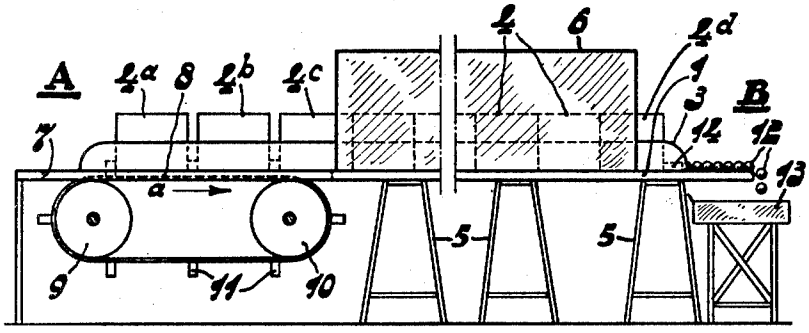


Fig. 1.

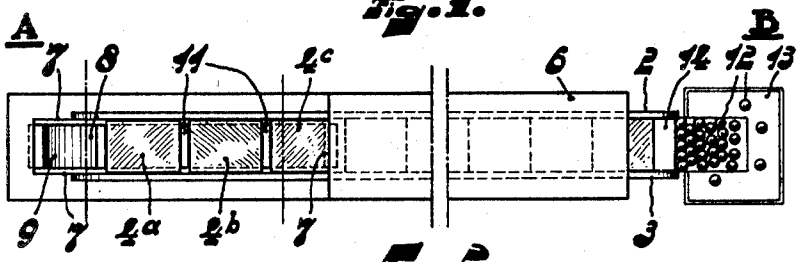


Fig. 2.

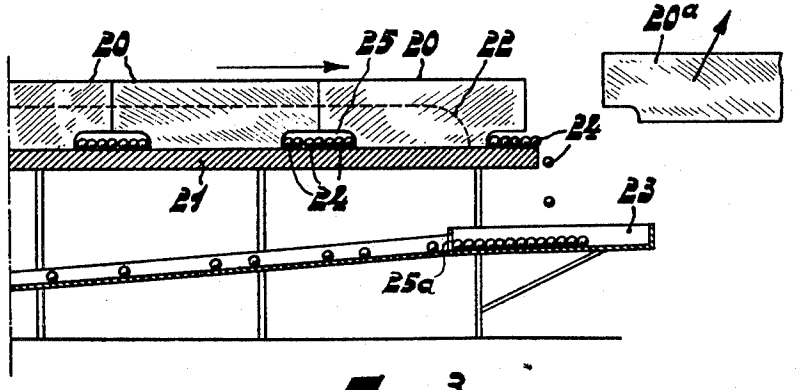


Fig. 3.

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TRANSPORT PATH COMPRISING SIGNAL DEVICES

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2 Claims. (Cl. 198—40)

This invention relates to transport paths comprising means by which one or more articles at the beginning of the path and forming part of a continuous row are propelled directly over the path to the effect that further articles present on the path are indirectly propelled by said means and also carried forward over the path. A transport path of this type has the advantage that the means carrying the articles forward over the path need to extend only over a comparatively short part of the path, since each article in the path propels the next following article. Such a transport device may successively be used for furnaces into which articles are continuously introduced at one end and delivered at the other end. The use of a transport path of the type referred to then yields the advantage that the means propelling the articles need not be heat proof, since they are situated completely outside the furnace. When propelling the articles over the transport path in an indirect manner there is a risk, however, that if for some reason or other one of the articles jams during its travel, the succeeding articles keep moving thus occasioning the phenomenon similar to the packing of ice. As a matter of fact, the driving mechanism of the transport path keeps moving undiminished upon stagnation and the workman supervising the transport path is not warned that something is wrong with the stagnant transport path.

This inconvenience is mitigated by the present invention by combining the aforesaid transport path with a signal device co-operating with one or more of the indirectly propelled articles such that deviations from the normal state of motion of indirectly propelled articles are announced.

The invention may be used with particular advantage if at least part of the articles conveyed over the transport path are hidden from direct view by screens or the like, for example in the case of annealing furnaces or the like or if a transport path extends from one factory room through a narrow opening in the wall into an adjacent factory room.

Signalization of deviations from the state of motion may be effected in a manner such that if a deviation occurs the means available at the beginning of the path and propelling the articles are automatically disengaged. To this effect, for example, each article may be moved past a photo-electric cell at the end of the path, thus intercepting a light beam incident on the photo-cell. In the case of stagnation the beam falls unimpeded on the photo-cell and the photo-cell current thus produced will stop the driving means.

Sometimes it will, however, be sufficient that deviations from the prescribed state of motion are announced to the supervising workman so that he may interfere and stop the driving means. Such announcement is preferably made acoustically.

