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DEVICE FOR AUTOMATICALLY INDICATING BREAKDOWN IN KILN CONVEYERS

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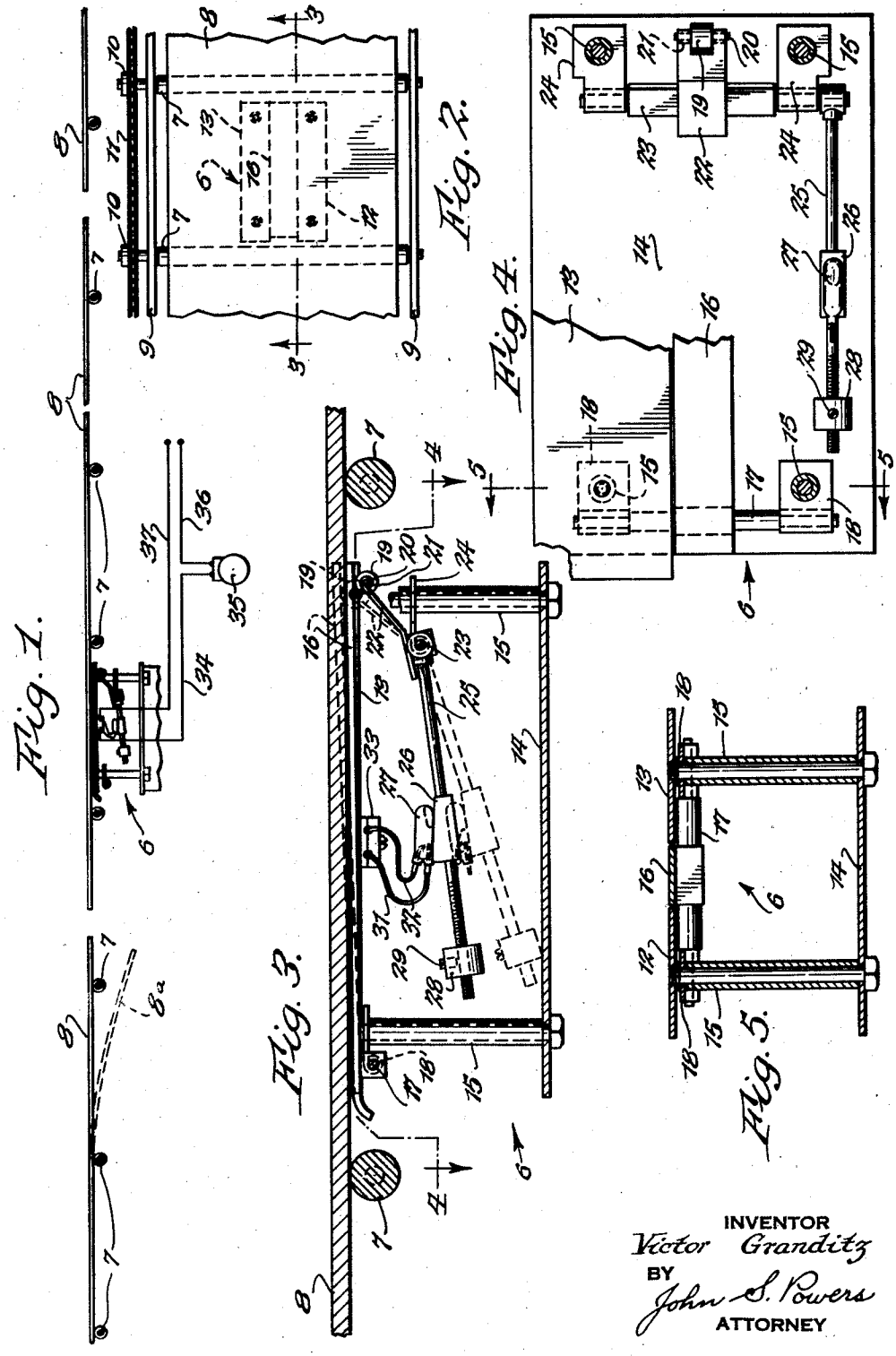


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

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DEVICE FOR AUTOMATICALLY INDICATING BREAKDOWN IN KILN CONVEYERS

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3 Claims. (Cl. 200—52)

This invention relates to an automatic signaling device which, although not necessarily so limited, is particularly adapted for use in connection with the conveying system of a kiln of the kind utilized in drying gypsum lath, the device being operative, when so employed, to give a warning in the event of a breakdown in said system so that the latter may be shut down immediately and thereby prevent the development of a jam within the kiln.

In a kiln of the character generally described the conveying system comprises horizontal, superposed decks which are provided by spaced rollers, each of the said decks supporting parallel rows of lath and the rollers being driven to move the latter slowly through the kiln. Occasionally, it happens that in the operation of the conveying system one of the rollers will become dislocated and as a result of the loss of support at the location originally occupied by such roller the leading ends of the lath sections approaching this point will, instead of passing on and over the succeeding rollers, sag down upon a lower deck. Unless such a failure is discovered within a very short time a serious jam will develop.

