Dec. 19, 1950 S. BIRKLAND 2,534,220

MACHINE FOR STRAIGHTENING CAN BODY FLANGES

Filed Nov. 18, 1947 3 Sheets-Sheet 1

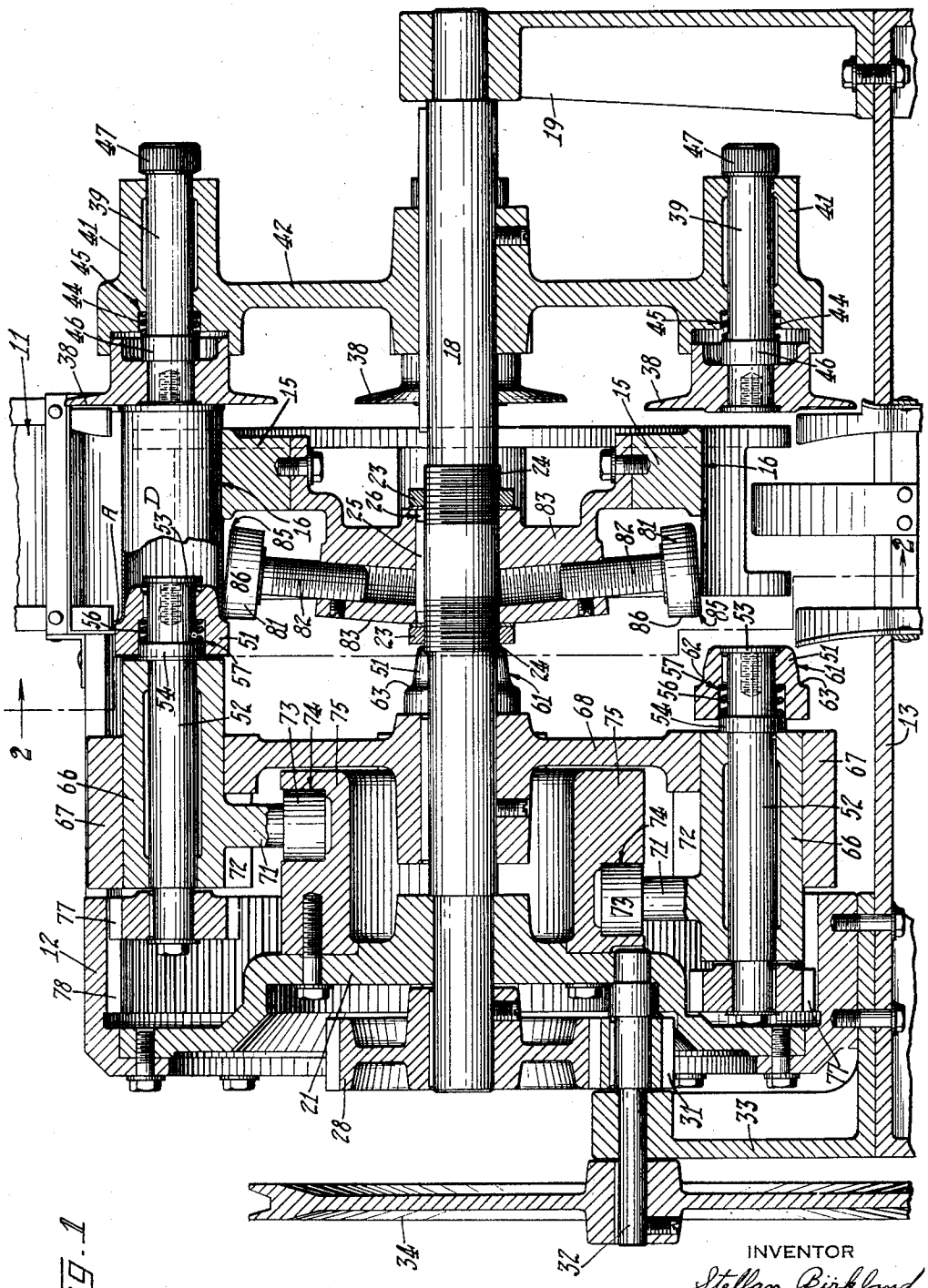


FIG. 1

INVENTOR
Stellan Birkland
BY Ivan D. Thornburgh
Charles H. Lane
ATTORNEYS

Dec. 19, 1950 S. BIRKLAND 2,534,220

