

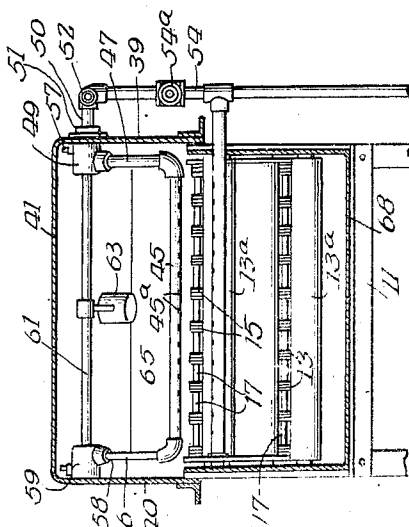
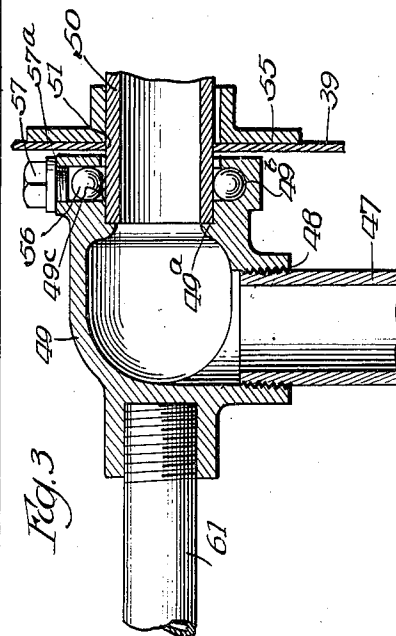
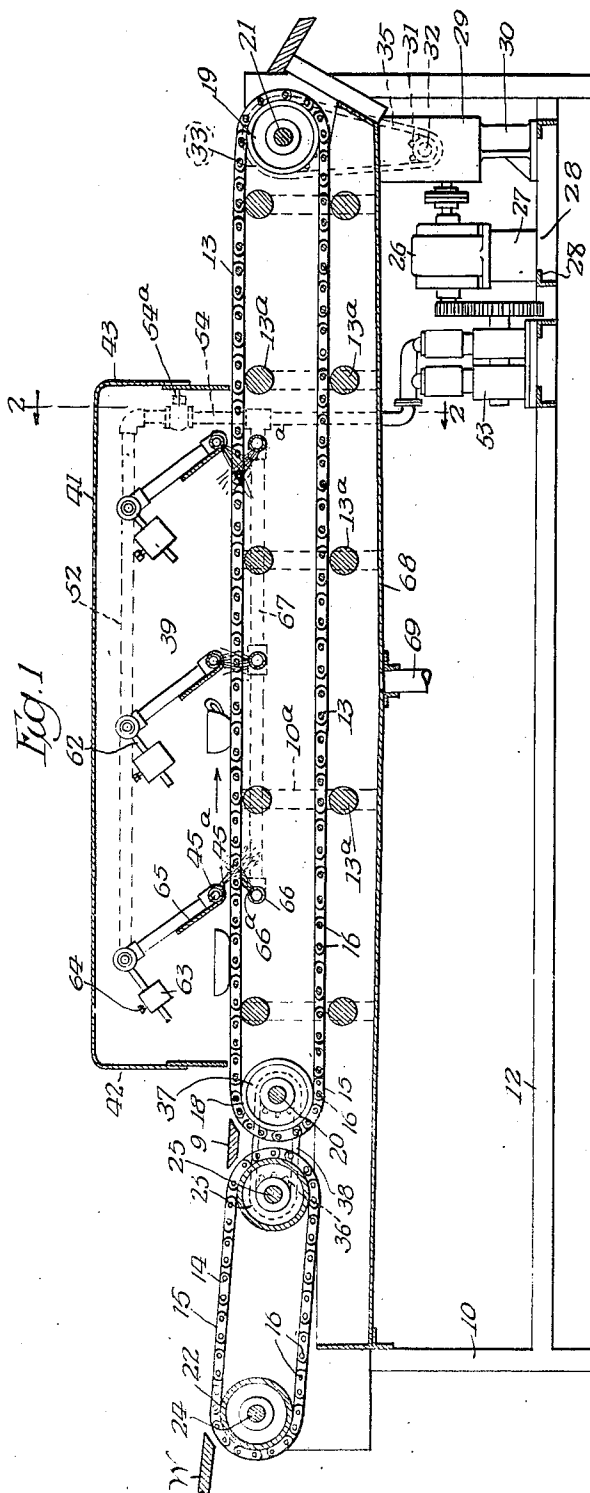
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DISH DRYING APPARATUS

Filed June 21, 1926



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UNITED STATES PATENT OFFICE.

