

July 26, 1932.

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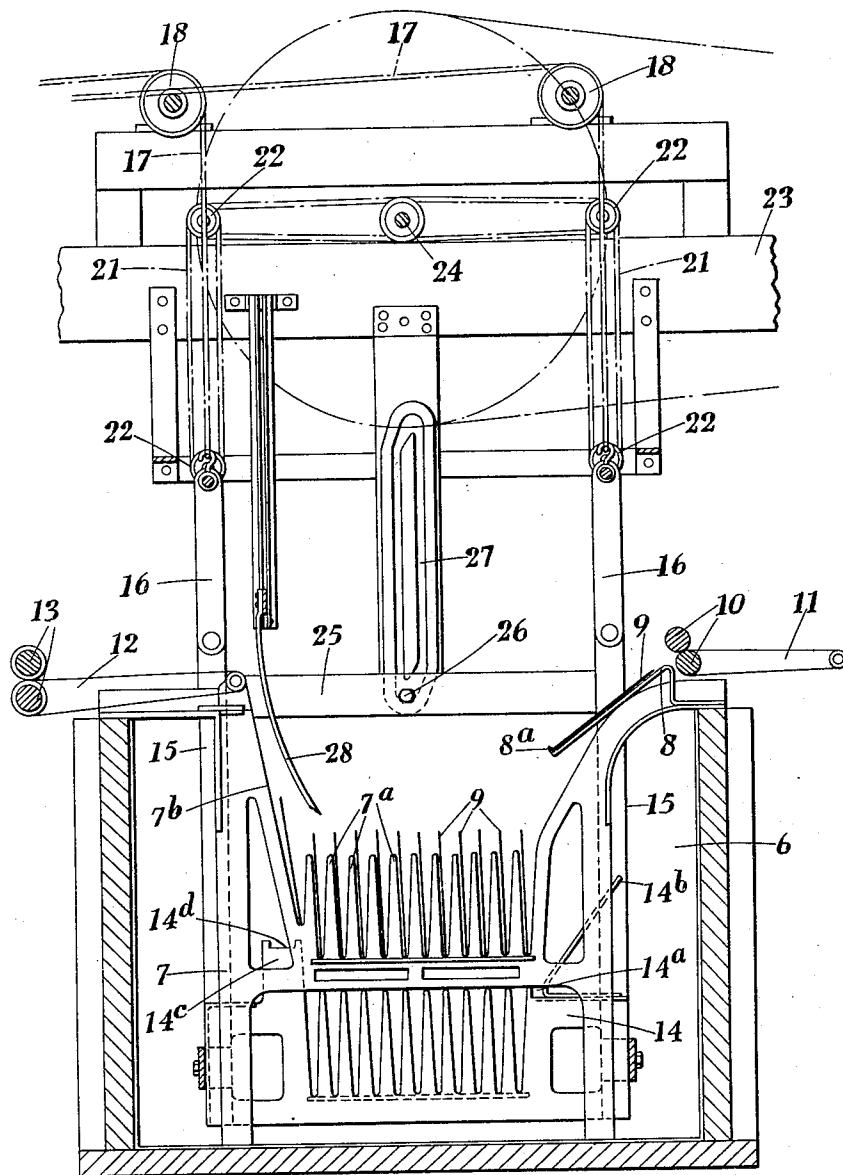
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CONVEYER FOR PLATES AND OTHER ARTICLES

Filed July 21, 1931

4 Sheets-Sheet 1

Fig.1.



