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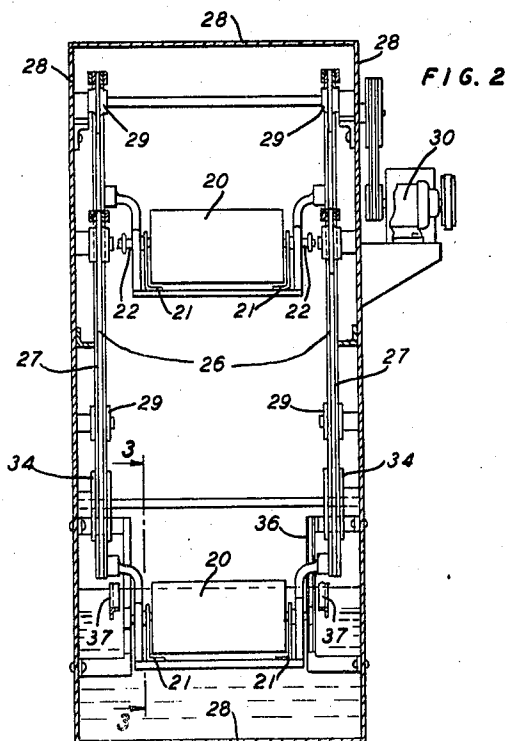
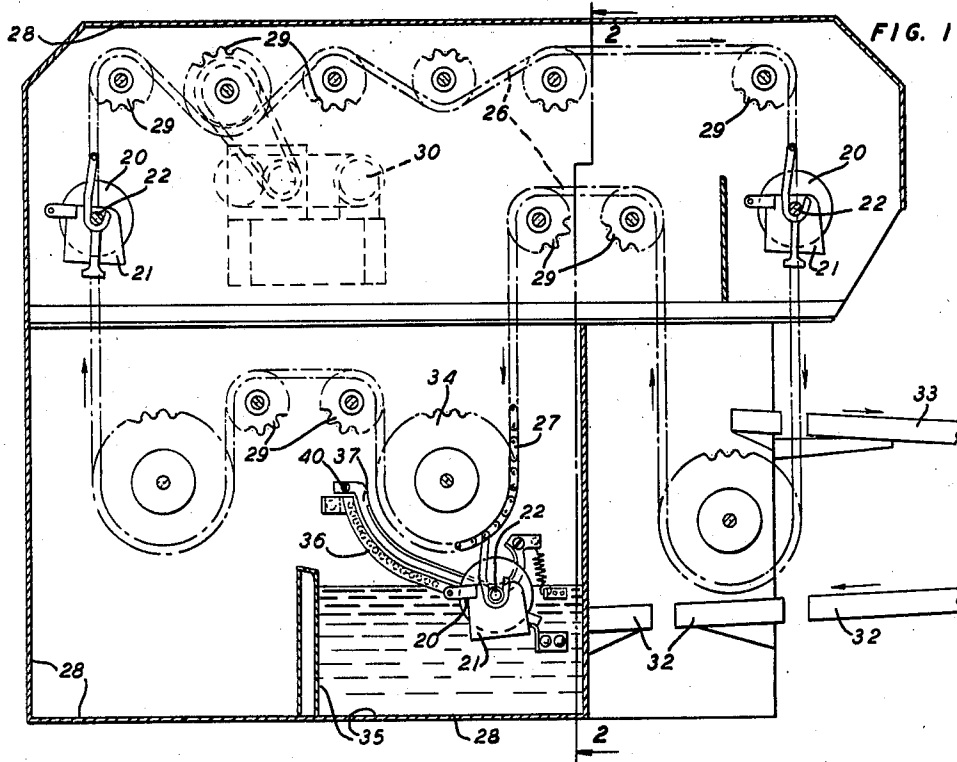
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ARTICLE HANDLING APPARATUS

