

Jan. 30, 1945.

B. G. DAW

2,368,525

CONVEYER

Filed Feb. 28, 1942

3 Sheets-Sheet 1

Fig. 1.

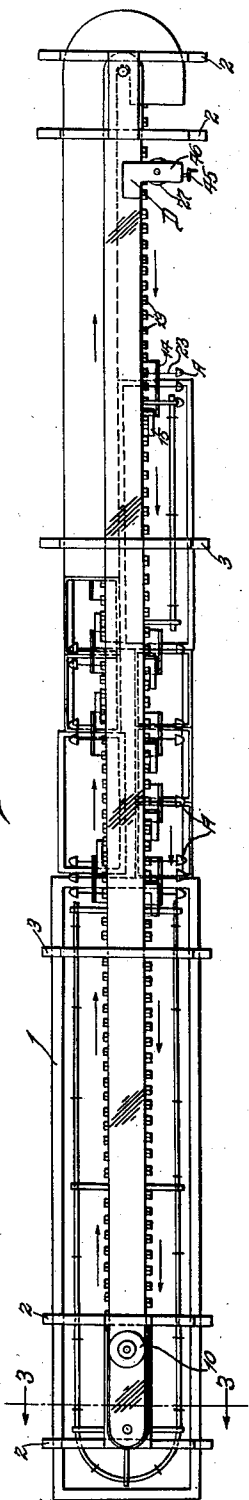


Fig. 2.

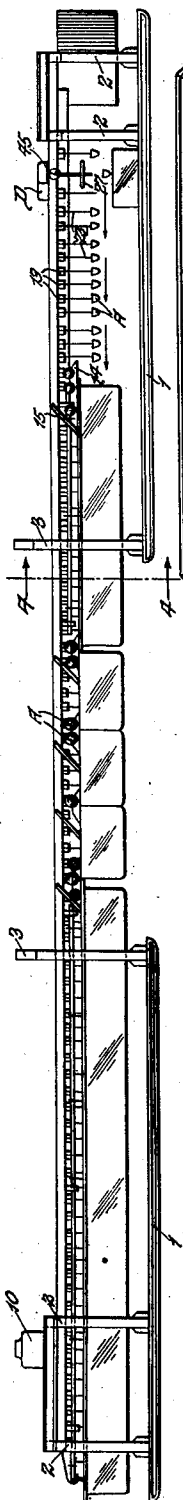


Fig. 3.

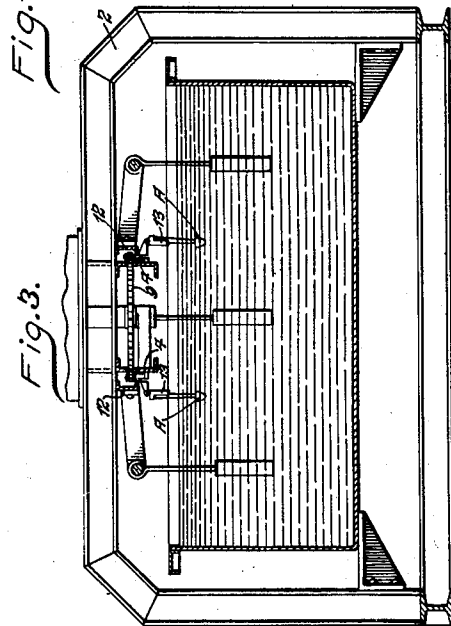
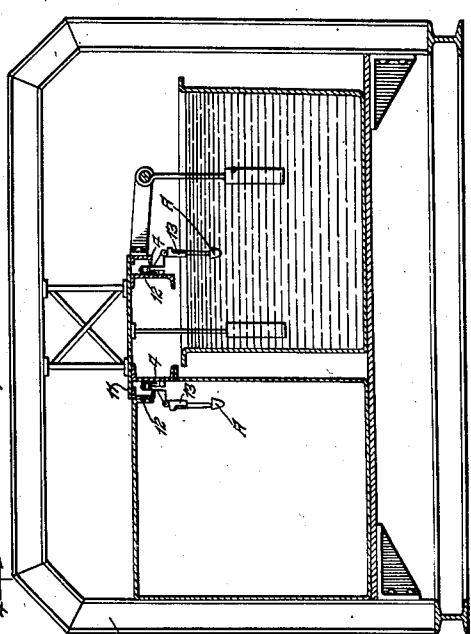


Fig. 4.



