March 7, 1950 H. SCHMIDT 2,499,422

MAGNETIC CAN TURNOVER MECHANISM

Filed Feb. 20, 1948 2 Sheets-Sheet 1

Fig. 1

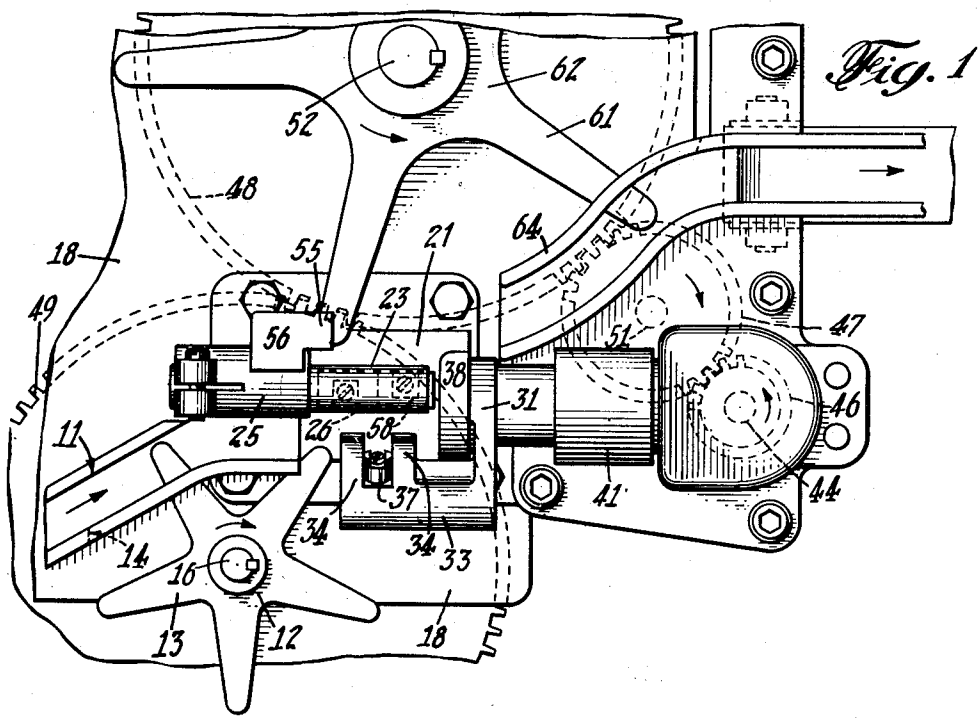
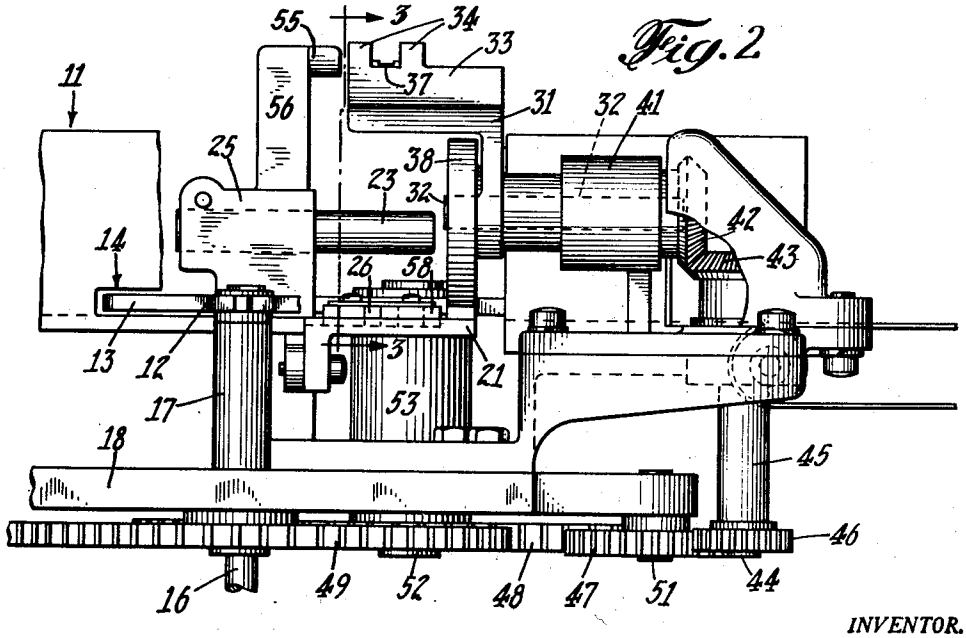