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2 Sheets-Sheet 1



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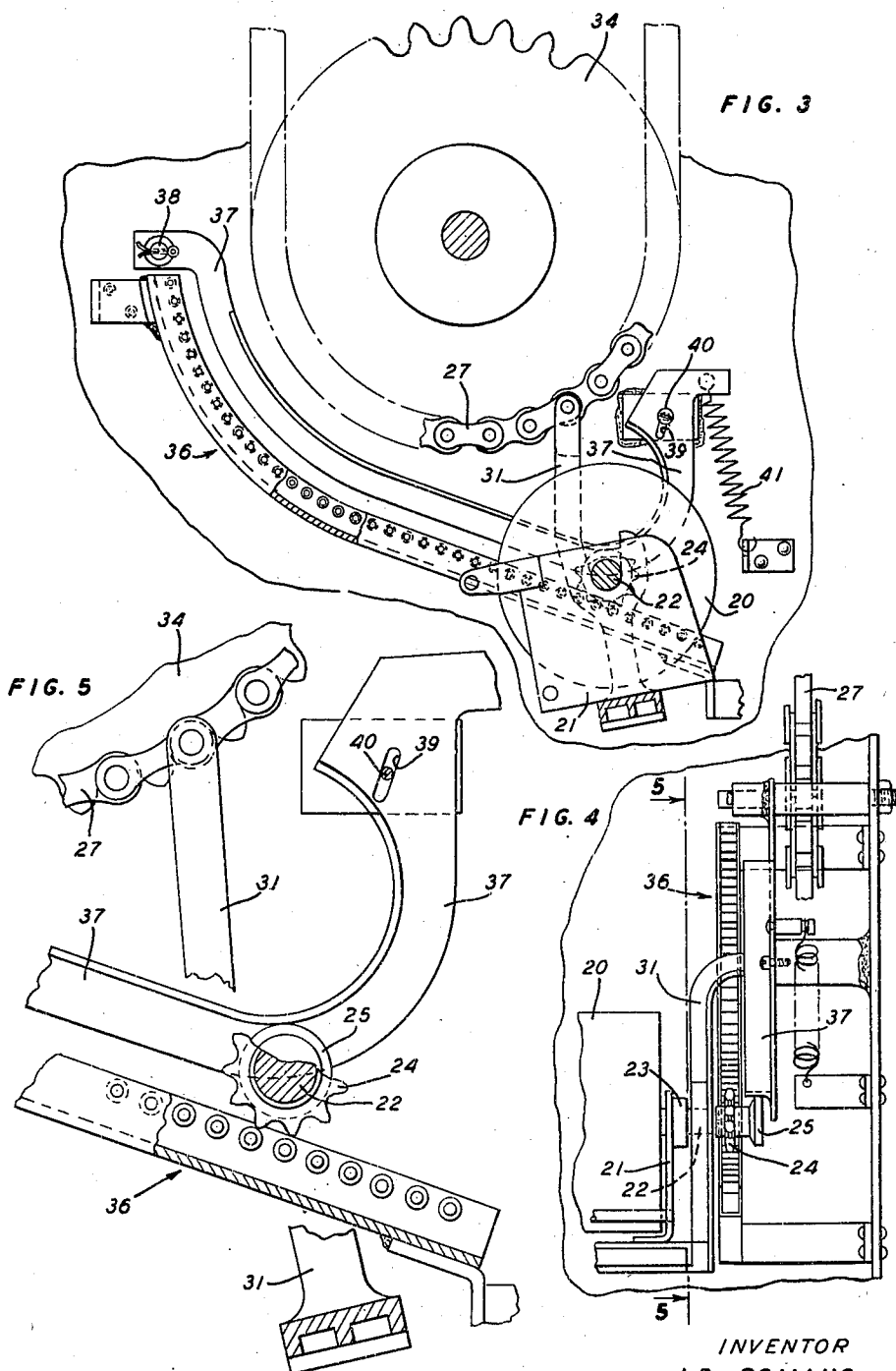
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ARTICLE HANDLING APPARATUS

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2 Claims. (Cl. 259-54)

This invention relates to article handling apparatus, and more particularly to apparatus for degreasing articles.