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Fig. 6.

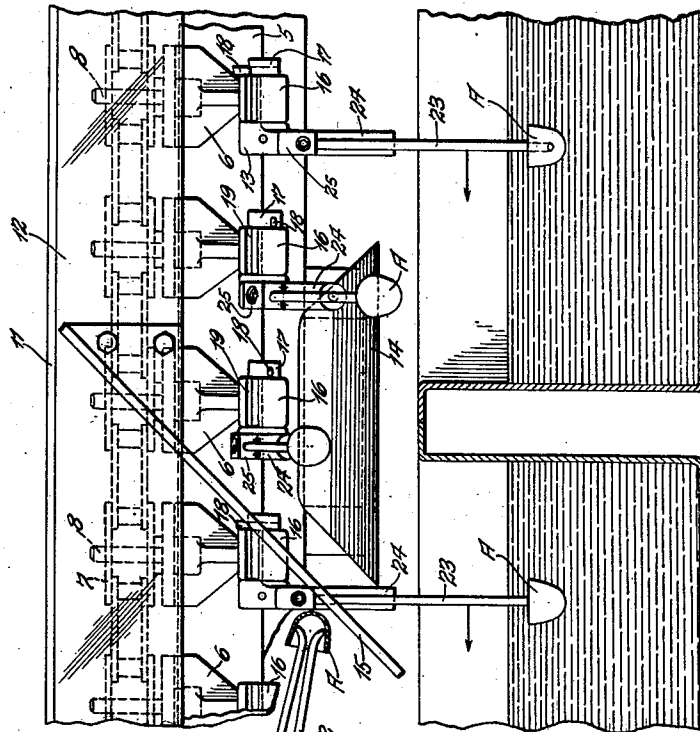


Fig. 5.

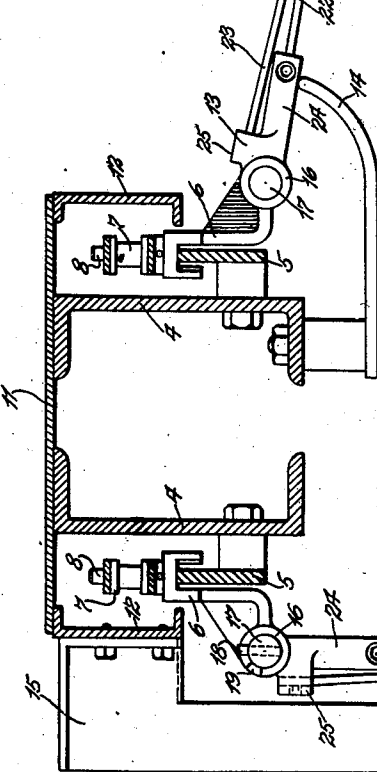


Fig. 12.

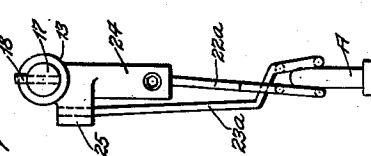
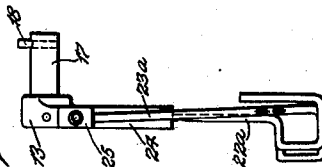


Fig. 11.



