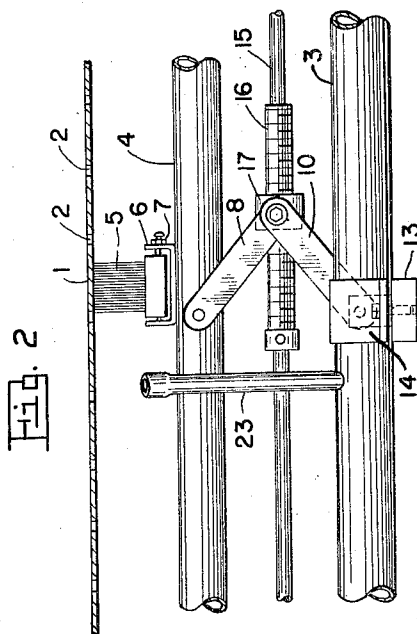
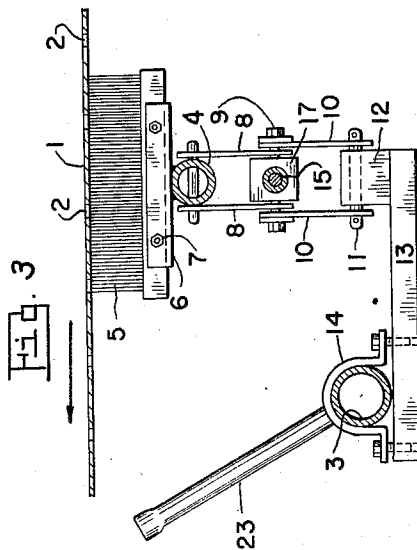
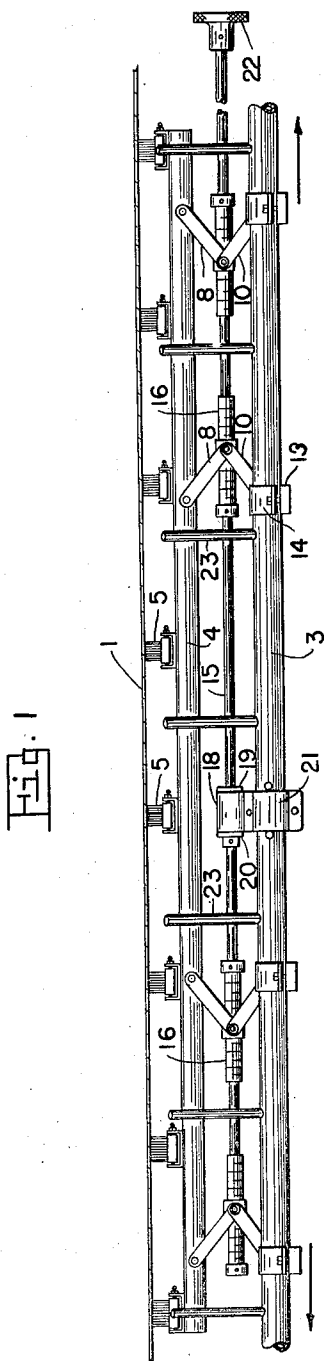


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CLEANING DEVICE FOR CONVEYER ELEMENTS
OF CHEMICAL DRYING APPARATUS
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INVENTORS
Daniel F. Tucker & Harold R. Tyler
BY *William R. Day*

ATTORNEY.

UNITED STATES PATENT OFFICE

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CLEANING DEVICE FOR CONVEYER ELEMENTS OF CHEMICAL DRYING APPARATUS

Daniel F. Tucker and Harold R. Tyler, Wyandotte, Mich., assignors to Wyandotte Chemicals Corporation, Wyandotte, Mich., a corporation of Michigan

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The present invention relates to a cleaning device for perforated, sheet-like, conveyor elements of a drying apparatus. In a drying apparatus for dehydrating chemical products such as alkali chemicals, and particularly products such as chemically precipitated calcium carbonate, the material to be dried is carried upon a perforated, endless belt, or perforated moving aprons or sheets. Hot air or hot gas is circulated around the conveyor element and the perforations in the latter aid in the efficient contact of the drying air or gases with the chemical product to be dried. It has been found that after a continued period of use, a dried residue of the chemical material, such as calcium carbonate, tends to build up on the surface of the conveyor element and to fill and clog the perforations therein. This results in an over-burdening of the conveyor and in decreasing the drying efficiency and output of the drying apparatus as a whole.

Heretofore it has been found necessary periodically to remove or clean out such built-up residue by hand, such as by tedious scraping and wire brushing. This procedure has been both time consuming and inefficient.

It is the general object and nature of our invention to provide a cleaning device for perforated conveyor elements, of the endless belt or apron type, whereby any adherence, or build-up of residue on the conveyor element surface is removed as rapidly as it is formed, and while the drying apparatus itself is in operation.

Briefly outlined, our invention comprises a set of movable brushes which are so mounted as to bear against the surface of the perforated conveyor element, preferably at a point on its empty or "return flight"; and to impart to these brushes a motion in a direction transverse to that of the travel of the conveyor element. The net result is that the brushes, in contacting the surface of the perforated conveyor element, have a combined lateral and longitudinal motion with respect to such surface. Thus the brushing action is enabled to cover the entire conveyor element surface universally and to impart the necessary mechanical dislodging action for removing and cleaning off any chemical product residue adhering thereon. Most conveniently, such set of movable brushes are mounted upon a reciprocable steam pipe having jets or nozzles directed against the surface of the conveyor element. Thus the mechanical scrubbing or brushing action is imparted to the conveyor element surface along with the steam cleaning action from the nozzles. This results in an efficient,

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trouble-free and highly economical device for keeping the perforated conveyor elements adequately clean and in good operating condition.

