Nov. 15, 1938. E. R. ZADEMACH 2,137,104

SWINGING NOZZLE

Filed May 19, 1936 2 Sheets-Sheet 1

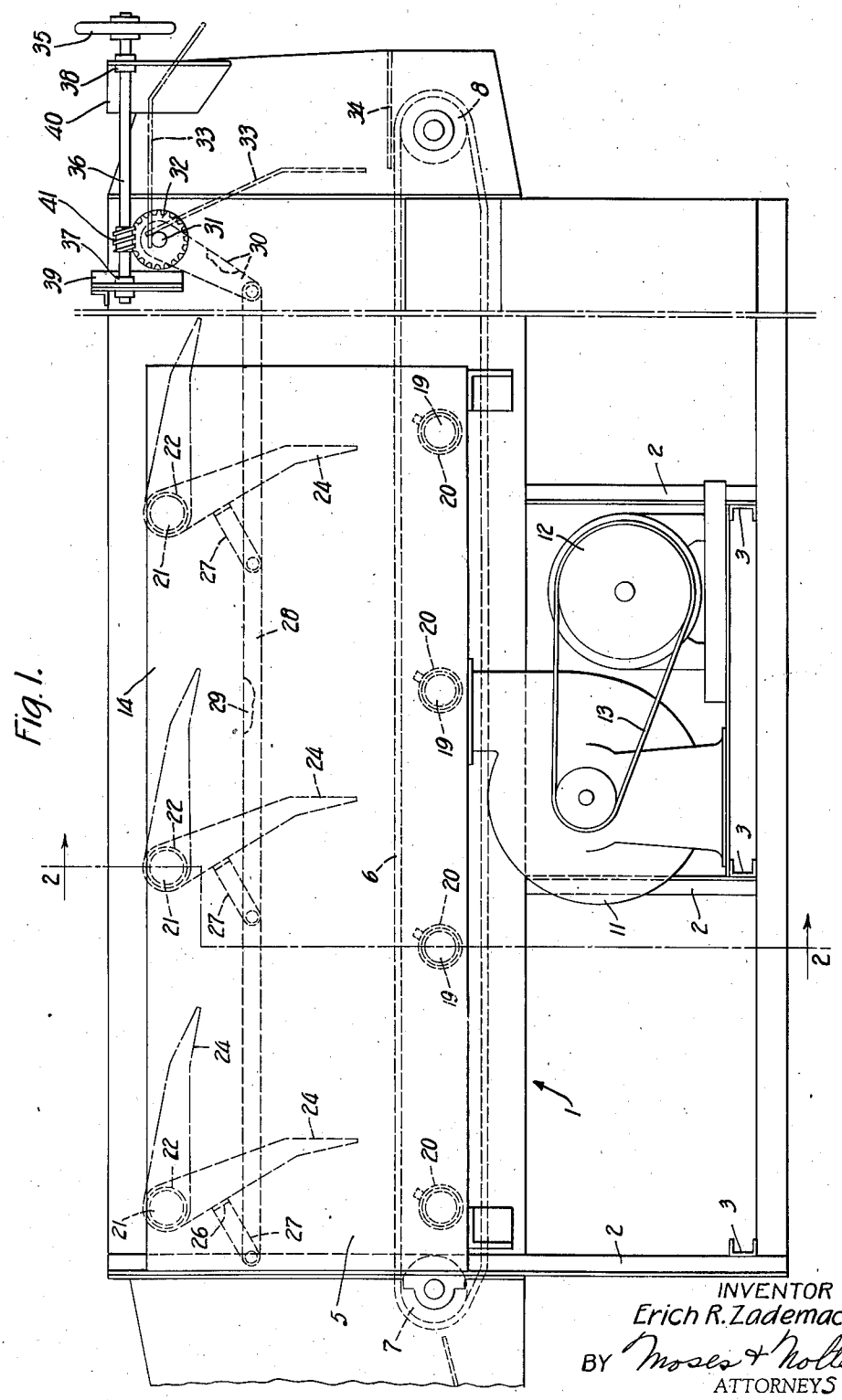

Fig. 1.