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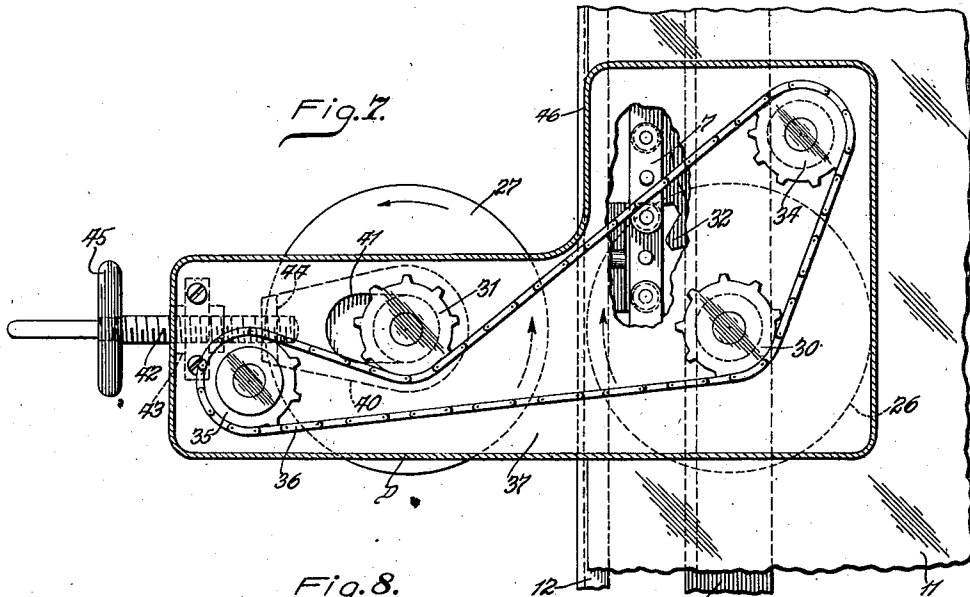
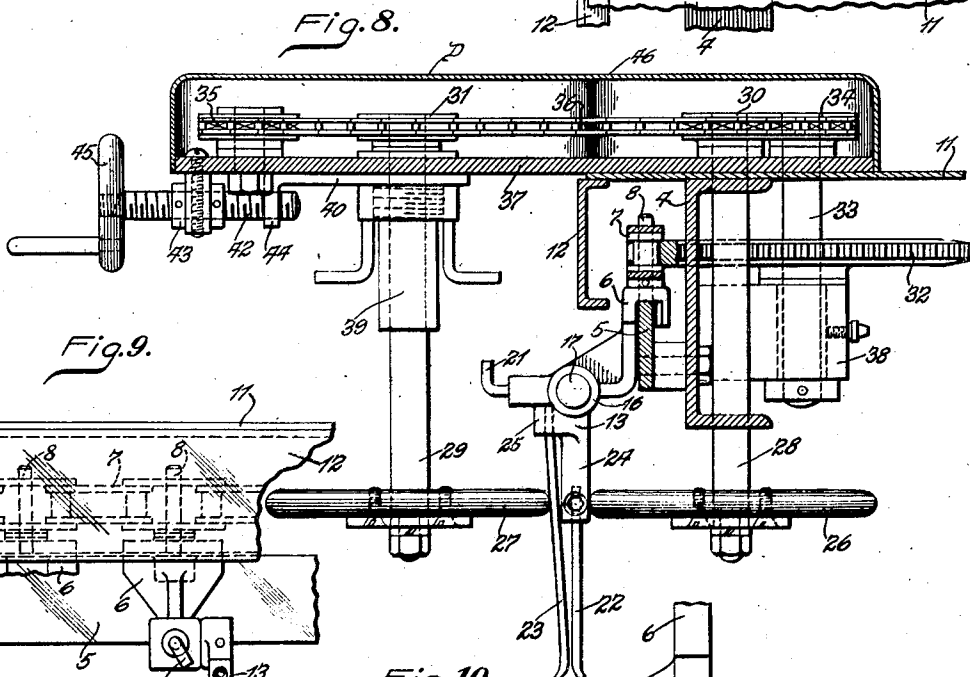
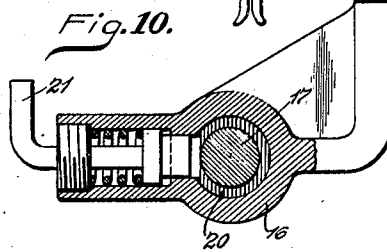
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CONVEYER

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UNITED STATES PATENT OFFICE

2,368,525

CONVEYER

Burton G. Daw, Webster Groves, Mo.

