Oct. 30, 1962 P. A. ROEHRBEIN 3,061,071

ATTITUDE CHANGING DEVICE

Filed May 18, 1960

Fig. 1

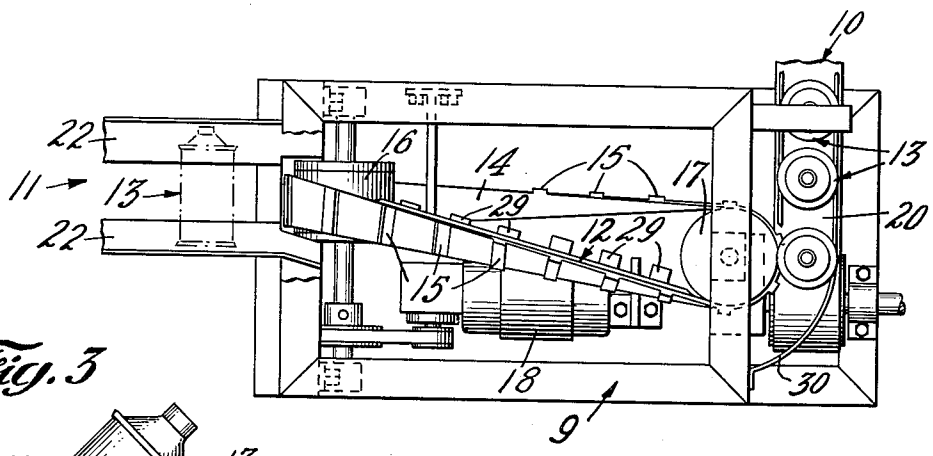


Fig. 3

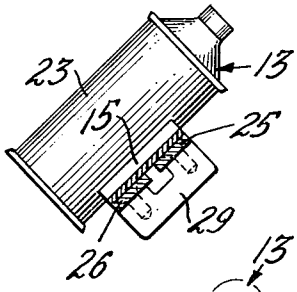
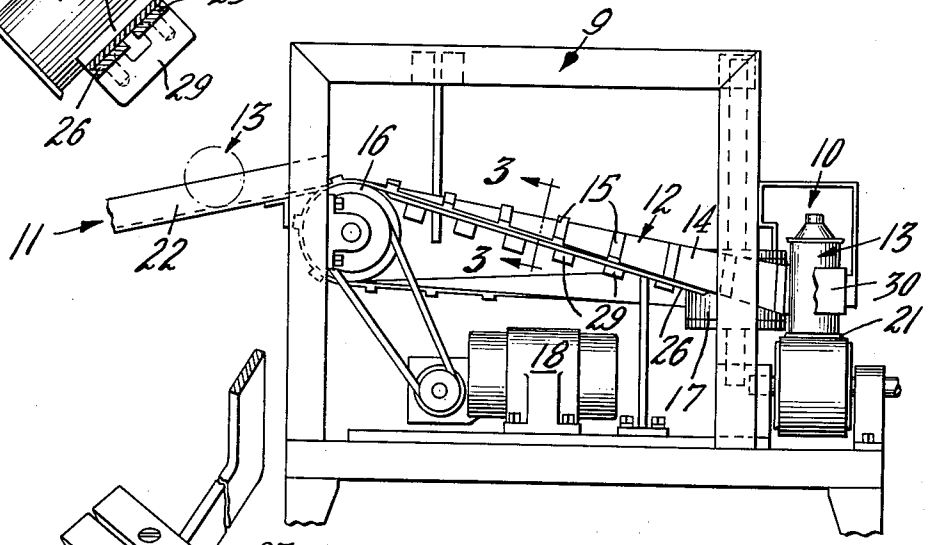