MACHINE FOR STRAIGHTENING CAN BODY FLANGES

Filed Nov. 18, 1947 3 Sheets-Sheet 2

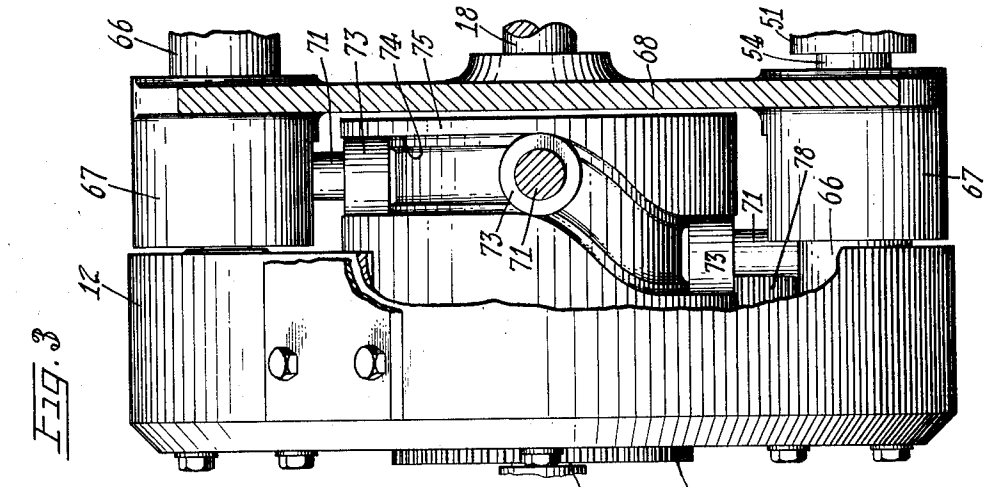


Fig. 3

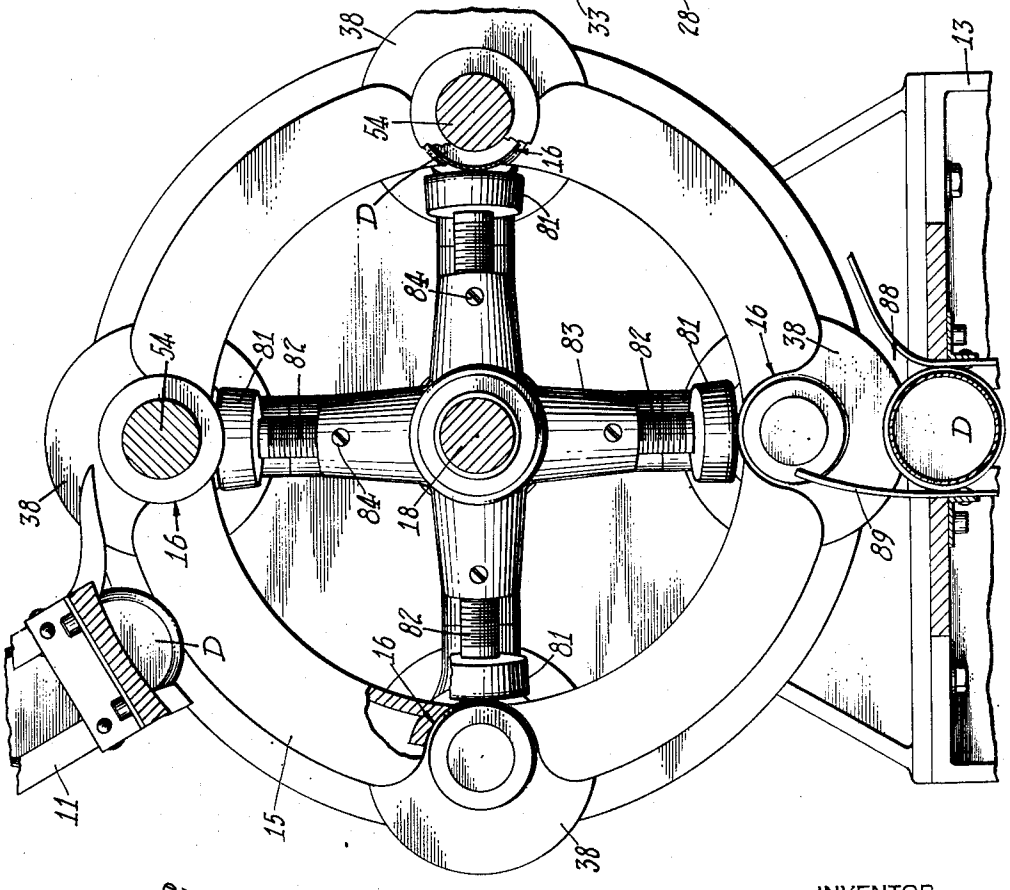


Fig. 2

INVENTOR
Stellan Birkland
BY Ivan D. Thornburgh
Charles H. Evans
ATTORNEYS

Dec. 19, 1950 S. BIRKLAND 2,534,220

MACHINE FOR STRAIGHTENING CAN BODY FLANGES