Application February 28, 1942, Serial No. 432,731

3 Claims. (Cl. 198—179)

This invention relates to conveyers of a type adapted for electroplating. More particularly it relates to unloading devices for such conveyers, and to work hangers adapted to cooperate with the novel unloading device.

An object of the invention is to provide a work hanger in a conveyer which is quickly detachable from the conveyer.

Another object is to provide a novel work hanger for articles, so arranged that the articles may be quickly attached to and detached from the hanger.

A further object is to provide an unloading device which will automatically detach articles from the work hanger, having the characteristics mentioned in the next preceding paragraph.

Further objects will be apparent from the following detail description taken with the accompanying drawings.

Fig. 1 is a plan view showing electroplating apparatus incorporating the invention;

Fig. 2 is a side elevation;

Fig. 3 is a sectional view on line 3—3, Fig. 1;

Fig. 4 is a sectional view on line 4—4, Fig. 2;

Fig. 5 is a detail vertical section showing the conveyer;

Fig. 6 is a detail elevational view showing the conveyer;

Fig. 7 is a plan view showing the unloader;

Fig. 8 is a vertical section showing the unloader, with a modified form of work carrier;

Fig. 9 is an elevational view showing the work carrier illustrated in Fig. 8;

Fig. 10 is a sectional view of the work carrier shown in Fig. 8;

Fig. 11 is a side view showing a work hanger with a different form of work engaging prongs; and

Fig. 12 is an end view of the work hanger shown in Fig. 11.

The invention may be incorporated in electroplating apparatus which has a conveyer arranged and adapted to convey work through a series of treatments, some or most of which include a bath for the work. The conveyer is so arranged that it will convey the work through spaces including those occupied by tanks, lowering the work into the liquids contained in the tanks and elevating the work at the ends of the tanks so that it clears the walls thereof. While the invention is illustrated and described as embodied in electroplating equipment, the invention may be put to other uses.

The frame for the apparatus includes base members 1, upon which are arranged vertical

supports or arches 2 and 3. Longitudinal beams 4 are supported by and within the arches 2 and 3.

A continuous rail 5, making a complete circuit about the apparatus is supported by the beams 4. This rail provides a support and guide for the shoes or brackets 6 of the work supports. This rail may form the electrical conductor by which the work is negatively charged at the electroplating step whereby the work forms a cathode. Similarly, for anodizing, the work may be positively charged.

An endless chain 7 is connected to the shoes 6. An upstanding pin 8, rigidly secured to the shoe, passes through holes in links of the chain 7.

The chain is driven by a sprocket 9 (Fig. 3) which in turn is driven by a motor 10 (Fig. 2) through speed reducing mechanism and connections, not shown, but well understood in the art.

A housing for the chain includes the beams 4, a plate 11 over the beams, and a longitudinal member 12, all clearly shown in Fig. 5.

A hanger or work support 13 is pivoted to the shoe 6, and is so constructed that normally it is suspended vertically below the shoe or bracket 6 with the work supported at its lower end. The hanger will be in this position when passing through a treating zone, such as the electroplating. But, since the hanger is pivoted to the shoe or supporting bracket, it may be deflected upwardly to clear the end of a tank.

This is accomplished by a cam 14, so arranged that it engages the inner surface or edge of the hanger, as shown in Figs. 5 and 6. A deflector plate 15, supported by the longitudinal member 12 serves to positively deflect the hanger when it passes the cam 14.

The work carrier which includes the shoe 6 and the hanger 13 is of novel construction. The arrangement is such that the hanger is quickly detachable from the shoe and also that work may be quickly detachable from the carrier.

To provide for quick detachability between the shoe and the hanger, a pivot connection is provided which comprises a journal integral with one of the members, an axle fitting the journal integral with the other member, and a releasable detent for holding the axle in the journal. As specifically shown the journal 16 is on the shoe, while the axle shaft 17 is on the hanger. Two different detents are shown in the drawings. One form is shown in Figs. 5 and 6, while the other form is shown in Figs. 8, 9 and 10.