The principal object of the present invention, therefore, is to overcome this objection, this object contemplating a signaling device which is automatically operative to give a warning whenever there is an interruption in the regular passage of the lath sections along the decks of the conveying system.

A further object is to provide a device which is so designed that substantial variations in the spacing of the lath sections on the decks of the conveying system are permissible and may occur without thereby rendering the device operative.

A still further object is to provide a device which will offer a minimum of resistance to the passage of the lath sections along the conveying decks.

A still further object is to provide a device which is simple in design and reliable and durable in operation.

The invention is illustrated in the accompanying drawing in which:

Figure 1 is a diagrammatic view of a deck of a drying kiln, a device embodying the features of my invention being illustrated in connection therewith.

Figure 2 is a fragmentary top plan view of a portion of said deck.

Figure 3 is an enlarged longitudinal section taken along line 3—3 of Figure 2.

Figure 4 is a horizontal section taken along line 4—4 of Figure 3.

Figure 5 is a vertical section taken along line 5—5 of Figure 4.

The signaling device, indicated generally at 6, is illustrated in connection with a horizontal series of rollers 7. The latter provide a deck upon which lath sections 8 may be supported in a row in end-to-end relation, the said rollers being mounted between parallel side bars 9 (Figure 2) and carrying sprockets 10 which are driven by a chain 11 to advance the lath sections lengthwise through the kiln (not shown). Although to simplify illustration only a single deck and a single row of lath sections are indicated, it is understood that in most instances the conveying system will, in accordance with conventional practice, consist of a series of such decks which are arranged one over the other in superposed relation and each of which is adapted to accommodate a plurality of rows of lath sections.

The lath sections which are advanced through the kiln, particularly in the initial drying stages, are pliable. Hence when a roller 7 breaks and becomes dislocated, as occasionally happens, it permits the leading end of each succeeding lath section to sag, as indicated in dotted lines at 8a in Figure 1, and the said section, instead of being advanced to the succeeding rolls in the deck, passes downwardly to the deck beneath. In the event that such a breakdown occurs, however, the signaling device 6 is automatically operative to give a warning to this effect and thereby enable the conveying system to be shut down and the necesssary repairs made before the development of a jam within the kiln.

As illustrated, the signaling device includes a frame which consists of spaced-apart, co-planar top plates 12 and 13, a base plate 14 and mounting posts 15. Preferably the said frame is mounted between a pair of the rollers 7 so that the upper faces of the top plates are located slightly below and out of contact with the under sides of the lath sections passing over the rollers; and the rear ends of the top plates are curved downwardly to insure their initial engagement with the under sides of the leading ends of the lath sections. A leaf 16 is accommodated in the space between the top plates 12 and 13, the said leaf being mounted at one end upon a transverse shaft 17 which is supported by bearing-providing straps 18 carried by a pair of the posts 15. At its opposite end the leaf 16 rests upon, and is supported by, a roller 19. The latter is carried upon a pin 20 which is supported between fork extensions 21

formed or provided at the outer end of an arm 22. The inner end of the arm 22 is fixed to a transversely extending rock shaft 23, the journal extensions of the said shaft being supported in bearing-providing straps 24 carried by the remaining pair of posts 15. The rock shaft 23 also carries a beam, or balance arm, 25 which is preferably in the form of a rod and which is connected at its forward end to a journal extension of the rock shaft. Substantially midway between its ends the beam, or balance arm, carries a mounting 26 for a mercury switch 27 while at its outer end it is threaded and carries an adjustable counterweight 28, the counterweight having a threaded opening in which the threaded end of the beam, or balance arm, is accommodated and being held against accidental or unintentional turning in its adjusted position by a set screw 29.

The roller 19 engages the under side of the free end of the leaf 16 and, under the influence of the beam, or balance arm, urges it upwardly in the direction of the dotted-line position shown in Figure 3. The leaf, however, is normally prevented from assuming such a position by the engagement of its free end with the under sides of the lath sections passing over it. In the event, however, that one of the rollers of the deck becomes dislocated, or if for any other reason, there is an interruption in the regular passage of lath sections over the leaf, the free end of the leaf will be moved automatically upwardly by the beam, or balance arm as the weighted end of the latter moves downwardly. The switch 27 will thereby be caused to assume a closed position.

Lead wires 31 and 32 are connected to the external terminals of the switch 27, the said wires being supported in a block 33 which is mounted upon the under side of the top plate 12 and gripping the wires in such a manner that substantial slack will be provided between the block and the switch terminals. The lead wire 31 is connected by a line 34 (Figure 1) to one side of a bell 35, or other warning device, the other side of the bell being connected by a line 36 to one side of a source of electrical energy and the lead wire 32 being connected by a line 37 to the other side of the said source. As the leaf 16 moves to the dotted-line position shown in Figure 3, therefore, the circuit which includes the bell or other warning device, will be closed and a signal will be given.