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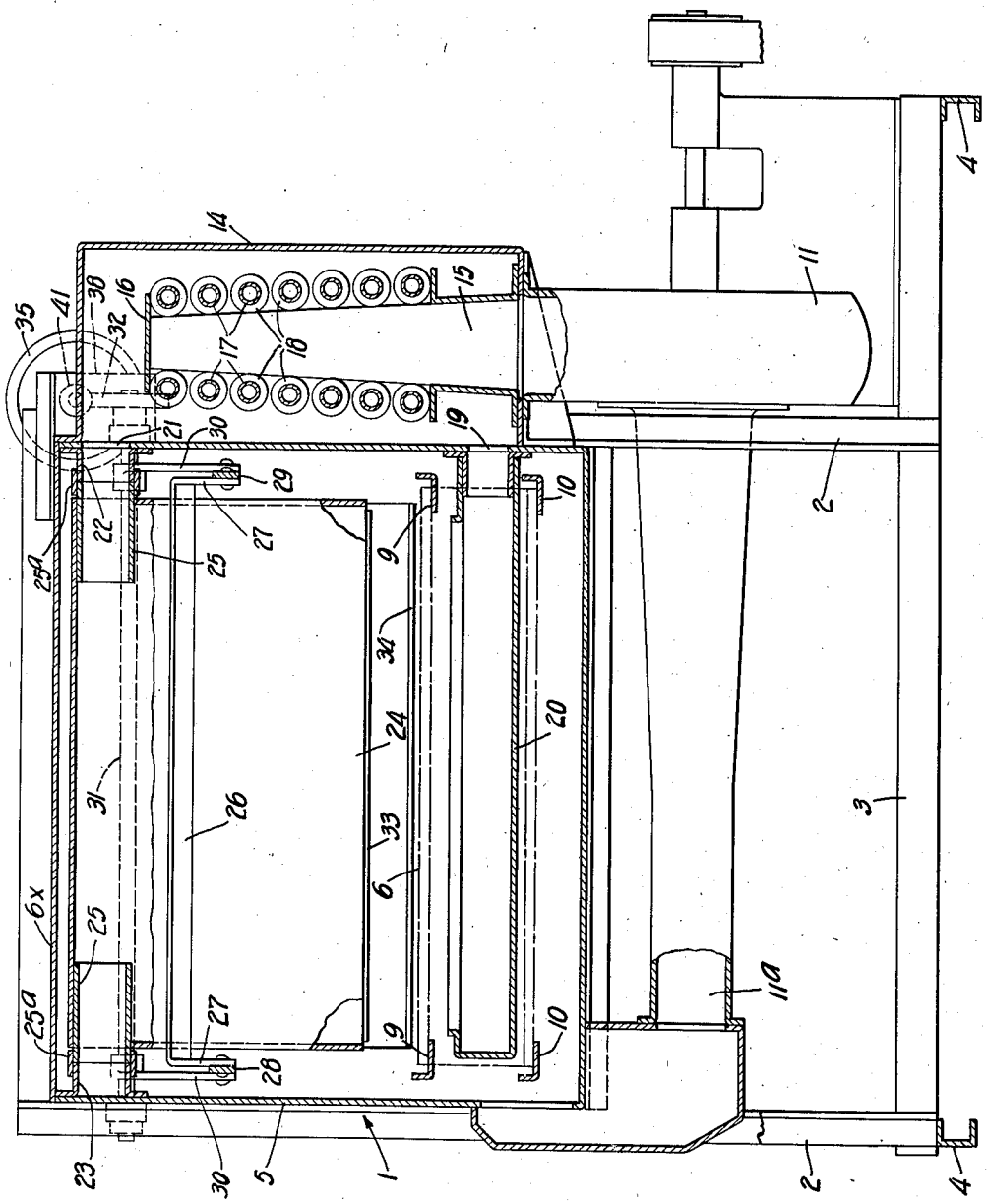


Fig. 2.