Filed Nov. 18, 1947 3 Sheets-Sheet 3

Fig. 4

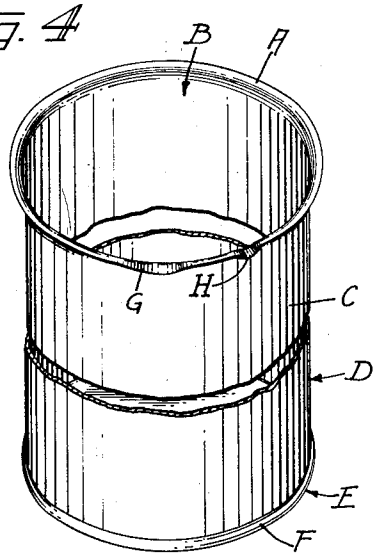


Fig. 8

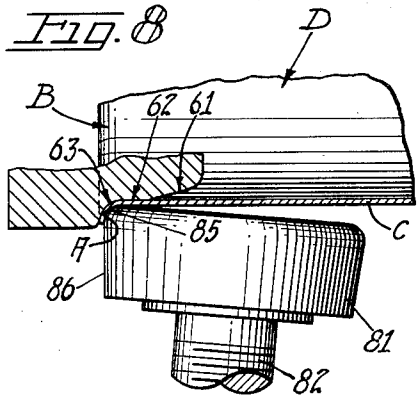


Fig. 5

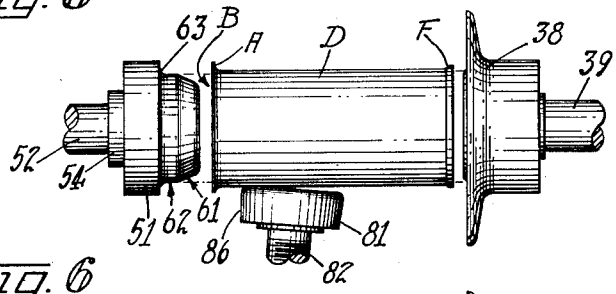


Fig. 6

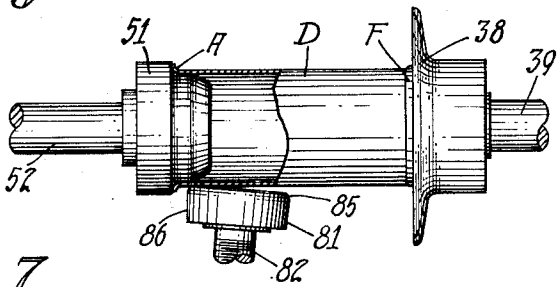
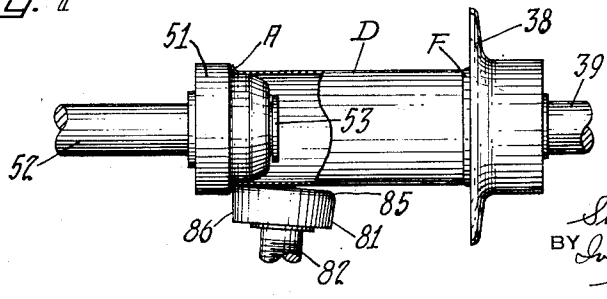