It will be noted that in its normal position the leaf 16 has a slight angle of inclination but is in effect substantially horizontal. As a result of this and the fact that it is straight and of substantial length the spacing between adjacent lath sections may vary widely and may exceed substantially the average normal spacing encountered without causing actuation of the switch 27. Owing to its slight angle of inclination only the tip of the free end of the leaf engages the lath sections. Such pressure is, moreover, light as the counterweight 28 is preferably adjusted so that the pressure which the beam, or balance arm, exerts upon the leaf is the minimum required to insure closing of the switch when this is to be effected in the manner described. One advantage thus attained is that wearing of the leaf is reduced to a minimum, although the said leaf will, of course, automatically adjust itself to compensate for any such wearing as may occur; and a second advantage obtained is that the resistance offered to the free movement of the lath sections is so small as to be negligible.

Referring to Figure 5 it will also be noted that the top plates 12 and 13 between which the leaf 16 is mounted provide a guard for the latter, being adapted to provide surfaces for supporting and guiding the lath sections in the event that there is any tendency for them to sag. The transmission of excessive weight to the leaf 16, with the attednant possibility of impairing the operation of the device or requiring frequent changes in its setting, is thus prevented.

I claim as my invention:

1. A circuit control device adapted to be located below a horizontally extending path along which conveying mechanism advances flat-wise, serially arranged articles of sheet-like form in such a manner that in the regular passage of said articles along said path the leading end of one article may be spaced from the trailing end of the preceding article, said device including a mercury switch, a pivotally mounted leaf having a free end extending in the direction of travel of said articles and being movable to positions corresponding to, and determining, the operative and inoperative positions of said switch but normally being held by the engagement of its free end with the under sides of said articles in a position corresponding to the inoperative position of said switch, a pivotally mounted beam which carries said switch and one end of which engages the under side of the free end of said leaf, and biasing means for rocking said beam to move said leaf to a position corresponding to the operative position of said switch in the event of the release of the free end of said leaf by an interruption in the regular passage of said articles along said path, said leaf being elongated and, in the normal position in which it is held by the engagement of its free end with the undersides of said articles, having a substantial part of its length in close proximity to said articles, whereby the magnitude of the deflection of said leaf with respect to said normal position, as a result of the spacing, or variations therein, between adjacent articles in their regular passage along said path, will be substantially less than that required for it to assume the position corresponding to the operative position of said switch.

2. A circuit control device adapted to be located below a horizontally extending path, along which conveying mechanism advances flat-wise, serially arranged articles of sheet-like form in such a maner that in the regular passage of said articles along said path the leading end of one article may be spaced from the trailing end of the preceding article, said device including a frame having spaced guard plates located in substantially parallel relation with respect to, and in close proximity to, said path and over which sagging portions of said articles may slide, a mercury switch, a leaf pivotally mounted at one end between said guard plates and having a free end extending in the direction of travel of said articles and being movable to positions corresponding to, and determining, the operative and inoperative positions of said switch but normally being held by the engagement of its free end with the under sides of said articles in a position corresponding to the inoperative position of said switch, a pivotally mounted beam which carries said switch, a roller which is carried by the leading end of said beam and which engages the under side of the free end of said

leaf, and an adjustable counter-weight carried by the trailing end of said beam for rocking the latter to move said leaf to a position corresponding to the operative position of said switch in the event of the release of the free end of said leaf by an interruption in the regular passage of said articles along said path, said leaf being elongated and, in the normal position in which it is held by the engagement of its free end with the under sides of said articles having a substantial part of its length in close proximity to said articles, whereby the magnitude of the deflection of said leaf, with respect to said normal position, as a result of the spacing, or variations therein, between adajcent articles in their regular passage along said path, will be substantially less than that required for it to assume the position corresponding to the operative position of said switch.

3. A circuit control device adapted to be located below a horizontally extending path along which conveying mechanism advances flat-wise, serially arranged articles of sheet-like form in such a manner that in the regular passage of said articles along said path the leading end of one article may be spaced from the trailing end of the preceding article, said device including a switch, a pivotally mounted leaf having a free end extending in the direction of travel of said articles and being movable to positions corresponding to, and determining, the operative and inoperative positions of said switch but normally being held by the engagement of its free end with the under sides of said articles in a position corresponding to the inoperative position of said switch, a pivotally mounted beam for actuating said switch and one end of which engages the under side of the free end of said leaf, and biasing means for rocking said beam to move said leaf to a position corresponding to the operative position of said switch in the event of the release of the free end of said leaf by an interruption in the regular passage of said articles along said path, said leaf being elongated and, in the normal position in which it is held by the engagement of its free end with the undersides of said articles, having a substantial part of its length in close proximity to said articles, whereby the magnitude of deflection of said leaf with respect to said normal position, as a result of the spacing, or variations therein, between adjacent articles in their regular passage along said path, will be substantially less than that required for it to assume the position corresponding to the operative position of said switch.

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