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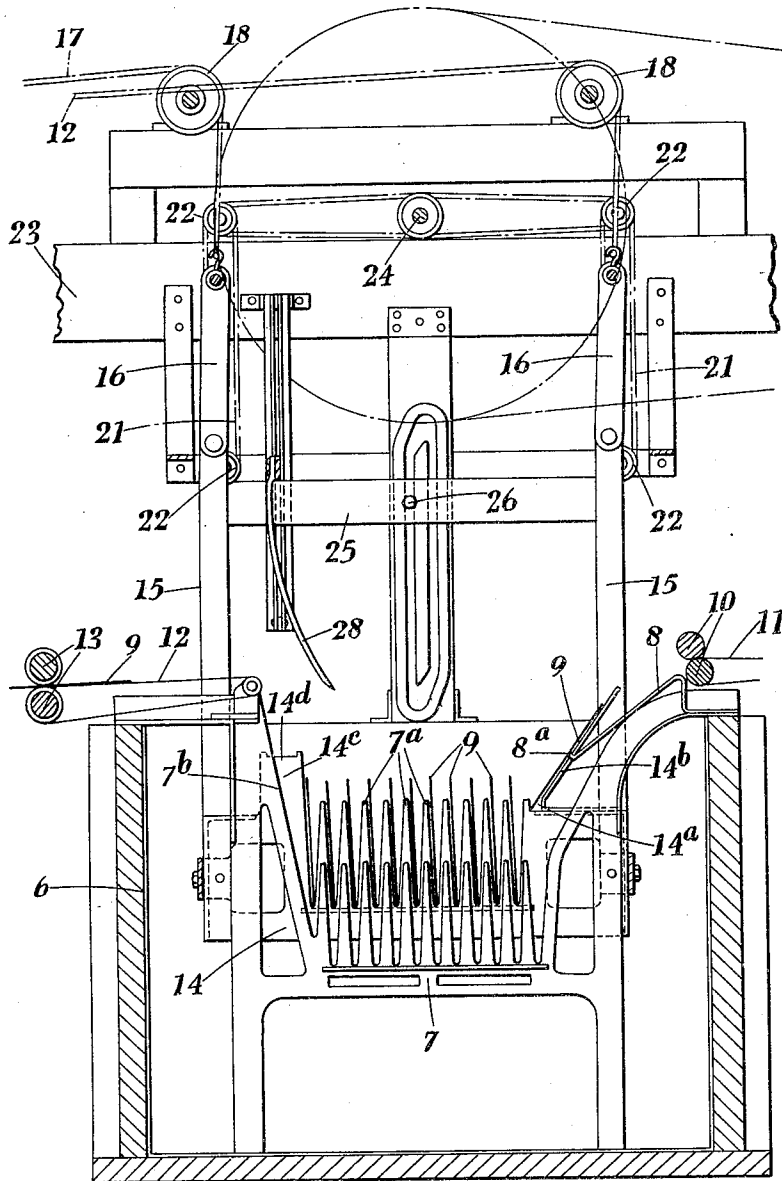
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4 Sheets-Sheet 2

Fig. 2.



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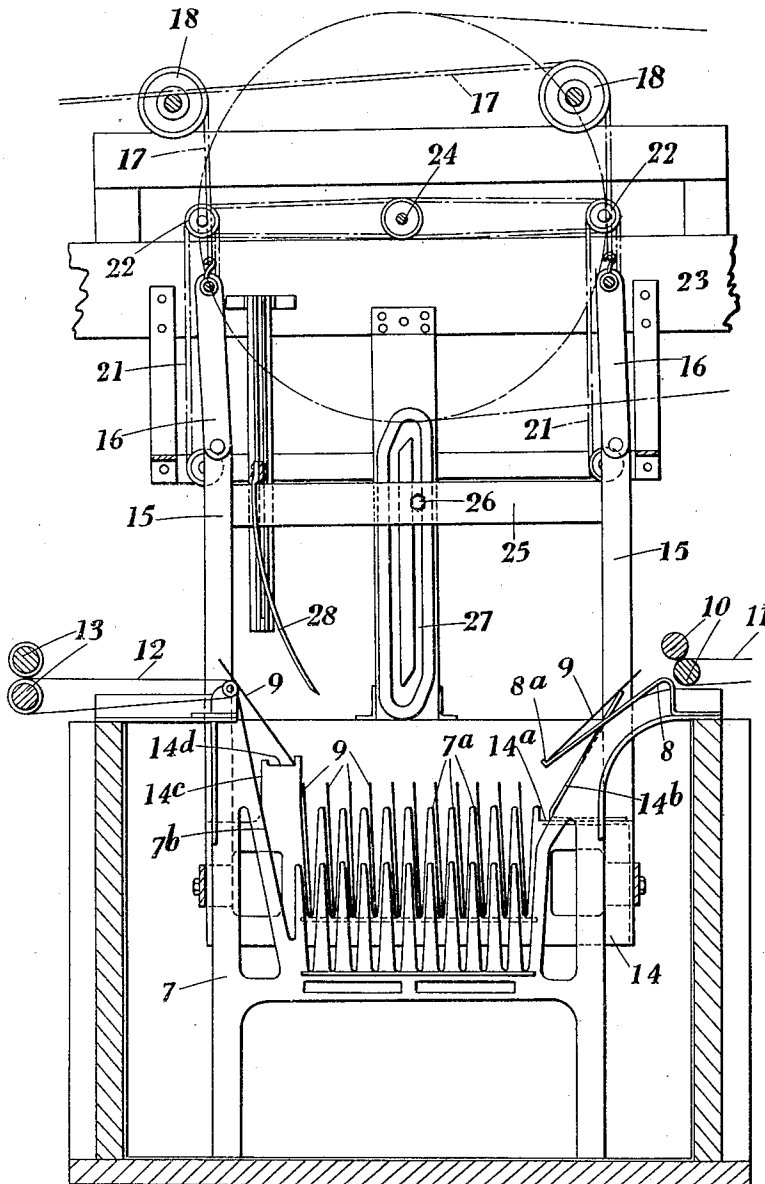
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4 Sheets-Sheet 3