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DISH-DRYING APPARATUS.

Application filed June 21, 1926. Serial No. 117,305.

The invention relates to apparatus for drying dishes and other such articles.

The object of the invention is to provide a dish drier of the type that is adapted for association with a washer, having improved means for delivering jets of air under pressure onto the articles to disperse and absorb the water thereon so as to quickly and thoroughly dry the dishes.

Other incidental objects will appear hereafter from the detailed description.

The invention consists in the several novel features hereinafter set forth and more particularly defined by the claims at the conclusion hereof.

In the drawing: Fig. 1 is a vertical longitudinal section of a dish drier embodying the invention. Fig. 2 is a transverse section taken on line 2—2 of Fig. 1. Fig. 3 is a detail section of the pivotal connection between the air delivery arm of one of the pipes for delivering jets of air to the top surface of the dishes and the air delivery pipe.

The invention is exemplified in a drier for dishes and other articles which comprises standards 10, cross-beams 11, and longitudinal beams 12, all of which are rigidly secured together to form a rigid frame-work for supporting the drying chamber, the drying apparatus, and a pair of endless conveyor belts 13 and 14. Each of the conveyor belts comprises links 15 which are pivotally connected to cross rods 16 and are spaced relatively to each other by sleeves 17 so as to form spaces therebetween. Conveyor belt 13 extends longitudinally across the top of the framework and is adapted to carry and propel the dishes and articles through the drying chamber and into contact with the drying apparatus. The receiving end of this belt is disposed adjacent the discharge end of belt 14. The latter slopes downwardly toward belt 13 so that the articles carried thereby will be held at an angle to permit any free water thereon to drain through the spaces in the conveyor belt onto a suitable receptacle or pan which is disposed below the belt and is hereinafter described more in detail. The receiving end of belt 14 is adapted to be positioned to receive dishes from the discharge end of a washer (not shown) and is adapted to convey the dishes received therefrom onto a slide 9 which is disposed between the discharge end of belt

14 and the receiving end of belt 13 and from which the articles are received by belt 13. The latter is supported at its ends by means of drums 18 and 19. These drums are secured to shafts 20 and 21 respectively which are rotatably mounted in any suitable bearings which may be secured to the longitudinal beams 12. A plurality of idler rollers 13^a for supporting both the upper and lower reaches of the belt 13 are rotatably mounted between drums 18 and 19 in uprights 10^a which are rigidly secured to longitudinal beams 12. Conveyor belt 14 is supported at its ends by means of drums 22 and 23 which are secured to shafts 24 and 25 respectively. The latter are pivotally mounted in any suitable bearings. The mechanism for driving conveyor belt 13 to propel the dishes through the drying chamber comprises an electric motor 26 which is mounted upon a bracket 27 which is supported on a base 28; reducing gearing which is driven by said motor and is disposed in a housing 29 which is secured to a bracket 30; a sprocket wheel 31 which is mounted on the outer end of a shaft 32 which extends transversely through the housing 29 and is driven by the reducing gearing contained therein; and a sprocket wheel 33 which is mounted on one end of shaft 21 and is connected to be driven from sprocket 31 by an endless chain 35. Base 28 is rigidly secured to longitudinal beams 12. Belt 14 is driven by a sprocket wheel 36 which is mounted on one end of shaft 25, a sprocket wheel 37 which is mounted on shaft 20 and an endless chain 38.