Fig. 2



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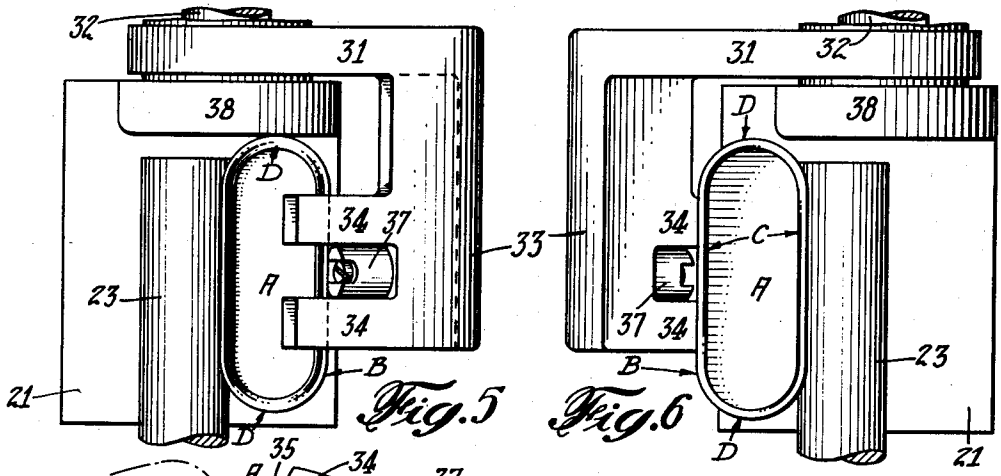


Fig. 5

Fig. 6

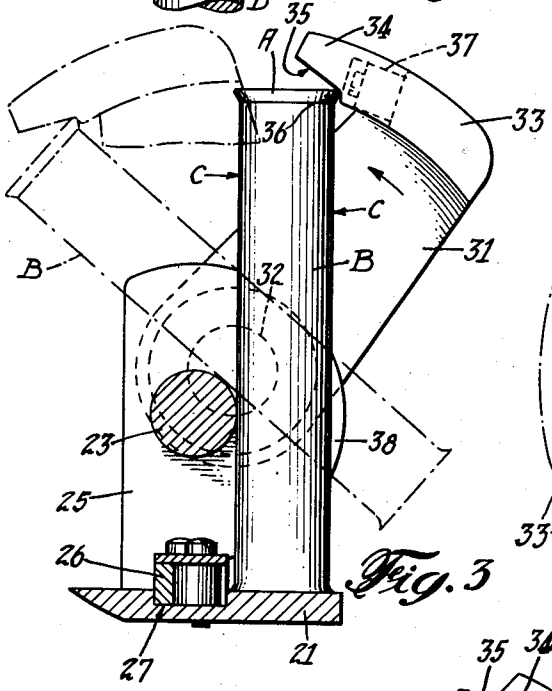


Fig. 3

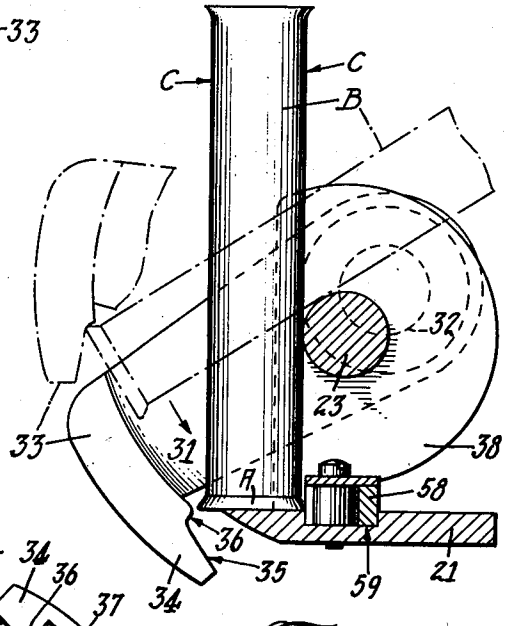


Fig. 4

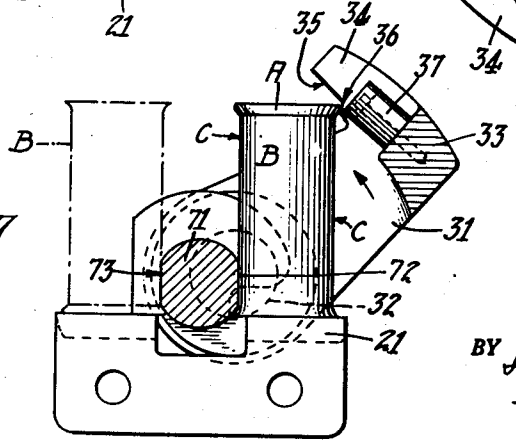


Fig. 7

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UNITED STATES PATENT OFFICE

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MAGNETIC CAN TURNOVER MECHANISM