Fig. 3.



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4 Sheets-Sheet 4

Fig. 4.

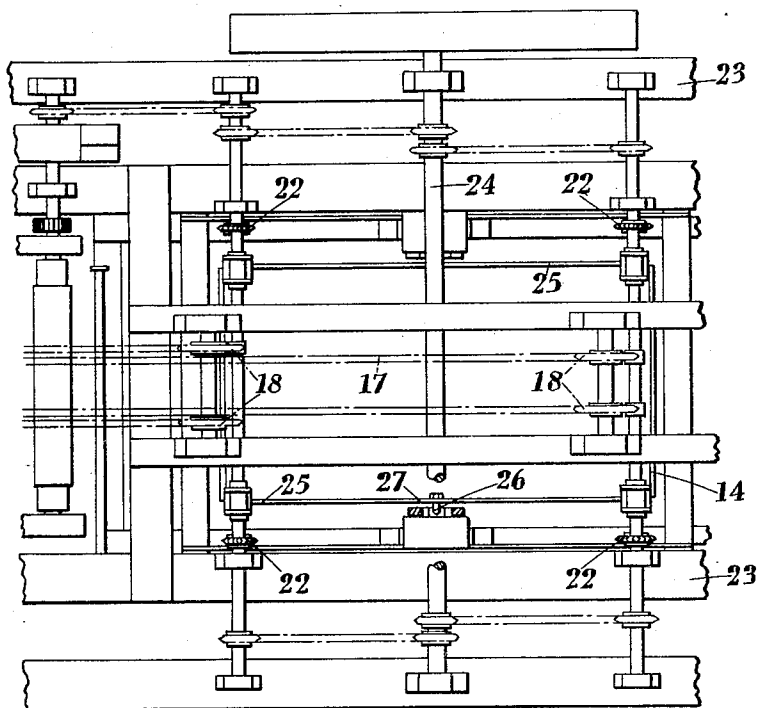
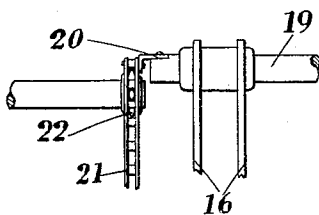


Fig. 5.



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CONVEYER FOR PLATES AND OTHER ARTICLES

Application filed July 21, 1931, Serial No. 552,096, and in Great Britain July 31, 1930.

This invention has reference to improvements in or relating to means for passing plates, sheets, bars or other articles through treatment baths, furnaces or the like and has for its object an improved means for the said purpose which occupies substantially the same relative space as devices employed for this purpose now in use and which, furthermore, permits of an increase in the number of plates, sheets, bars or other articles which are capable of being subjected to treatment at any one time.

The invention consists of an improved means for passing plates, sheets, bars or other articles through treatment baths, furnaces or the like and is characterized by a stationary member provided with a plurality of racks disposed within the bath or furnace each rack being adapted to receive a sheet, plate or other article; and a relatively movable rack member to which is imparted a vertical and longitudinal movement for the purpose of depositing the sheets, plates or other articles in the stationary racks and for passing them progressively through the bath or furnace to a delivery point.

The invention will now be described with particular reference to the accompanying sheets of drawings which illustrate the invention somewhat diagrammatically in its application to a mechanism for use in the manufacture of tinplates for passing the plates through the pickling bath.

In the drawings:—

Figure 1 is a view mainly in longitudinal vertical section showing the movable transfer member in its lowest position.