Fig. 2



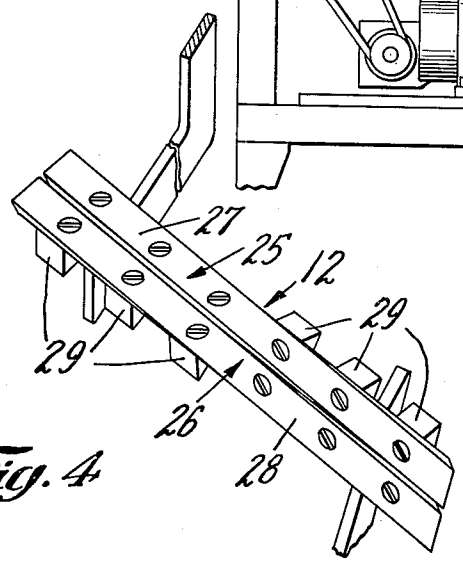


Fig. 4

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ATTITUDE CHANGING DEVICE

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This invention relates to an attitude changing device and more particularly to a device for changing the attitude of an article such as a tubular metal container or can.

Prior devices employ structure which engages the ends of cans during twisting or changing the attitude of the cans and accordingly can be used only with cans having ends of a specific configuration, usually flat. Such prior devices could not accommodate cans having ends of various configurations, such as domed or breast-shaped ends.

A principal object of the present invention is to provide a device which will twist an article such as a can, container, or the like, regardless of the configuration of the container ends.

A further object of the present invention is to provide a device operative to use magnetic lines of flux as gripping means and a non-magnetic belt as transfer means in moving a magnetic flux responsive metal container from a first track to a second track while simultaneously changing the attitude or orientation of the container.

Numerous other objects and advantages of the invention will be apparent from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

FIGURE 1 is a top view of a device incorporating the features of the invention;

FIGURE 2 is a front view of the device illustrated in FIGURE 1;

FIGURE 3 is a fragmentary enlargement partly in cross section taken along the line 3—3 of FIG. 2 and

FIG. 4 is a perspective view of the attitude changing way which provides magnetic flux and also guides the movement of containers between the infeed and outfeed means.

Referring to the drawings there is illustrated in FIG. 1 a supporting structure 9 supporting infeed means 10 such as a conveyor belt, an outfeed means 11 such as a chute, and a transfer and reorientation way 12 extending in cooperative relationship with and between the infeed and outfeed means 10 and 11. A cylindrical container 13 of ferrous metal is moved from infeed means 10 along the attitude changing way 12 and delivered to outfeed means 11. The container is moved along way 12 by an endless belt 14 provided with transverse flights or cleats 15 which engage the sidewalls of containers 13. The belt 14 is movably and operatively supported at opposite ends of way 12 for movement thereover by magnetized pulley wheels 16 and 17 having their respective rotational axes disposed to correspond with the axial orientation of the article at the adjacent feed means. Wheel 16 is driven by a suitable drive means as motor 18 to move belt 14.

Infeed conveyor 10 is provided with a horizontal surface 20 on which the bottom end 21 of the cylindrical container 13 rests so that the container 13 is disposed in a first predetermined orientation, such as an upright attitude with its axis of revolution orientated vertically. Outfeed means 11 is spaced from infeed means 10 and has an upper surface 22 disposed horizontally and thus parallel to infeed conveyor surface 20. The outfeed chute surface 22 will be engaged by the cylindrical wall 23 of container 13 delivered thereto, whereby the container 13 will roll from the apparatus along the chute in a second predetermined orientation, i.e. horizontal.

Way 12, as best seen in FIG. 4, includes a pair of

elongated cooperatively spaced and longitudinally extending belt support shoes 25 and 26 having aligned way faces 27 and 28 respectively. The way faces 27 and 28 at the end of way 12 adjacent infeed conveyor surface 20 are perpendicular thereto, i.e. vertical, and at the opposite end of way 12 the way faces 27, 28 are substantially horizontal to blend with outfeed surface 22. Thus, the curvature of the way 12 undergoes a quarter-turn therealong, and as the active run of belt 14 is supported thereon, the belt is likewise twisted 90° and thereby will twist container 13 90° during the travel thereof. Shoes 25 and 26 are constructed of flux conductive material capable of conducting magnetic lines of flux and form the opposite polarity poles of a magnet. Although the lines of flux may be provided by permanent magnets or electromagnetic coils, in this instance magnetic flux is provided by a plurality of individual permanent magnets 29 which bridge the space between shoes 25 and 26 and hold shoes 25 and 26 in spaced alignment with each other as well as providing the opposite magnetic poles and the magnetic flux at shoes 25 and 26.