The drying chamber through which the dishes are propelled is formed by a sheet metal housing or enclosure comprising a pair of side walls 39 and 40 which are secured to beams 12, a top wall 41, and a front and rear wall 42 and 43 which terminate at a sufficient distance above belt 13 to form an opening and an exit through which the dishes or articles may pass. The new and improved apparatus for drying the dishes comprises a plurality of air pipes 45 which extend transversely across the drying chamber and are disposed normally adjacent the top surface of belt 13. Each of these pipes is provided with a longitudinal series of jet openings 45^a. The latter are arranged to project jets of air toward the conveyor belt as indicated in Fig.

1. Thus the dishes as they are conveyed through the drying chamber are subjected to jets of air which disperse and absorb the moisture thereon. The series of jet-openings
 5 are arranged to project the air at different angles with respect to each other so that the dishes and articles will be subjected to jets of air delivered at different angles. The ends
 10 of pipes 45 are provided with upwardly extending arms 46 and 47, the distal ends of which are pivotally mounted so that the pipes may be swung by the articles into an elevated position corresponding to the height of the
 15 articles and thus the latter are permitted to pass thereunder. A characteristic of suspending or mounting the pipes as set forth is that the pipes are at all times disposed in close proximity to the articles, and hence the articles are efficiently and quickly dried.

20 The upper end of each arm 47 is connected by a screw-thread connection 48 to a fitting 49 which extends laterally and is rotatably mounted around the inner end of a branch
 25 pipe 50. Pipes 50 extend through openings 51 in the side 39 of the housing and are connected to receive air under pressure from a supply pipe 52. The latter extends longitudinally of the drying chamber and is connected by a pipe 54 to a compressor 53 which
 30 is mounted on the base 28 and is driven by motor 26 through suitable reducing gearing. A valve 54^a is connected to pipe 54 and is adapted to control the amount of air delivered to pipe 52. Pipes 50 are supported by
 35 brackets 55 which are secured to the outer surface of side 39 adjacent openings 51. Each fitting 49 is provided adjacent the end of its respective pipe 50, with an annular integral flange 49^a which is adapted to abut
 40 against the inner end of said pipe to limit the outward movement of the fitting. An annular groove 49^b is formed in each fitting outwardly of the flange 49^a and in which are disposed a plurality of balls 56 which form
 45 a suitable bearing for the fitting. A cylindrical opening 49^c which is closed by a removable plug, is formed in each fitting adjacent the groove and through which balls 56 may be inserted into the groove. A plug
 50 57 is connected by a screw-thread connection 57^a to fitting 49 and is adapted to close openings 49^c.

Each arm 46 is solid and is connected at its outer end by a screw-thread connection
 55 58 to a laterally extending fitting 59 which is pivotally mounted on side 40 of the housing by a suitable ball bearing. A connecting rod 61 extends between each pair of fittings and is adapted to space the latter apart.
 60 Each connecting rod 61 is provided with a shaft or rod 62 which extends downwardly and at an angle with respect to arms 46 and 47. A weight 63 is mounted on each rod and acts as a counter-balance for pipe 45. Each
 65 weight is slidably mounted and provided

with a thumb screw 64 whereby it may be rigidly secured in a fixed position. By adjusting the position of the weights, the elevation of pipes 45 may be varied. A strip 65
 70 extends longitudinally of each pipe 45 and forms a surface against which the dishes will abut to swing the pipe into its elevated position. Each strip 65 is formed of resilient material, such as rubber, and is secured at
 75 its ends to arms 46 and 47 to hold it in position.

A plurality of pipes 66 are disposed adjacent the under surface of the upper reach of conveyor belt 13 and are provided with jet
 80 openings 66^a which are inclined upwardly at different angles and are adapted to deliver jets of air through the spaces of the conveyor belt to the under surface of the articles to disperse and absorb the moisture thereon.
 85 These pipes are connected to a supply pipe 67 which extends longitudinally of the drying chamber and is connected to pipe 54. A drain tray 68 is disposed below the conveyor belts 13 and 14 and is secured to the longitudinal beams 12. This tray is adapted to
 90 receive the water which is drained and dispersed from the articles and is connected by a pipe 69 to a suitable drain.