Figure 2 is a similar view to Figure 1 but showing the transfer member approaching its uppermost position and removing a plate from the feeding side of the machine in readiness for transference to the stationary member on the succeeding downward movement.

Figure 3 is a similar view to Figure 1 showing the method of raising the plate after it has passed through the bath.

Figure 4 is a plan of Figure 1.

Figure 5 is a detail view illustrating the method of effecting the movement of the transfer member.

In the drawings like numerals of reference indicate similar parts in the several views.

In one embodiment of the invention, as illustrated in the drawings, the pickling bath 6 has disposed therein a stationary member 7 formed with a central rectangular section which is disposed below the acid level in the bath and which is provided at each side with a rack 7^a so that the said section partakes of a comb structure when viewed in side elevation (see Figures 1-3).

Adjacent the feeding end of the bath and above the aforesaid stationary member 7 is a chute 8 on to which the plates 9 to be treated are fed through a pair of rolls 10, the plates being supplied to the said rolls by a conveyer 11 on to which the plates are fed either by hand or by a known sucker device (not shown). The aforesaid chute 8 is provided at its lower end with a stop ledge 8^a. At the delivery end of the bath 6 the stationary member 7 is provided with inclined guides 7^b which terminate adjacent to a second belt conveyer 12 which is adapted to receive the treated plates in a manner to be referred to hereinafter and to pass them to other mechanism through rollers 13. Disposed around the sides of the central portion of the stationary member 7 is a rectangular transfer member 14 the longitudinal sides whereof have a rack formation generally similar as to dimensions and shape of the teeth to the teeth of the rack sides of the stationary member 7. Adjacent to the feeding end the transfer member 14 is provided with a shallow recess 14^a which is located adjacent to upwardly and outwardly inclined guide bars 14^b fixed to the front end of the transfer member 14. At the delivery end the transfer member 14 is formed with a lifting section 14^c having a shallow recess 14^d to engage the lower edges of the plates, said lifting section 14^c being disposed above the level of the bottom extremities of the teeth of the rack. Adjacent each corner the transfer member 14 has fixed thereto vertical bars 15 said bars 15 being pivotally connected at their upper ends to links 16. The opposite pairs of links 16 are connected by bars 19 which are supported at their central portions from the ends of chains

17 which pass over sprocket wheels 18 and over other sprocket wheels (not shown) the ends of the chains 17 depending from the last mentioned sprocket wheels and being
 5 anchored to a balance weight (not shown) for counterbalancing the mass of the transfer member 14. The bars 19 (see Figure 5) have attached to the ends thereof the horizontal limbs of angle brackets 20 the vertical
 10 limbs whereof are connected to the pivot pins of pairs of vertically disposed endless roller chains 21 which pass around sprocket wheels 22 mounted in shafts supported from the frame 23 of the machine, said sprocket wheels
 15 22 being adapted to be driven in the same direction from a common driving shaft 24. The bars 15 are also interconnected adjacent their upper ends by longitudinally disposed side bars 25 having fixed at the centres thereof
 20 inwardly directed pins 26 which engage within vertically disposed cam tracks 27 fixed to the frame of the machine on opposite sides thereof.

Depending from the frame 23 adjacent to
 25 the delivery end are a pair of vertically displaceable downwardly and inwardly curved rods 28 as and for a purpose to be set forth hereinafter.

It will be appreciated that the movement
 30 of the endless chains 21 in conjunction with the cam tracks 27 impart successively to the transfer member 14 an upward, forward, downward and rearward movement.

The mechanism operates in the following
 35 manner:—

The plates 9 are conveyed from the feeding conveyer 11 one at a time on to the inclined chute 8 above the feeding end of the stationary member 7 with the said plate resting
 40 against the stop ledge 8^a. Upon the upward vertical movement of the transfer member 14 the plate resting against the stop ledge 8^a on the chute 8 is lifted by reason of the engagement of the lower edge of the plate with
 45 the bottom of the shallow recess 14^a and during the final stages of the upward movement of the transfer member the plate is lifted clear of the stop ledge 8^a and allowed to fall against the guide plate 14^b carried by the
 50 transfer member. Upon the subsequent forward movement of the transfer member 14 the plate is brought into register with the first rack space in the stationary member 7 and is deposited therein upon the downward
 55 movement of the transfer member. The rearward movement of the transfer member 14 brings the said member to its initial position. On the subsequent operation of the transfer member 14 the plate deposited as
 60 hereinbefore described is lifted from the first rack space in the stationary member 7 and transferred to the next space and the succeeding plate fed in to the rack space previously occupied thereby. This feeding movement
 65 continues until the last rack space of the sta-

tionary member is reached when upon the succeeding upward movement of the transfer member 14 the bottom of the recess 14^a in the lifting section 14^c of the transfer member 14 contacts with the under edge of the
 70 plate and carries the plate upwards and the plate falls on to the conveyer 12 whence it is fed into the nip of the rolls 13, the progressive feeding of the plates through the bath then proceeding continuously during the operation of the transfer apparatus.