Another object of our invention is to provide means for mounting the set of brushes on the reciprocable steam pipe, whereby they may be easily and uniformly adjusted with respect to their contact pressure upon the perforated conveyor element surface, thus accommodating correct initial alignment and setup, as well as compensating for the necessary wear in the brushes themselves.

To the accomplishment of the foregoing and related ends and to enable any person skilled in the art readily to understand and practice the invention, the following full and concise description and annexed drawing set forth the best mode in which we have contemplated applying the principle thereof.

In said annexed drawing—

Fig. 1 is an elevational view showing the device embodying the principle of our invention;

Fig. 2 is an enlarged detailed view of a portion of Fig. 1 and taken upon the same plane; and

Fig. 3 is an enlarged detailed view taken upon a plane perpendicular to that of Fig. 2.

Now referring more particularly to the drawing, there are shown therein the perforated metal sheet or apron 1 which is adapted normally to move in the direction such as indicated by the arrow in Fig. 3, and having the perforations 2 therein. The steam pipe 3 is mounted below the perforated sheet 1 and is adapted to move in a longitudinally reciprocating direction, as indicated by the arrows in Fig. 1, by means of an actuating or driving device (not shown).

A supporting tube or bar 4 is located parallel to the steam pipe 3 and carries a set of brushes 5, the ends of whose bristles are adapted to contact with the under side of the perforated sheet 1. The brushes 5 are mounted upon the bar 4 by means of the channel bracket 6 and set screws 7.

Link arms 8, 8 are pivotally connected at their upper end through a suitable dowel pin to the bar 4. Each one of the link arms 8 is connected at its free pivot point or lower end, through the pivot pin 9, to one of the link arms 10, 10; the latter in turn being pivotally connected through the pin 11 to the block 12 mounted on each of the supporting brackets 13. The brackets 13 are in turn fixed to the pipe 3 by means of the U-clamps 14. The last described structure thus constitutes a series of collapsible

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toggle link members joining the bar 4 to the pipe 3.

A height adjusting or control rod 15 is located parallel to the bar 4 and pipe 3 and at a point spaced intermediately therefrom. The rod 15 carries the screws 16 (preferably in the form of a threaded sleeve) fixed or keyed thereto. The screws 16 in turn engage with the interior threads on each of the nuts 17 which are connected to the movable or free pivot end of the link arms 8, 8, 10 through the medium of the connecting pins 9.

A thrust bearing 18 is provided for the rod 15 at a point approximately intermediate its length. Thrust collars 19 and 20 on the rod 15 co-operate with the bearing 18, to lock the rod 15 against longitudinal movement. The lateral extension 21 on the bearing 18 secures the latter to the steam pipe 3.

A suitable manipulating fixture, such as the hand wheel 22, is provided on the outwardly projecting end of the control rod 15.

A series of steam nozzles 23 are located at spaced points along the steam pipe 3, and are adapted to direct jets of steam up against the surface of the perforated sheet 1.

It will thus be seen, that by turning the hand wheel 22, the movable pivot points 9 of the link arms 8, 10 can be moved in the appropriate direction correspondingly to move the bar 4 upwardly or downwardly with respect to its supporting steam pipe 3. Thus the correct setting of all of the brushes 5 and their degree of contact pressure with the underside of the perforated sheet 1 may be simply adjusted and controlled. As the steam pipe 3 reciprocates back and forth, the brushes 5 are likewise moved in the same direction. As the perforated sheet or conveyor element 1 is moved in a direction at right angles to such reciprocation, the brushes 5 are thus imparted a compound, or combined sideways and longitudinal motion on the surface of such sheet 1. The extent of the reciprocating movement of the brushes 5 is such that it is equal to slightly more than half the distance between the brushes. In this manner the entire surface of the sheet 1 is assured proper brushing action.

Other modes of applying the principle of our invention, in addition to the one hereinabove described and illustrated in detail, may be employed, provided the structural elements stated

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by any of the following claims or the equivalent of such elements be utilized.

We, therefore, particularly point out and distinctly claim as our invention and discovery:

1. A cleaning device for a perforated conveyor sheet, comprising a reciprocable steam pipe mounted below and parallel to said conveyor sheet, a supporting bar carrying a plurality of brushes adapted to bear against the surface of said conveyor sheet, adjustable height mounting means connecting said supporting bar to said steam pipe, and a plurality of nozzles in said steam pipe directed upwardly toward said conveyor sheet.

2. A cleaning device for a perforated conveyor sheet, comprising a reciprocable steam pipe mounted below and parallel to said conveyor sheet, a supporting bar carrying a plurality of brushes adapted to bear against the surface of said conveyor sheet, collapsible toggle link members joining said supporting bar to said steam pipe, a control rod extending parallel to said supporting bar, screw elements on said control rod each engaging with a nut attached to the free pivot of each of said link members, whereby rotation of said control rod effects the adjustment of all of said link members, a thrust bearing for holding said control rod against longitudinal movement with respect to said steam pipe, said thrust bearing being secured to said steam pipe, and a plurality of nozzles in said steam pipe directed upwardly toward said conveyor sheet.

DANIEL F. TUCKER.
HAROLD R. TYLER.

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