There are innumerable instances in various arts where it is desirable to subject articles to the action of a liquid agent or its vapor or both. In many such cases it will be preferable in practice to subject a batch consisting of a considerable plurality of the articles simultaneously to the action of the agent; and in such cases it may well be eminently desirable to agitate or stir the batch of articles while being treated in order that all parts of the surface of each article in the batch may be acted on the agent and not have parts thereof mashed against the agent by other articles in the batch. In some cases of such procedure apparatus is provided in which a batch, or a plurality of batches in sequence, carried in one or more pervious baskets or other appropriate containers by some form of conveyor means are automatically subjected to the several steps of a cleansing process which includes a step of dipping each such container with its batch of articles into a tank or the like of the liquid or of its vapor or both for a predetermined length of time and then removing it therefrom. In such cases it may be desirable, in order to stir or agitate the batch or articles, to rotate the container while in the tank of agent, in order to ensure satisfactory action of the agent on all parts of the surface of each article.

An object of the present invention is to provide simple, reliable, effective and durable means to rotate a container such as described while being transported by conveyor means.

With the above and other objects in view, the invention may be embodied in a container adapted to be transported by conveyor means and having a pinion projecting therefrom, in combination with a fixed rack to engage the pinion during its passage over a predetermined portion of its path to rotate the same and thereby the container; and a guide member to effect and maintain operative engagement of the pinion with the rack, the guide member being mounted to have resiliently yielding freedom of motion with respect to the rack to ensure operative engagement of the pinion with the rack without jamming.

Other objects and features of the invention will appear from the following detailed description of one embodiment thereof taken in connection with the accompanying drawings in which the same reference numerals are applied to identical parts in the several figures and in which

Fig. 1 is a diagrammatic longitudinal sectional view of an apparatus constructed in accordance with the invention;

Fig. 2 is a sectional view thereof on the line 2-2 of Fig. 1;

Fig. 3 is an enlarged broken detail view of the container rotating means in side elevation;

Fig. 4 is a partial end view of the showing of Fig. 2; and

Fig. 5 is a further enlarged detail view of the pinion, rack and guide.

The invention as herein illustrated is embodied in an apparatus for degreasing small metal articles by treating them with either or both the liquid and vapor phases of some suitable solvent such as benzene, carbon tetrachloride, trichloroethylene, or the like. For simplicity the articles to be treated may be thought of as small, flat punchings of sheet metal, greasy from various causes and so tending strongly to stick together flatwise.

A batch of the parts to be treated is placed in a generally cylindrical and normally completely closed container 20 supported to be rotatable about its axis in a cradle 21 by means of stub shafts 22 secured to and extending outwardly from the container ends and journaled at 23 in the end walls of the cradle. The cylindrical wall of the container is wire mesh or multiperforate sheet metal or otherwise made to admit the treating fluid or vapor freely to the interior of the container. On each shaft 22 is rigidly mounted a pinion 24, spaced a short distance outwardly from the journal 23, and on the outer end of the shaft is a cam roller 25, here shown as an integral part of the shaft, but which may also be rotatable on the shaft if desired. Principal purpose of the cradle is to support the container when not in active use as hereinafter described.

A chain type conveyor generally indicated at 26 comprises two parallel chains 27 which are guided together as shown in Figs. 1 and 2 over a more or less tortuous path within a housing 28 by means of paired sprockets 29, one pair of which may be driven by a motor 30 to drive the chains. The chains 27 are spaced a somewhat greater distance apart than the length of the shaft 22, and carry at suitable intervals paired hook members 31 adapted to hook under, lift and carry the shaft 22, engaging it in the spaces between the journals 23 and the cam roller 25. Thus a container and its cradle may be slid into the housing on a roller conveyor 32 and engaged as described with a pair of hooks 31 and by these carried along through the path of the chains to

a discharge platform or conveyor 33 and there disengaged from the hooks.

In illustrating the present invention the details of the apparatus, beyond what has been generally indicated above and what is particularized below, are irrelevant and so are not further described. For present purposes the point of importance is that at one point of the path of the chains, the chains are carried under a sprocket pair 34 and thus caused to dip the container down into and bring it up again out of an open topped tank 35 in which is a body of the degreasing liquid or vapor or both.