The rods 28 serve to prevent a plate passing out of the bath to the conveyer 12 from falling rearwardly into the bath or into the rack, and is only operative in the event of a
 80 plate leaving the guides.

It should be appreciated that the invention is not limited to the means described herein for effecting the movement of the transfer member 14 and further that instead
 85 of working around the stationary member 7 the transfer member 14 may work within the said stationary member 7.

It is found in practice that a feeding mechanism constructed in accordance with the invention occupies substantially the same space
 90 as feeding devices of the kind heretofore in use and that owing to the employment of a fixed rack which is constantly disposed within the pickling bath a relatively larger number of plates can be subjected to treatment
 95 at any one time than is possible with feeding devices of the aforesaid known kind.

If it is desired to still further increase the capacity of the bath a plurality of stationary
 100 rack members may be employed arranged side by side in a lateral direction so as not to increase the length of the bath and thereby to increase the overall length required for a continuously operating apparatus of which the pickling mechanism may
 105 constitute a part.

It will be understood that for certain purposes, such for example as the normalizing of steel sheets, the sheets may be dealt with
 110 in packs containing a plurality of sheets and the packs passed through the treatment bath by a step-by-step feed in a similar manner to that hereinbefore described with reference to single sheets or plates.

Although the invention has been described in its application to an apparatus for passing the plates employed in tinplate manufacture through a pickling bath, it will be
 115 understood that the invention is equally capable of use in industry generally for passing articles through liquids such, for example, as preparatory baths for galvanizing and other anti-corrosion processes and
 120 for passing articles through furnaces for heat treatment and similar processes.

What we claim is:—

1. A means for passing plates, sheets, bars or other articles through acid treatment
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baths, furnaces, or the like incorporating a racked stationary member disposed within the bath or furnace, a movable transfer member, means for moving the said transfer member about the stationary member in a closed path and in a cycle involving successive upward, forward, downward and rearward movements, a feeding point, means carried by the movable transfer member for lifting the articles to be dealt with from said feeding point, a delivery mechanism and a lifting means forming part of the movable transfer member for lifting the longest treated articles to the delivery mechanism, the successive upward, forward, downward and rearward movements imparted to the movable transfer member serving to progress the articles to be treated progressively through the bath or furnace.

delivery of the longest treated articles to the delivery mechanism.

In testimony whereof, we have signed our names to this specification.

HUBERT SPENCE THOMAS.

WILLIAM ROBERT DAVIES.

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2. A means for passing plates, sheets, bars or other articles through acid treatment baths, furnaces or the like incorporating a racked stationary member disposed within the bath or furnace, a correspondingly racked movable transfer member, power driven means for effecting a motion of the movable transfer member in a closed path and in a cycle involving successive upward, forward, downward and rearward movements, a feeding point to which the articles to be treated are passed, means carried by the movable transfer member adjacent the said feeding point for lifting the articles from the feeding point during the upward movement of the said member and for depositing them in the racked stationary member upon the succeeding downward movement, a delivery mechanism and means carried by the movable transfer member adjacent the delivery point for lifting the longest treated articles from the stationary member and delivering them to the delivery mechanism upon the upward movement of the movable transfer member, the successive upward, forward, downward and rearward movements imparted to the movable transfer member passing the articles progressively through the bath or furnace.

3. A means for passing plates, sheets, bars or other articles through acid treatment baths, furnaces or the like according to claim 2, wherein the motion of the movable transfer member is determined by a cam track.

4. A means for passing plates, sheets, bars or other articles through acid treatment baths, furnaces or the like according to claim 2, having means for counterbalancing the weight of the movable transfer member for the purpose of reducing the power required to effect the desired movement thereof.

5. A means for passing plates, sheets, bars or other articles through acid treatment baths, furnaces or the like according to claim 2, having deflector means for assisting in the