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Application February 20, 1948, Serial No. 9,842

11 Claims. (Cl. 198—33)

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The present invention relates to a mechanism for inverting sheet metal containers or cans and other metallic articles, and has particular reference to a magnetic turnover device for inverting cans or articles by rolling them around the outer surface of a cylindrical magnet.

An object of the invention is the provision of a can turnover mechanism wherein sheet metal cans and other metallic articles are rapidly and gently inverted as they move along a path of travel and while being maintained in a predetermined spaced and timed order.

Another object is the provision of such a turnover mechanism wherein the cans or other articles are inverted by being revolved on and around a stationary bar magnet so that control of the can or other article may be maintained during the entire inverting operation.

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

Referring to the drawings:

Figure 1 is a top plan view of a turnover mechanism embodying the instant invention, with parts broken away;

Fig. 2 is a side elevation of the mechanism shown in Fig. 1, with parts broken away;

Fig. 3 is an enlarged fragmentary sectional view taken substantially along the broken line 3—3 in Fig. 2 and showing a can being inverted in the mechanism;

Fig. 4 is a view similar to Fig. 3 and showing a can and the movable parts of the mechanism in different positions incidental to completing the can inverting operation;

Figs. 5 and 6 are top plan views of the mechanism and cans shown in the respective Figs. 3 and 4, with parts broken away; and

Fig. 7 is an enlarged view similar to Fig. 3 and showing a modified form of the invention for a short can.

As a preferred embodiment of the instant invention the drawings illustrate a can turnover mechanism for use between two closing machines for attaching end closure members A (Figs. 3 and 4) to both ends of oblong shaped, sheet metal cans B having flat sides C and rounded ends D although the invention is applicable to other shaped containers and to other machines and purposes.

The cans B after having one end member A attached thereto, are fed into the mechanism in an upright on-end position and in a continuous

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procession, along a horizontal runway 11 (Figs. 1 and 2). Adjacent the machine end of the runway, the cans are engaged individually and are advanced in timed and spaced order by a rotatable star wheel 12 having radial prongs 13 which sweep across the runway through an opening 14 formed in a side thereof.

The star wheel 12 is mounted on the upper end of a vertical drive shaft 16 which is journaled in a bearing 17 formed on a frame 18 which constitutes the main frame of the mechanism. The drive shaft 16 is continuously rotated in any suitable manner.

A can B engaged by a prong 13 of the star wheel 12 is swept out of the terminal end of the runway 11 and advanced along a short table 21 bolted to the frame 18. The can is placed in a position with one flat side C against a horizontally disposed cylindrical bar permanent magnet 23 as best shown in Figs. 3 and 5. The outer end of the star wheel prong wipes past the can as it leaves the can in this position. One end of the bar magnet is clamped in a clamp block 25 formed on the frame 18. The opposite end, which is engaged by the can is held in suspension by the clamp block.

The can B is held in this position temporarily by a small horseshoe permanent magnet 26 (Figs. 1, 2 and 3) which is secured in a recess 27 formed in the table 21. This holding magnet is in vertical alignment with the bar or turnover magnet 23 and engages the bottom end of the positioned can as best shown in Fig. 3.

While the can B is in this position against the bar magnet 23 it is rotated around the magnet over the top thereof and thus turned over through an angle of 180° into an inverted position on the opposite side of the magnet as shown in Figs. 4 and 6. During this turnover action the can clings to the turnover magnet and thus the magnet controls the action of the can by effecting a rolling of the can on the magnet.

This turning or inverting of the can B on and over the turnover magnet 23 is effected by a turnover arm 31 which is disposed adjacent the free end of the turnover magnet and which is mounted on a rotatable horizontal shaft 32 (Figs. 2, 3 and 4). The outer end of the arm is formed with a turnover member 33 which extends parallel with the turnover magnet 23 in spaced and overlapping relation thereto and directly opposite the magnet for rotation around the magnet. This turnover member 33 is formed with a pair of spaced inverting lugs 34 having tapered lower faces 35 (Figs. 3 and 4) terminating in a shoulder

36 engageable with the upper edge or as in the instant case, the end seam of the can to be turned over as shown in Fig. 3. A small horseshoe permanent magnet 37 is disposed in the turnover member 33 between the inverting lugs 34 for retaining the engaged portion of the can in contact with the shoulder 36. The outer faces of this retaining magnet are flush with the shoulder 36 and thus form a part of the shoulder.