The operation of the drier will be as follows: Dishes or other such articles will be
 95 discharged onto the conveyor belt 14, which will convey the articles downwardly to permit any free water thereon to be drained off onto the tray 68 and will discharge them onto
 100 belt 13 which will propel them through the drying chamber. As the articles pass through the drying chamber they will abut against the strips 65 and swing the pipes 45 upwardly a sufficient distance to permit the
 105 articles to pass thereunder during which movement their top surface will be subjected to jets of air under pressure which will disperse and absorb the moisture thereon. The under surface of the articles will be subjected to like jets of air from the pipes 66 so that
 110 the entire surfaces of the articles will be thoroughly dried.

The invention exemplifies a dish-drying apparatus which is provided with new and improved means for delivering jets of air
 115 under pressure onto the articles to disperse and to absorb the water thereon, so as to quickly dry the dishes.

The invention is not to be understood as restricted to the details set forth, since these
 120 may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a drying apparatus of the character described, the combination of a conveyor for the articles to be dried, movably mounted means for delivering jets of air to the articles

to dry them, said means extending across the path of and being adapted to be shifted by said articles to permit the latter to pass thereunder, and means for delivering air under pressure to said delivery means.

2. In a drying apparatus of the character described, the combination of a conveyor for the articles to be dried, an enclosure through which the conveyor carries the articles, movable means in said enclosure for delivering jets of air to said articles to dry them, said means extending across the path of and being adapted to be shifted by the articles to permit the latter to pass thereunder, and means for delivering air under pressure to said delivery means.

3. In a drying apparatus of the character described, the combination of a conveyor for the articles to be dried, a pipe extending across the path of the articles and provided with a series of openings for delivering jets of air to said articles to dry them, said pipe being mounted so that it may be swung upwardly when engaged by the articles to permit the latter to pass thereunder, and means for delivering air under pressure to said pipe.

4. In a drying apparatus of the character described, the combination of a conveyor for the articles to be dried, an enclosure through which the conveyor carries the articles provided with sides, a pipe having formed therein a series of openings for delivering jets of air to said articles to dry them, said pipe being disposed in the enclosure and extending across the path of the articles, means at the sides of said enclosure for pivotally supporting the pipe so that it will swing upwardly when engaged by the articles to permit the latter to pass thereunder, and means for delivering air under pressure to said pipe.

5. In a drying apparatus of the character described, the combination of a conveyor for the articles to be dried, a pipe extending across the path of the articles and positioned normally in close proximity to the upper surface of the conveyor, said pipe being provided with a series of openings for delivering jets of air to the articles to dry them, upwardly extending arms connected to the ends

of the pipe, pivotal supports for the distal ends of the arms, said supports being operative to permit the pipe to be swung upwardly when engaged by the articles, and means for delivering air under pressure to said pipe.

6. In a drying apparatus of the character described, the combination of a conveyor for the articles to be dried, a pipe extending across the path of the articles and positioned normally in close proximity to the upper surface of the conveyor, said pipe being provided with a series of openings for delivering jets of air to the articles to dry them, upwardly extending arms connected to the ends of the pipe, pivotal supports for the distal ends of the arms, said supports being operative to permit the pipe to be swung upwardly when engaged by the articles, means for counterbalancing the pipe, and means for delivering air under pressure to said pipe.

7. In a drying apparatus of the character described, the combination of a conveyor for the articles to be dried, movably mounted means for delivering jets of air to the articles to dry them, said means extending across the path of and being adapted to be shifted by said articles to permit the latter to pass thereunder, an abutment element of resilient material connected to the delivery means, and an air pipe for supplying air under pressure to said delivery means.

8. In a drying apparatus of the character described, the combination of a conveyor for the articles to be dried, a pipe extending across the path of the articles and provided with a series of openings for delivering jets of air to said articles to dry them, a pair of upwardly extending arms connected to the ends of the pipe, pivotal mountings for the distal ends of said arms, said mountings permitting the pipe to be swung upwardly when engaged by the articles to permit the latter to pass thereunder, an abutment element of resilient material secured to the pipe in front thereof, and means for delivering air under pressure to said pipe.

Signed at Chicago, Illinois, this 1st day of February, 1926.

SAMUEL OLSON.