Fig. 7



INVENTOR
Stellan Birkland
BY Ivan D. Thornburgh
Charles H. Ernst
ATTORNEYS

Patented Dec. 19, 1950 2,534,220

UNITED STATES PATENT OFFICE

2,534,220

MACHINE FOR STRAIGHTENING CAN BODY FLANGES

Stellan Birkland, San Francisco, Calif., assignor to American Can Company, New York, N. Y., a corporation of New Jersey

Application November 18, 1947, Serial No. 786,709

5 Claims. (Cl. 153—32)

1

The present invention relates to a machine for straightening the flanges on sheet metal can bodies and the like and has particular reference to devices for truing a flange on a can body and for removing dents and other distortions from the body flange preparatory to sealing an end closure member to the body.

In the manufacture of sanitary cans or containers the top and bottom end closures are usually attached to the can body by the interfolding of flange parts formed on the can body and on the end closure to unite these parts in a tight permanent end seam. In handling the body during its travel from the bodymaker to the machine for securing an end closure in place, the flanges of the body sometimes become dented or otherwise distorted so that they do not properly fit the flange of the end closure to be secured thereto. Similarly, cans comprising a flanged body having one closure member secured thereto during travel from the can factory to the canning plant sometimes are handled so that denting or other distortions of the can body flange take place with the result that improper fit is obtained between the can flange and its sealing end closure after the can is filled and ready for sealing.

Such distortions in the flange of the can body prevent the tight interfolding of the flange with the end closure flange. It has been found that even small dents in a can body flange, when incorporated in an interfolded end seam, are of such a magnitude as to cause leakage of air through the seam, thereby destroying the vacuum in a vacuumized can, with the result that the contents of the can are sometimes seriously affected.

The instant invention contemplates overcoming this difficulty by the provision of a machine which will effectively and speedily iron out any distortions in a can body flange and true the flange for subsequent use.

An object of the invention is the provision of a can body flange straightening machine wherein the flange on a can body is freed of any distortions preparatory to fitting with an end closure so that the flange of the body will properly cooperate with the flange of the end closure in providing a tight, leakproof interfolded seam between the body and the end closure.

Another object is the provision of such a machine wherein any dents or other distortions in a can body flange are ironed out to such an extent as to insure the holding in a sealed can of a maximum and uniform vacuum or pressure.

Another object is the provision of such a machine wherein the straightening and truing of a

2

distorted flange may be effected rapidly and efficiently in an improved apparatus of simple and economical construction which is well adapted for operating on can bodies passing through the apparatus in a continuous procession and at a high speed rate of travel.

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 transverse sectional view of a machine embodying the instant invention, with parts broken away;

Fig. 2 is a sectional view taken substantially along the broken line 2—2 in Fig. 1, with parts broken away;

Fig. 3 is a top plan view of that portion of the machine shown at the left in Fig. 1, with parts broken back and parts shown in section.

Fig. 4 is an enlarged perspective view of a can having a body flange showing exemplary forms of flange distortions;

Figs. 5, 6 and 7 are schematic views of principal parts of the machine and a can body in different relative positions and showing different stages in the straightening and truing of the flange of the body; and

Fig. 8 is an enlarged detailed view of a portion of the flange straightening parts and the flange portion of the can body as illustrated in Fig. 7.

As a preferred embodiment of the instant invention the drawings illustrate a machine for straightening or truing a flange A (Fig. 4) surrounding an open mouth B of a sheet metal, cylindrical body C of a can or container D having a bottom end closure E secured by a suitable end seam F. The invention is equally well adapted to can bodies having both ends open and flanges surrounding both ends and to other tubular articles having flanges at one or both ends thereof. By way of example of the types of distortion usually encountered in flanged can bodies, the flange A of the can D is shown with a long shallow downwardly bent portion or distortion G, such as may be produced by the can falling on its flange. Another example is that of a sharp deep dent H such as may be produced by the flange being struck by or jammed against a machine part or other obstruction, although many other types of flange distortions may be encountered.

The machine illustrated in the drawings is preferably intended for use in connection with a

can filling and sealing machine, and as such, all cans intended for use in the filling and sealing machine are first passed through the flange straightening machine on their way into the filling and sealing machine so as to insure that all cans that enter this latter machine will have their flanges straightened and trued and ready for the reception of an end closure.