In accordance with the invention, a suitable form of such a signal device comprises a number of bodies, for example metal balls, and a baffle, the bodies behind the last article on the path being successively removed from the path by the motion of said article and falling on the baffle. The said articles may everytime be laid behind the last article on the path. In practice it has been found that this exceedingly simple signal device has a high reliability of service.

In order that the invention may be readily carried into effect, it will now be described with reference to the accompanying diagrammatic drawing, given by way of example, in which

Fig. 1 is a side view.

Fig. 2 is a plan view of a transport path comprising such a signal device; and

Fig. 3 is a fragmentary side elevation view of another embodiment of my invention.

The transport path comprises a bottom 1 and edge portions 2 and 3 guiding the articles 4 to be conveyed from A to B. The transport path is mounted on a number of supports 5 and surrounded over part of its length by a hood-shaped structure 6 by which the articles on the path are hidden from direct view and which may, for example, form part of a furnace jacket.

At A the bottom 1 exhibits an elongated recess, the edges of which are designated 7 and in which fits the upper portion 8 of a conveyer belt passing over rollers 9 and 10, either one of which may, for example, be driven by an electric motor. Said conveyer belt carries a number of projecting parts 11 and moves in the direction of the arrow *a*.

The relative spacing between two successive projecting parts 11 on the conveyer belt 8 is so chosen that one or more of the articles 4 fit between them. Said articles may, for example, be bodies to be subjected to a heat treatment in the furnace 6 or supports each carrying a number of bodies to be subjected to a heat treatment. As may be seen from the drawing the bodies 4*a*, 4*b* and 4*c* are those bodies of the continuous row of articles extending from A to B, which are directly propelled by the conveyer belt 8. Owing to the motion imparted to the said articles, the articles located more to the right in the drawing are indirectly propelled so that in the absence of stagnation they leave the right-hand part of the furnce 6 at a rate corresponding to the speed of the conveyer belt 8. If, however, anyone of the indirectly propelled articles becomes stagnant and the driving continues the supply of articles to the furnace takes place unimpeded, so that at a given instant the articles in the furnace pack together and the whole passageway is choked. The consequent breakdown may sometimes even necessitate breaking open of the furnace. In this instance the articles are subjected to an exceedingly long heat treatment in the oven, which should naturally be avoided. Unless safety measures be taken this means that the workman supervising the transport path must continuously keep an eye on the outlet of the furnace.

In order to mitigate the last-mentioned inconvenience a signal device is provided which announces the regular motion of the articles over the transport path. In this instance said device comprises a number of balls 12, situated behind the last article 4*d* on the transport path, and a tray 13 placed beneath the transport path and acting as a baffle. If the articles are moving regularly over the path the workman hears the regular fall of balls from the end of the path into the tray 13, which permits distant supervision of the transport path. In the case of stagnation on the transport path the rate at which the balls are falling from the path on the baffle is slower and in the case of complete stagnation the balls cease dropping. Provided between the balls and the surface of the article 4*d* facing the balls is a metal strip 14 which also falls on the baffle after all the balls have fallen on the latter. Then the workman knows that the transport path must again be filled with balls and the rearmost article must be removed

from the transport path. Of course, means may be provided for filling the transport path with sound-producing bodies automatically.

In the embodiment of the invention shown in Fig. 3, in which the articles **20**, the bottom **21** of the right-hand part of the transport path and an edge portion **22** thereof are shown on a larger scale, the tray **23** acting as a baffle is also provided at the end of the path. In this construction, however, the balls **24** are not laid each time behind the last article on the path, but at the beginning of the path i. e. at A in Figs. 1 and 2 between the articles. This has the advantage that at the end of the path only the finished articles (denoted **20***a* in Fig. 3) need to be lifted from the path, if desired automatically. If the tray **23** is further provided with an outlet **25***a* returning the balls to the beginning of the path, no supervising workman is required at the end of the path.

As may be seen from Fig. 3 the balls between the bodies **20** are provided in recesses **25** of said bodies which permits the bodies to be propelled indirectly without difficulty. Of course, a bottomless frame for the balls may alternatively be placed between every two articles of the row on the path.

What I claim is:

1. A transport system and signal device for a plurality of articles over a predetermined path, comprising means to directly propel said articles over said path, said articles being further propelled indirectly by said means over said path, said signal device co-acting with at least one of the indirectly propelled articles to signal acoustically any deviation from the prescribed movement of said articles and comprising a metal receptacle, a plurality of metal balls in front of the article to be removed first before the other articles in said transport system, said metal balls being adapted to fall successively from said path into said receptacle.

2. A transport system and signal device for a plurality of articles over a predetermined path, comprising means to directly propel said articles over said path, said articles being further propelled indirectly by said means over said path, said signal device co-acting with at least one of the indirectly propelled articles to signal acoustically any deviation from the regular prescribed movement of said articles and comprising a metal receptacle, a plurality of metal balls in front of the article to be removed first before the other articles in said transport system, a metal strip, said metal balls being adapted to fall successively from said path into said receptacle followed by said metal strip.

No references cited.