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# UNITED STATES PATENT OFFICE

2,137,104

## SWINGING NOZZLE

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5 Claims. (Cl. 34—12)

This invention relates to driers which act to blow air upon wet articles carried through a drying chamber by means of a conveyor.

Driers of this kind are generally used at different times for drying articles of different sizes, although the articles put through at a single run are generally all of the same size. It is desirable that the blowing nozzles be located as close to the articles on the conveyor as is practicable because the blast from a nozzle is strongest right at the nozzle tip.

It is an object of the present invention to provide a series of nozzles which may be adjusted so as to locate the nozzle tips at different distances above the conveyor. Thus for small articles the nozzle tips will be located at a low level to be near the articles while for relatively large articles the tips wil be adjusted to a higher level which is sufficiently high to clear the articles comfortably.

It is a further object of the invention to provide a common adjusting means for adjusting all of the articles in unison.

It is a further object to provide an entrance gate or guard at the introductory end of the machine which is also adjustable in unison with the nozzles. The entrance gate or guard is arranged automatically to afford a little less clearance than the nozzles at all times, so that any article which can pass the gate and enter the drying chamber will be sure to pass clear of the nozzles, and, therefore, not to foul the apparatus.

The drying chamber is sometimes used in tandem with preceding washing, and rinsing chambers. In such a case the entrance gate is provided at the introductory end of the first unit and the common control for the entrance gate and for the nozzles is located at the introductory end of the first unit.

Other objects and advantages will hereinafter appear.

In the drawings forming part of this specification and illustrating a referred embodiment of the invention;

Figure 1 is a fragmentary view in side elevation illustrating a drier unit, and,

Figure 2 is a transverse, vertical sectional view, taken on the line 2—2 of Fig. 1, and looking in the direction of the arrows.

The drying chamber 1 is supported at a distance above the floor upon legs 2 in the form of channel bars. The legs are secured at their lower ends to cross beams 3, which in turn are secured to longitudinally extending channel bars 4. The drying chamber is desirably composed of a three-sided sheet metal plate 5 which forms the sides and bottom of the chamber, and a flat plate 6x which forms the top of the chamber. An endless conveyor belt 6 runs through the chamber, being arranged to travel around end sprockets 7 and 8 and to be supported between the sprockets on upper rails 9 and lower rails 10. The articles are conducted through the chamber upon the upper or active stretch of the belt 6.

A blower 11 mounted alongside the chamber 1 and below it, is driven from a motor 12 through a belt 13. The blower draws air from the drying chamber through a duct 11a. The blower delivers air into a heating chamber 14 which is located above the blower and along one side of the drying chamber. The air passes first into a space which is bounded at its ends and top by imperforate plates 15 and 16 and which is bounded along its sides by steam coils 17 which have radiating fins 18 formed or mounted upon them at frequent intervals. All the air delivered by the blower must pass out through one bank or the other of the heating pipes. A portion of the air escapes through the heating chamber 14 through lower openings 19 to lower jets 20 which are located in the drying chamber between the upper and lower stretches of the conveyor.

The principal feature of the present invention has to do with upper nozzles which the air from the heating chamber 14 enters through openings 21. A flanged bearing tube 22 is secured within the chamber 1 in line with each opening 21. A similar bearing tube 23 is secured to the opposite wall of the drying chamber. A nozzle 24 is provided with bearing tubes 25 of the same size as the bearing tubes 22 and 23. Bearing rings 25a are provided which may be initially mounted upon the bearing tubes 22 and 23 and which may be slid inward to overlap the bearing tubes 25 when the latter have been put in place. Each nozzle has fixed to its lower side a yoke shaped plate 26, each plate 26 including end arms 27 outside the lateral bounds of the nozzle which arms extend downward. The end arms 27 at one side of the chamber are all pivotally connected to a longitudinally extending bar 28 and the end arms at the other side of the chamber are all pivotally connected to a longitudinal bar 29. The bars 28 and 29 extend to a point adjacent the introductory end of the apparatus and are there connected to crank arms 30 which are fast upon a shaft 31. The shaft 31 also has fast upon it a gear 32 and an entrance gate or guard plate