The cans D enter the flange straightening machine in a continuous procession, one behind the other and rolling on their sides, by way of an inclined entrance chute 11 (Figs. 1 and 2) the machine end of which is secured by brackets to a cylindrical housing 12. The housing may be bolted to a frame 13 as shown in the drawings or may be suspended on support rods secured to the ceiling of the room in which the machine is used as is sometimes desired when long lines of cans are propelled along runways attached to the ceiling.

The lowermost can D in the entering procession of cans temporarily engages against the outer periphery of a continuously rotating turret 15 which is formed with a plurality of can receiving pockets 16 equally spaced around its outer circumference. The drawings show four of these pockets 16, although any number may be used as desired. The turret 15 is mounted on a rotatable horizontal shaft 18, one end of which is journaled in a bearing bracket 19 bolted to the frame 13. The opposite end of the turret shaft is journaled in a bearing plate 21 bolted to the cylindrical housing 12 as best shown in Fig. 1.

The turret 15 is manually adjustable longitudinally of its turret shaft 18 and after such an adjustment the turret is locked in place by a pair of lock nuts 23 which surround and which are threadedly engaged with threaded portions 24 of the shaft. There is one of these lock nuts on each side of the hub of the turret. A key 25 secured in the shaft, engages in a key slot 26 in the hub of the turret and thus rotates the turret with the shaft.

The turret shaft 18 and the turret 15 mounted thereon are continuously rotated in a clockwise direction as viewed in Fig. 2, by a gear 28 which is mounted on the outer end of the shaft 18 adjacent the bearing plate 21. This gear meshes with and is rotated by a speed reducing pinion 31 mounted on a short driving shaft 32. This shaft is journaled in the bearing plate 21 and in a bearing bracket 33 bolted to the frame 13. The shaft is rotated in any suitable manner through a pulley or sheave 34 mounted on the outer end of the shaft 32.

Hence as the turret shaft 18 rotates, it turns the turret 15 and thus carries the turret pockets 16 successively past the machine end of the entrance chute 11. As a pocket passes the chute, a can D from the chute drops into the pocket and the picked up can is thus carried forward with the turret. During this travel with the turret, the can is operated upon to effect the straightening and truing of its flange A as hereinbefore mentioned.

A can D received in a pocket 16 of the turret 15 is disposed with its longitudinal axis in parallelism with the axis of the turret shaft 18. The closed end of the can is disposed adjacent and in axial alignment with a yieldable backing pad 38. There is one of these backing pads 38 for each turret pocket 16 and each pad is carried on the inner end of a pad shaft 39.

The four pad shafts 39 are rotatably carried in bearings 41 formed on a disc or wheel 42 mounted on the turret shaft 18 between the turret 15 and the bearing bracket 19. The wheel 42 thus turns in time with the turret. Each pad 38 is maintained under pressure of a compression spring 44 which surrounds the pad shaft and which is located in a recess 45 formed in the inner ends of the bearings 41, the spring being interposed between the bottom of the recess and a collar 46 formed on the pad shaft. A collar 47 secured to the outer end of each pad shaft 39 retains the shaft in place in the bearings and limits its inward travel under the pressure of the spring 44.

The open flanged end of the can D in a turret pocket 16 is disposed adjacent and in axial alignment with a yieldable chuck 51 (Fig. 1). There are four of these chucks, one for each pocket 16 in the turret 15 and they are mounted on and keyed to the outer ends of rotatable spindles 52, between an enlarged head 53 on the end of the spindle and a collar 54 formed on the spindle adjacent the inner end of the chuck. Yieldability of the chuck relative to the spindle is provided by a compression spring 56 which surrounds the spindle and which is disposed in a recess 57 in the inner end of the chuck, the spring being interposed between the bottom of the recess 57 and the collar 54 on the spindle.

The chucks 51 are intended to fit within the open end or mouth B of the cans D in the turret 15 and to engage against and back up the flanges A on the cans. For this purpose each chuck 51 is formed with tapered sides 61 constituting a frustum of a cone for easy entrance of the chuck into the can mouth. These tapered sides 61 merge into a short straight or cylindrical side wall section 62 (see Fig. 8) having a diameter slightly less than the inside diameter of the can D. At the base of the chuck the straight side wall section 62 merges into an outwardly curved wall section 63 which is the true shape and size of the flange A on a can D. The function of this curved wall section 63 is to backup and true the flange A during its straightening operation as will be explained hereinafter.