Between the turnover magnet 23 and the turnover arm 31, the shaft 32 carries a stop plate 38 against which the can engages when it is initially placed adjacent the turnover magnet 23, for properly locating the can relative to the magnet and for guiding the can as the latter is rolled around the magnet during the inverting operation.

The shaft 32 which carries the turnover arm 31 is disposed in an eccentric relation to the turnover magnet 23 as best shown in Fig. 3 and is journaled in a bearing 41 formed on the frame 18. This shaft 32 is continuously rotated in time with the entrance star wheel 12 by a bevel gear 42 (Fig. 2) carried on the outer end of the shaft. The gear 42 meshes with and is driven by a bevel gear 43 carried on the upper end of a vertical shaft 44 journaled in a bearing 45 formed on the frame 18. The vertical shaft 44 is driven by a train of meshing gears 46, 47, 48, the last of which meshes with and is driven by a driving gear 49 carried on the lower end of the drive shaft 16. The gear 46 is mounted on the lower end of the vertical shaft 44. The gear 47 is carried on a pin 51 secured in the frame 18 while the gear 48 is mounted on a shaft 52 journaled in a bearing 53 formed in the frame.

Hence as the shaft 32 rotates, it revolves the turnover arm 31 and its member 33 around the turnover magnet 23 in an eccentric relation thereto and in time with the reception of the cans B adjacent the magnet. A can B is received adjacent the turnover magnet 23 just as the turnover member 33 is traveling upward in a counterclockwise direction as viewed in Fig. 3. As the turnover member approaches the upper end of the now stationary can B, its inverting shoulder 36 engages the can as shown in Fig. 3 and thus starts to tilt and roll the can over the magnet. The retaining magnet 37 adjacent the shoulder 36 holds the upper end of the can in place against the shoulder during this rolling action. The upper end of the can is also guided during this initial rolling action to insure proper seating of the can against the shoulder, by an overhanging guide block 55 (Figs. 1 and 2) formed on an upright support 56 which extends up from the frame 18.

As the turnover arm 31 continues to revolve around the stationary turnover magnet 23, it rolls the can on and around the magnet through the positions shown in dotted lines in Figs. 3 and 4 and finally brings it into a fully inverted vertical position as shown in full lines in Figs. 4 and 6 supported on the table 21 but on the opposite side of the turnover magnet. During this can inverting operation and near the end thereof as the can engages the table 21, the turnover member 33 pushes the engaged end of the can inwardly along the table, substantially parallel thereto and this action, together with the eccentricity of the shaft 32 relative to the turnover magnet 23, causes the shoulder 36 on the turnover member to gradually slide off the can with a wiping action relative thereto and thus smoothly pass by the can while leaving the can

in its properly inverted position. During this final positioning of the can, its now lowermost inverted end member A is pushed into engagement with a small horseshoe permanent magnet 58 (Fig. 4) which is disposed in a recess 59 in the table 21 adjacent the magnet 26. This magnet serves as a stop for properly locating the lower inverted end of the can and for temporarily holding the can in place preparatory to further advancement in its inverted position.

After thus being inverted, the can B is engaged by a prong 61 (Fig. 1) of a discharge star wheel 62 mounted on the upper end of the vertical shaft 52 which is rotated by the gear 48. This discharge wheel operates in synchronism with the turnover arm 31 and the entrance star wheel 12 and thus continues the timed and spaced relation of the can B as they pass through the mechanism. The discharge wheel shifts the inverted can along the table 21 and thus strips the can from the turnover magnet 23 and retaining magnet 58. Under continued movement by the discharge wheel, the inverted can is advanced into a discharge runway 64 which guides the can into the next machine or to any other suitable place of discharge.

When the cans to be operated upon are short so that the holding magnets 26, 58 must be omitted for lack of space, a modified form of turnover magnet 71 as shown in Fig. 7 is used. In this modfiied form of the invention the magnet 71 is formed with two oppositely disposed flat sides or sections 72, 73 which are vertically disposed on opposite sides of the magnet so that when a can initially engages the magnet, the flat section 72 will hold the can in a vertical position without further support. In like manner, a can that has been rotated on and around the magnet, into an inverted position, is automatically brought into and held in a vertical position when it engages the flat section 73 on the magnet. Thus the flat sections 72, 73 alone retain the can in an erect position just prior to and immediately following the can inverting operation. In this modified form of the invention the preferred form of eccentrically disposed turnover arm 31 and its members 33, 34, 35, 36 and 37 are utilized to roll the can over the turnover magnet to effect the inverting of the can in the same manner as in the preferred form.