33. The guard plate 33 is of such length that it extends at least as near to the article support, and preferably a little nearer to the article support than do the nozzles 24. This is true in all adjusted positions of the nozzles and the guard plate. The guard plate assures that no article which can pass the entrance gate can possibly jam the machine by engaging a nozzle. In the illustrative embodiment a loading platform 34 is provided at the entrance end of the drying unit which stands a little above the level of the conveyor 6. In this form of construction it is only necessary that the clearance between the entrance gate 33 and the loading platform 34 be small enough to assure that an article which can enter will be able to pass the nozzles when resting on the conveyor 6.

Adjustment of the nozzles and the entrance gate in unison is effected by operation of a hand wheel 35 located at the introductory end of the apparatus. The hand wheel 35 is fast upon a shaft 36. The shaft 36 is journalled in bearings 37 and 38 carried, respectively, by brackets 39 and 40. The shaft 36 also has fast upon it a worm 41 which meshes with gear 32 and drives the gear to effect the desired adjustments.

I have described what I believe to be the best embodiments of my invention. I do not wish, however, to be confined to the embodiments shown, but what I desire to cover by Letters Patent is set forth in the appended claims.

I claim:

1. In a drier, the combination with a drying chamber and a conveyor running therein, of a series of nozzles each pivotally mounted, means connecting the nozzles for parallel movement in unison, and operating means for adjusting the nozzles toward and from the conveyor comprising a gear, a worm driving the gear, and a handle for operating the worm, the arrangement being such that the nozzles are automatically retained in any positions to which they may be operated.

2. In a drier, the combination with a drying chamber and a conveyor running therein, of a series of nozzles each pivotally mounted, means connecting the nozzles for parallel movement in unison, operating means for adjusting the nozzles toward and from the conveyor, and an adjustable entrance gate or guard connected to be adjusted simultaneously with, and as an incident of, the adjustment of the nozzles, to provide an entrance opening automatically regulated in size to preclude admission of an article of sufficient height to strike a nozzle.

3. In a drier, the combination with a drying chamber and a conveyor running therein, of an entrance guard adjustable to regulate the size of article which may enter the chamber, a series of nozzles within the chamber above the conveyor, and means connecting the entrance guard and the nozzles to adjust the nozzles toward and from the conveyor in accordance with the adjustment of the entrance guard.

4. In a drier, the combination with a drying chamber and a conveyor running longitudinally therein, of a succession of similar nozzles disposed at intervals over the conveyor, means providing separate, transversely extending, parallel pivots for the successive nozzles at equal distances from the conveyor, each nozzle being swingable about its axis to change the distance between the nozzle tip and the conveyor, an operating member disposed outside the chamber for adjusting the nozzles in unison about their respective pivots, and operating means connecting the operating member to the several nozzles to cause the nozzles to be maintained in parallelism while being adjusted and at all other times, whereby the nozzle tips will be caused to clear the conveyor by equal amounts in all adjusted positions.

5. In a drier, the combination with a drying chamber and a conveyor running therein, of a succession of similar nozzles disposed at intervals over the conveyor, a fluid manifold, means supporting the nozzles individually from the fluid manifold and in independent communication therewith, with capacity for adjustment relative thereto to shift the nozzle tips toward and from the conveyor, an operating member disposed outside the chamber for adjusting the nozzles, and means connecting said operating member with the several nozzles to cause all the nozzles to be adjusted simultaneously and in unison to change the height of the clearance path between the conveyor and the nozzle tips uniformly throughout, at a single operation.

ERICH R. ZADEMACH.