The spindles 52 on which the chucks 51 are mounted, are journaled in slide blocks 66 which are carried for reciprocation in slide bearings 67 formed in a wheel 68 mounted on and keyed to the turret shaft 18. The wheel and the slide blocks 66 carried therein thus rotate with the turret 15. There are four slide blocks 66, one for each chuck 51 and each block is formed with a lateral elongated boss 71 which extends inwardly toward the turret shaft 18, through a slot 72 formed in the slide bearings 67. These bosses prevent turning of the slide blocks in their bearings. The bosses carry cam rollers 73 which operate in a cam track 74 formed in a stationary cam 75 which surrounds the turret shaft 18 and which is bolted to the bearing plate 21 of the stationary cylindrical housing 12. This cam controls the movement of each chuck 51 toward and away from its associated can D in the turret 15.

While traveling through a circular path of travel with the turret 15, the chucks 51 are also rotated on their own axes. This rotation of the chucks is brought about by a pinion 77 which is mounted on the outer end of each of the spindles 52. These pinions together with the collars 54 formed on the spindles retain the spindles in their slide blocks 66. The pinions mesh with a

stationary internal gear 78 formed on the inside of the stationary cylindrical housing 12.

Thus as the wheel 68 turns with the turret 15 the pinions 77 travel around the inside of the internal gear 78 and rotate the chucks 51. At the same time, the cam rollers 73 traverse the cam track 74 of the stationary cam 75 and thereby reciprocate the slide blocks 66 and the chucks 51 toward and away from the flanged end of a can D in the turret 15. The internal gear 78 is made wide enough to permit of this reciprocation of the spindles 52 and their driving pinions 77 without taking the pinions out of mesh with the gear.

In operation, a can D drops into a turret pocket 16 when the chuck 51 opposite this pocket is in a retracted position as best shown in Fig. 5. As the can is carried forward by the turret 15, the chuck 51 moves into the open end or mouth B of the can and presses its curved wall section 63 against the flange A of the can as shown in Fig. 6. Continued movement of the chuck forces the can endwise into engagement with the backing-up plate 38. With the can thus clamped between the chuck and the backing-up plate as shown in Fig. 6, the rotation of the chuck is imparted to the can and the can thus begins to rotate on its own axis.

The inward movement of the rotating chuck 51 does not stop when the can is forced against the backing-up plate 38 but continues to force the can and its backing-up plate against the resistance of the plate spring 44 and thus brings the flange of the rotating can into engagement with a truing roller 81 as shown in Figs. 7 and 8. There are four of these truing rollers 81, one for each turret pocket 16 of the turret 15 and they are disposed adjacent the pockets in an angular position as best shown in Figs. 1 and 8. Each roller is rotatably mounted on the outer end of a stud or post 82 which is threadedly secured in a boss 83 formed on the hub of the turret 15. The studs are manually adjustable for locating the truing roller relative to the outer surface of the can to be operated upon. When once adjusted the stud may be locked in place by a set screw 84 threadedly secured in the boss. An outer peripheral edge 85 of each roller and an adjacent peripheral face 86 are shaped to the true shape of the flange A of the can.

Hence when the chuck 51 presses the flange A of the rotating can D into engagement with a truing roller 81, the flange is squeezed between the truing surfaces 63 of the chuck and truing faces 85, 86 of the roller and is thus reformed into a true flange shape, any dents or other distortions in the flange being rolled or ironed out during the truing operation. Any overthrow of the cam 75 during this squeezing operation is taken up by the spring 56 in the chuck.

This truing operation continues while the turret 15 rotates through approximately one half a turn. As the can approaches the bottom of the turret as viewed in Fig. 2, the cam 75 retracts the chuck 51 and thus the can with its trued flange A is released for discharge from the machine. This release of the can takes place over a discharge chute 88 disposed under the turret. The chute extends down through an opening in the frame 13 and leads preferably to a filling and sealing machine or other suitable place of deposit. A guide rail 89 of the chute extends up in the path of travel of the cans and insures their extraction from the turret.