In these disclosed forms of the invention all of the magnets mentioned and illustrated are of the permanent magnet type. Obviously these magnets could equally well be of the electromagnet or other type, if desired.

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. A turnover mechanism for inverting magnetizable containers and other magnetizable articles, the combination of a magnet, and a turnover member rotatable around said magnet and engageable with a container and revolving it on and around said magnet for rotating the container from one position into another position.

2. A turnover mechanism for inverting magnetizable containers and other magnetizable articles, the combination of a magnet, and a turn-

over member rotatable eccentrically around said magnet and engageable with a container in one position and revolving it on and around said magnet for rotating it into another position and leaving the container in said other position.

3. A turnover mechanism for inverting magnetizable containers and other magnetizable articles, the combination of a magnet, a turnover member rotatable around said magnet and engageable with a container and revolving it on and around said magnet for rotating the container from one position into another position, and a magnet element on said turnover member for maintaining engagement between the container and the turnover member during rotation of the container.

4. A turnover mechanism for inverting magnetizable containers and other magnetizable articles, the combination of a support for a container, a magnet suspended adjacent said support in spaced relation thereto, magnet elements on said support and engageable by a container on opposite sides of said magnet for locating the container relative to said magnet, and a turnover member rotatable around said magnet and engageable with a positioned container and revolving it on and around said magnet for rotating the container from one position into another position.

5. A turnover mechanism for inverting magnetizable containers and other magnetizable articles, the combination of a stationary cylindrical magnet, and a turnover member rotatable around said magnet and engageable with a container and revolving it on and around said magnet with a rolling action for turning the container from an upright position into an inverted position.

6. A turnover mechanism for inverting magnetizable containers and other magnetizable articles, the combination of a stationary cylindrical magnet having a pair of oppositely disposed flat sides for attracting and temporarily retaining a container in oppositely disposed positions, and a turnover member rotatable around said magnet and engageable with a container held by one of said flat sides and revolving it on and around said magnet with a rolling action for turning the container from said position into an inverted position in engagement with the opposite flat side of said magnet.

7. A turnover mechanism for inverting magnetizable containers and other magnetizable articles, the combination of a stationary cylindrical magnet, a continuously rotating arm eccentrically mounted relative to the longitudinal axis of said magnet, and a turnover member on said arm and rotatable with said arm around said magnet along a curved path of travel eccentric to the longitudinal axis of said magnet and engageable with an edge of a container in one position and revolving it on and around said magnet with a rolling action for turning the container into an inverted position and moving away from the propelling edge of said inverted container for leaving the container in an inverted position.

8. A turnover mechanism for inverting magnetizable containers and other magnetizable articles, the combination of a magnet, a turnover member rotatable around said magnet and engageable with a container and revolving it on and around said magnet for rotating the container from one position on one side of said magnet into another position on the other side of said magnet, and feeding means for shifting a container into its initial position adjacent said magnet preparatory to its rotation around said magnet and for discharging the rotated container from the opposite side of said magnet.

9. A turnover mechanism for inverting magnetizable containers and other magnetizable articles, the combination of a magnet, a turnover member rotatable around said magnet and engageable with a container and revolving it on and around said magnet for rotating the container from one position on one side of said magnet into another position on the other side of said magnet, and feeding means operable in timed relation to the rotation of said turnover member for shifting a container into its initial position adjacent said magnet preparatory to its rotation around said magnet and for discharging the rotated container from the opposite side of said magnet.

10. A turnover mechanism for inverting magnetizable containers and other magnetizable articles, the combination of a magnet, a turnover member rotatable around said magnet and engageable with a container and revolving it on and around said magnet for rotating the container from one position into another position, and a stop element disposed adjacent said magnet for locating a container relative to said magnet for rotation therearound and for guiding the container during its rotation around said magnet.

11. A turnover mechanism for inverting magnetizable containers and other magnetizable articles, the combination of a magnet, a turnover member rotatable around said magnet and engageable with a container and revolving it on and around said magnet for rotating the container from one position into another position, and a stop element rotatable with said turnover member for locating a container relative to said magnet for rotation therearound and for guiding the container during its rotation around said magnet.

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No references cited.