Endless belt 14 is constructed of material capable of allowing the lines of flux to pass therethrough between the shoes and the containers being moved along the way 12 so that flux will pass through the cylindrical wall 23 of container 13 and between shoes 25 and 26 while container 13 is being moved along way 12. In actual practice, belt 14 is constructed of rubber, leather, plastics or other materials having similar electrical, magnetic, and physical properties. The belt spaces the container 13 from surfaces 27 and 28 as it moved along, so that the container is free from any surface marring contact with the way 12. Pushers 15 may be non-magnetic cleats or ridges integral with or joined to belt 14 and extending crosswise thereof. The pusher 15 is on the opposite side of belt 14 from way faces 27 and 28 and is aligned to engage the cylindrical wall of the container. When the side of a container 13 is moved into contact with the belt 14 by infeed means 10, pusher 15 engages container 13 to move it along with belt 14. The belt 14 is provided with a plurality of pushers 15 and the pushers are spaced apart therealong a distance greater than the diameter or width of the container so that each succeeding pusher will contact each succeeding infed container when more than one container is to be twisted.

Extending partially about wheel 17 is an arcuate guide 30 to maintain the container 13 in contact with belt 14, in those instances in which wheel 17 may have lost its magnetism, or may provide a magnetic field incapable of pulling the containers against the endless belt. As soon as container 13 enters the magnetic field of way 12, the flux from magnets 29, passing through shoes 25 and 26 and container wall 23 holds the side of container 13 against belt 14 while pusher 15 thereof moves container 13 from the infeed conveyor toward the outfeed chute. The general curvature of way faces 27 and 28 between the opposite ends of way 12 changes the attitude of or twists container 13 from its initial vertical position as it is moved along way 12 so that the container will be positioned horizontally when it reaches outfeed means 11.

It is apparent from the foregoing description that the present invention twists objects, cans, containers, or the like, while the ends thereof are free of engagement with any part of the transfer and reorientating means. For this reason containers or cans having ends of various sizes and shapes, for example, the modified cone shaped end illustrated in FIGURES 2 and 3, may easily be twisted by the device.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made in the form, construction, and arrangement of the

parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. An attitude changing device for tubular magnetic articles comprising,

infeed means for delivering said articles in a first predetermined axial orientation,

outfeed means for discharging said articles in a second predetermined orientation,

article transfer and reorientating means disposed between and operatively associated with said infeed means and said outfeed means to receive articles therefrom and deliver articles thereto in said orientations, respectively,

said transfer and reorientating means including, a pair of magnetized pulleys rotatably mounted adjacent said infeed means and said outfeed means, respectively, and adjacent the sides of the articles thereat,

each said pulley having its rotational axis disposed to correspond with the axial orientation of the article at the respective feed means thereadjacent,

an endless belt trained around said pulleys and having an active run and a return run extending therebetween,

said belt runs being progressively lonigtudinally twisted to merge at each end thereof into arcuate belt portions respectively concentric with the said pulley axes,

a rigid way extending between said pulleys in supporting underlying engagement with said active belt run and conforming to the twist thereof,

said way including a pair of spaced adjacent shoes providing a slide face for said belt, and a plurality of magnets rigidly secured in spaced relation to the underside of said shoes and transversely thereof to maintain the spacing therebetween,

said magnets having their like magnetic poles connected to each said shoe, respectively,

said belt having a plurality of longitudinally spaced transverse flights,

and means for driving said pulleys,

whereby the magnetic articles are transferred from said infeed means to said outfeed means by said magnetic pulleys and by said active belt run with the sides of the articles magnetically gripped thereto with their axes transversely thereof, the articles thereby reorientating during transfer from their infeed orientation to their outfeed orientation as the flights advance the articles along the twisted path of the supported belt.

2. The device of claim 1 wherein said pulleys have their rotational axes vertical and horizontal, respectively, and wherein said active belt run is twisted 90 degrees between said arcuate belt portions.

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