In such a machine a line or continuous procession of cans is steadily passing through the machine, the cans entering near the top, passing through a curved path of travel while being operated upon, and being discharged at the bottom of the machine, all in timed order.

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. In a machine for truing flanges on a tubular body, a rotatable spindle, means for continuously rotating said spindle, a chuck mounted on and rotatable with said spindle and engageable against one face of the flange of a body for rotating said body, spring means effective against said chuck and longitudinally of said spindle, means for holding the body against said chuck to yieldably back up the flange thereon, a fixed truing element disposed opposite said chuck, and cam means for shifting said spindle and said chuck for compressing the flange of the rotating body against said truing element to straighten said flange for subsequent use.

2. In a machine for truing end flanges on a tubular body, the combination of means for receiving an individual body and for holding it intermediate its ends, a rotatable inner truing element mounted in the machine adjacent said body receiving means and insertable inside of the held body from one end for engagement with the adjacent face of an end flange of the body, yieldable means interposed between said inner truing element and its mounting for urging said element against said tubular body, means for rotating said inner truing element to rotate the body engaged therewith, an outside truing element engageable with the opposite face of said body end flange, and means for shifting one of said truing elements relative to the other for effecting insertion of said inner truing element into the body and for compressing said body flange between said truing elements during rotation of the body for straightening indentations and other distortions in the said body flange.

3. In a machine for truing flanges on a tubular body, a rotatable spindle, means for continuously rotating said spindle, a chuck mounted on and rotatable with said spindle and engageable against the flanged end of a body for rotating said body, spring means carried by said chuck and located between the chuck and the spindle for pressing the chuck against the flange of the body, a yieldable backing-up pad disposed opposite said chuck for holding said body clamped between the chuck and said pad, a truing element disposed between said chuck and said pad and in alignment with the flange on said body, and cam means for shifting said spindle, said chuck, said body and said pad for compressing the flange of the rotating body against said truing element to straighten said flange.

4. In a machine for truing flanges on a tubular body, the combination of a chuck insertable into the open end of a flanged body, said chuck having tapered sides merging into a curved wall section of true flange shape, means for inserting said chuck inside of the body to bring its curved wall section into engagement with the inner face of

the flange on said body, means for rotating said chuck and the body engaged therewith, a truing roller disposed opposite said chuck and having rotation substantially at right angles to the chuck, said truing roller having a curved wall section of true flange shape complementary to the curved wall section of said chuck for engagement with the outside face of the flange of the rotating body, and yieldable pressure means effective between said rotating chuck and said chuck inserting means for yieldably pressing the flange of said rotated can body against said truing roller for rotating the latter thereby compressing said flange against the curved wall section of the chuck for reforming the body flange into a true flange shape.

5. In a machine for truing flanges on a tubular body, a rotatable turret having spaced pockets therein for receiving flanged bodies and for carrying them around a curved path of travel, a plurality of rotatable spindles disposed one adjacent each pocket in axial alignment therewith and on one side of said turret, means for rotating said spindles continuously and in unison, a chuck mounted on each of said spindles adjacent its turret pocket and engageable against the flanged end of a body in the pocket for rotating said body, spring means located in each of said chucks and engageable with a said spindle for urging the chuck against the body and for longitudinally backing-up the flange of the body, a plurality of yieldable and freely rotatable backing-up pads disposed one adjacent each turret pocket in axial alignment therewith and on the side of the turret opposite said chucks for holding a body in a pocket clamped between said chuck and said pad, a plurality of truing elements carried on said turret and disposed one adjacent each pocket between its chuck and its pad and in alignment with the flange on said body, and cam means for shifting a said spindle and its associated chuck axially into engagement with the flanged end of said body and for clamping the body against said backing-up pad and for compressing the flange of the body against said truing element simultaneously with the rotation of the turret to straighten said flange for subsequent use, said cam means operating to retract said chuck after a flange straightening operation to release said body for discharge from its turret pocket.

STELLAN BIRKLAND.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
912,377	Hutchison	Feb. 16, 1909
948,353	Swangren	Feb. 8, 1910
1,604,345	Grotnes	Oct. 26, 1926