In the form shown in Figs. 5 and 6, the axle 17 has a fixed laterally projecting pin 18 at the outer end of the axle and positioned to engage

the edge of the journal 16. The journal has a slot 19 therealong. Thus, by rotating the hanger 13 inwardly, the pin 18 may be brought into registry with the end of the slot 19, and then the hanger may be removed from the shoe by merely pulling the hanger forwardly (Fig. 6), with the pin 18 passing through the slot.

In the embodiment shown in Figs. 8, 9 and 10, a circumferential groove 20 is cut in the shaft 16, while a spring pressed detent 21, supported on the shoe, has its inner end engaging in the groove. Thus, in this embodiment, by pulling the detent 21, the shaft will be released and the hanger can be pulled longitudinally and away from the shoe.

The hanger 13 has means comprising resilient prongs 22 and 23, whereby articles A may be held for the travel throughout the circuit of the device and the treating steps, but which are so arranged as to permit such articles to be quickly placed on and removed from the carrier.

As specifically shown, the hanger 13 includes a relatively long rigid portion 24 with a socket in its end adapted to receive the end of the wire or resilient prong 22. The hanger 13 also has a shorter portion 25 which has a socket to receive the inner end of the prong 23. The prongs 22 and 23 are held in their respective sockets on the hanger 13 by appropriate set screws. The back of the longer portion 24 engages a cam 14, as shown in Fig. 5.

It will be apparent that the wires or resilient prongs 22 and 23 may be squeezed together so as to engage the inner walls of a hollow article A, (Fig. 5) and that the placing of an article on the end of the prongs is a simple manipulation. At the same time it can be seen that to unload the article from the hanger it is necessary only to squeeze the prongs together, letting the article drop from the end. It may also be understood that the wires or prongs 22 and 23 can be readily bent or formed to engage and hold the articles to be plated, even though such articles may vary widely in dimensions. The prongs 22 and 23 may be constructed of ordinary steel wire, and hence are quite inexpensive. The set screws provide for easy replacement. It is usual, of course, that a conveyer of this kind would ordinarily be used for plating a particular article of uniform dimensions, so that the hangers would be equipped with prongs all of which would be arranged uniformly to hold the articles.

When hollow articles, such as thimbles, collars, nuts and nipples, are to be plated, the prongs 22 and 23 will be approximately parallel, as shown in Fig. 5. When the articles to be plated must be grasped on exterior surfaces, the prongs are crossed, and may be of the form shown as 22a and 23a, Figs. 11 and 12. In either case the article may be released by pressing together the shanks of the prongs.

An unloading device, indicated by the symbol D, Fig. 1, and illustrated in detail in Figs. 7 and 8, accomplishes the unloading function with the hanger automatically. The important means for accomplishing this result are wheels 26 and 27 spaced from each other, so that the path of the hanger 13 is between the wheels, as best shown in Fig. 8. These wheels are preferably of fiber. They are rotated through a driving connection with the conveyer chain 7, the driving connection being such that their periphery rotates at the same speed as the hanger itself.

As specifically shown, the wheels 26 and 27 are in the same horizontal plane. They need not be in the identical plane, but may be in spaced paral-

lel planes, that is with one, preferably the wheel 27, below the other.

The wheels 26 and 27 are secured on the lower ends of vertical shafts 28 and 29 respectively, and have at their upper ends sprockets 30 and 31. Power for driving the wheels 26 and 27, through their sprockets 30 and 31, is supplied by the chain 7, with which is meshed a sprocket 32 secured to a shaft 33. The upper end of the shaft 33 carries a sprocket 34 in the same plane as the sprockets 30 and 31. The sprockets 30, 31 and 34, as well as an idling sprocket 35, are connected by a chain belt 36.