Above the tank 35 and below the sprockets 34 is positioned a pair of rigidly supported racks 36 each positioned and oriented to engage one of the pinions 24 shortly after the container 20 moves down into the tank. Each rack then follows the path of the pinion at first along an asymptotic straight line and then along a concentric arc. The pinion is engaged by the rack and dragged along over it, the hooks 31 being pivotable on their attachments to the chain to permit of this. The pinion rolls on the rack and thus drives the shaft 22 and therewith the container 20 in rotation, tumbling the contents of the container over and over while the container is passing through the agent in the tank and also for some time after the container emerges therefrom.

To enforce operative engagement of the pinion with the rack, a guide rail 37 is mounted above and parallel to each rack but outside the same to be engaged by the upper side of the cam roller 25 on that end of the shaft 22. Generally, the guide rail is of the same shape and is equidistant at all points from the corresponding rack. The entrance end (right hand end in Figs. 1, 3 and 5) is, however, curved upwardly to afford easy entrance between the guide and rack for the pinion and cam roller.

Were the guide rails 37 supported rigidly in position the arrangement would operate as designed and desired a large percentage of the time. There would, however, be occasions when a pinion would engage the corresponding rack with the tip of one of the teeth of the pinion meeting and being pressed against one of the bars of the rack at just the angle at which the stress exerted is radial to the pinion. There is then no force operative to rotate the pinion and the apparatus locks, the motor stalls, and there is danger of burning out motor windings. Power has to be cut off, the housing opened and entered and the accidental locking released.

To obviate this difficulty the guide 37 is mounted to be able to yield resiliently away from the rack, particularly at the entrance. As here disclosed, this is accomplished by pivoting the exit end of the guide on a fixedly supported pin 38, while the entrance end of the guide is formed with a slot 39 generally radial to the pinion when the latter is just about to engage the rack. A fixedly supported pin 40 passing through slot and normally engaged against the guide at the top of the slot supports the guide in its normal position, but leaves the entrance end of the guide free to move up, if the pinion jams, against the resilient resistance of a spring 41 to release the pinion.

The arrangement as described appears to work flawlessly for its purpose, at least so long as the containers are far enough apart on the chains so that there are never two sets of pinions between the racks and guides at one time. Should there be a possibility of there being a pinion pair and cam roller pair still in engagement just to the left of the pins 38 (Fig. 3) at the moment when a following pinion jams at the entrance, the exit end of the guide 37 instead of being pivoted on the pin 38 may be supported thereon in the same fashion that the entrance end is supported on the pin 40.

The embodiment herein disclosed is illustrative and may be modified and departed from variously without departing from the spirit and scope of the invention as pointed out in and limited solely by the appended claims.

What is claimed is:

1. In an apparatus for handling articles and having conveyor means and a container for articles and pivotable carrier means to attach the container to the conveyor means to be carried along by the conveyor while making the container free to swing transversely toward and from the conveyor means, a shaft on the container and mounted in the carrier means to make the container rotatable in the carrier means, a pinion on the shaft to rotate the container, a coaxial disk on the shaft, a rack of less length than the path of the pinion and fixedly positioned beside the path of the pinion to be engaged by the pinion and thereby effect rotation of the container during a portion only of the travel of the container, and a resiliently yieldable guide rail mounted beside the rack to engage the disk and thereby urge the pinion against the rack when coming into engagement therewith to ensure proper meshing engagement of the teeth of the pinion into the intertooth spaces of the rack and avoid jams occasioned by direct abutment of a tooth of the pinion against a tooth of the rack.

2. In an apparatus for handling articles and having conveyor means and a container for articles and pivotable carrier means to attach the container to the conveyor means to be carried along by the conveyor while making the container free to swing transversely toward and from the conveyor means, a shaft on the container and mounted in the carrier means to make the container rotatable in the carrier means, a pinion on the shaft to rotate the container, a coaxial disk on the shaft, a rack of less length than the path of the pinion and fixedly positioned beside the path of the pinion to be engaged by the pinion and thereby effect rotation of the container during a portion only of the travel of the container, and a resiliently yieldable guide rail pivotably mounted beside the rack to engage the disk and thereby urge the pinion against the rack when coming into engagement therewith to ensure proper meshing engagement of the teeth of the pinion into the intertooth spaces of the rack and avoid jams occasioned by direct abutment of a tooth of the pinion against a tooth of the rack.

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