The unloader support includes a bottom plate 37 which rests on and is secured to the plate 11, which in turn is supported, as previously described, by a beam 4 and a longitudinal member 12. The bearing for the shaft 28 is supported by the plate 37, and an upper bearing for the shaft 33 is also supported by the plate 37. The lower end of the shaft 33 is journaled in a bracket 38 secured to the beam 4. The idling sprocket 35 is mounted on a stud shaft supported by the plate 37.

The shaft 29 is journaled in a bearing 39 supported by a slide 40, the upper end of the shaft 29 passing through a slot 41 in the plate 37. The slide 40 is movable laterally of the rail 5 and conveyer chain 7, so that the wheel 27 may be moved toward and away from the wheel 26, thus regulating the space between them. The slide 40 is moved by means of a screw 42 supported by a bracket 43 and in threaded engagement with a lug 44 on the slide 40. The screw 42 is turned by means of a hand wheel 45.

It may now be understood that the driving connection for the unloader is such that the wheels 26 and 27 are driven by the conveyer chain 7, so that the speed of the periphery of the wheels 26 and 27 is the same as the speed of the conveyer chain and the work hanger. It will also be seen that the wheels 26 and 27 are spaced in such a manner that the hanger 13 will pass between them, but the space is such that the wheels will press against the prongs 22 and 23 to force them together, thus releasing an article which may be suspended on the ends of the prongs.

It will also be seen that the space between the wheels 26 and 27 is adjustable, so that the unloader may operate with articles of different form and when the prongs 22 and 23 are in different spaced relationship. It will also be seen that the wheel 26 has its axle stationary, and engages the rigid portion 24 of the hanger. It will also be apparent that for some purposes the prong 22 may itself be rigid or substantially so, it being essential only that the one prong 23 be resilient. The wheel 27 is adjustable, so as to be properly spaced with reference to the relationship of the prong 23.

It is apparent that the hanger may be so constructed and proportioned and the wheel 26 be so arranged that it would engage the resilient prong 22, but an advantage is obtained by the construction shown in which the wheel 26 engages a rigid part of the hanger. Since a rigid portion of the hanger will always travel along the same path the wheel 26 may have its shaft in a fixed position. Thus any necessary adjustment in the spacing between the wheels 26 and 27 to accommodate different work and different spacing of the prongs 22 and 23 may be accomplished by adjusting the location only of the one wheel 27.

A cover plate 46 is provided for the chain belt 36 and its sprockets.

It will be understood that while a chain belt drive is shown, other means of driving the wheels 26 and 27, equivalent in nature, may be provided. 5

Various changes may be made in the details of construction, within the scope of the appended claims, parts of the invention may be used without the whole, and the invention may be used with apparatus other than that specifically disclosed, without departing from the spirit of this invention.

I claim:

1. In a conveyer, a work support pivotally secured to conveying mechanism, having a rigid body with a relatively short portion and a relatively long portion, and having downwardly directed parallel sockets in said portions, and resilient spaced prongs held in said sockets with opposed bottom ends spaced to yieldingly engage an article to be conveyed. 15 20

2. In combination with a conveyer having an endless chain and a work support connected to the chain, with a pair of spaced prongs, one at least of which is resilient, with opposed ends spaced to yieldingly engage an article to be con- 25

veyed, an unloader having a pair of wheels on vertical shafts with the peripheries of the wheels spaced from each other and on either side of a path of the work support sufficiently to engage and squeeze the prongs together and thereby release the work, a shaft driven by the chain, a sprocket on each of the shafts, and a belt connecting the sprockets.

3. In combination with a conveyer which has a work support with a pair of spaced prongs, one at least of which is resilient, with opposed ends spaced to yieldingly engage an article to be conveyed, an unloader having a pair of wheels with their peripheries spaced from each other and on either side of a path of the work support sufficiently to squeeze the prongs together and thereby release the work, a rigid support, a shaft for one of the wheels journaled in the support, a slide adjustable on the support, a shaft for the other wheel journaled in the slide, a driving shaft journaled in the support, a sprocket on each of the shafts an idling sprocket on the support, a belt connecting all of said sprockets and a sprocket on the driving shaft engaging with the conveyer.

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