Oct. 14, 1941. J. PEARLMAN ET AL 2,258,801

DEVICE FOR STRAIGHTENING FILLED CANS

Filed Nov. 9, 1939

FIG. 4.

FIG. 1.

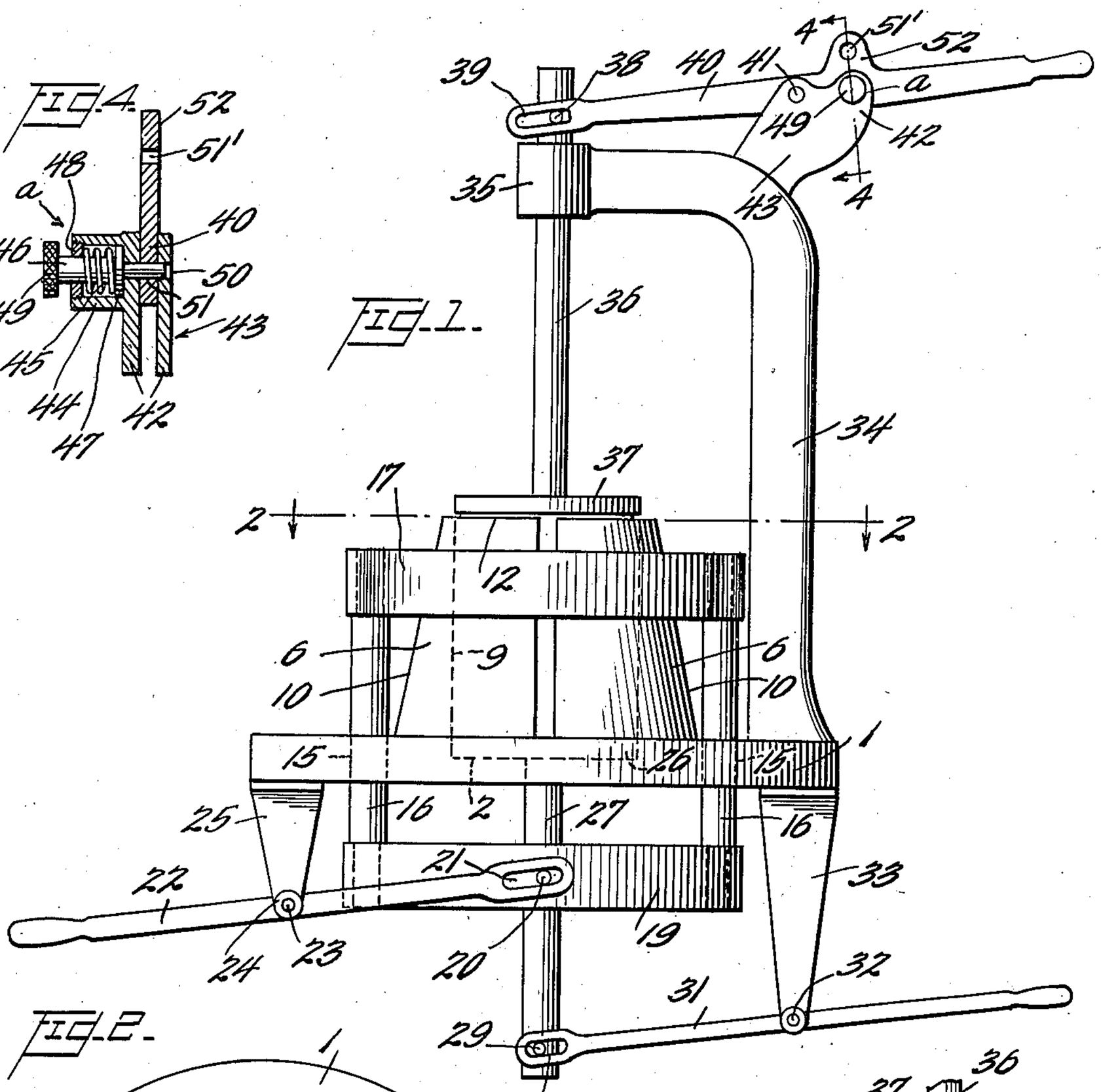


FIG. 2.

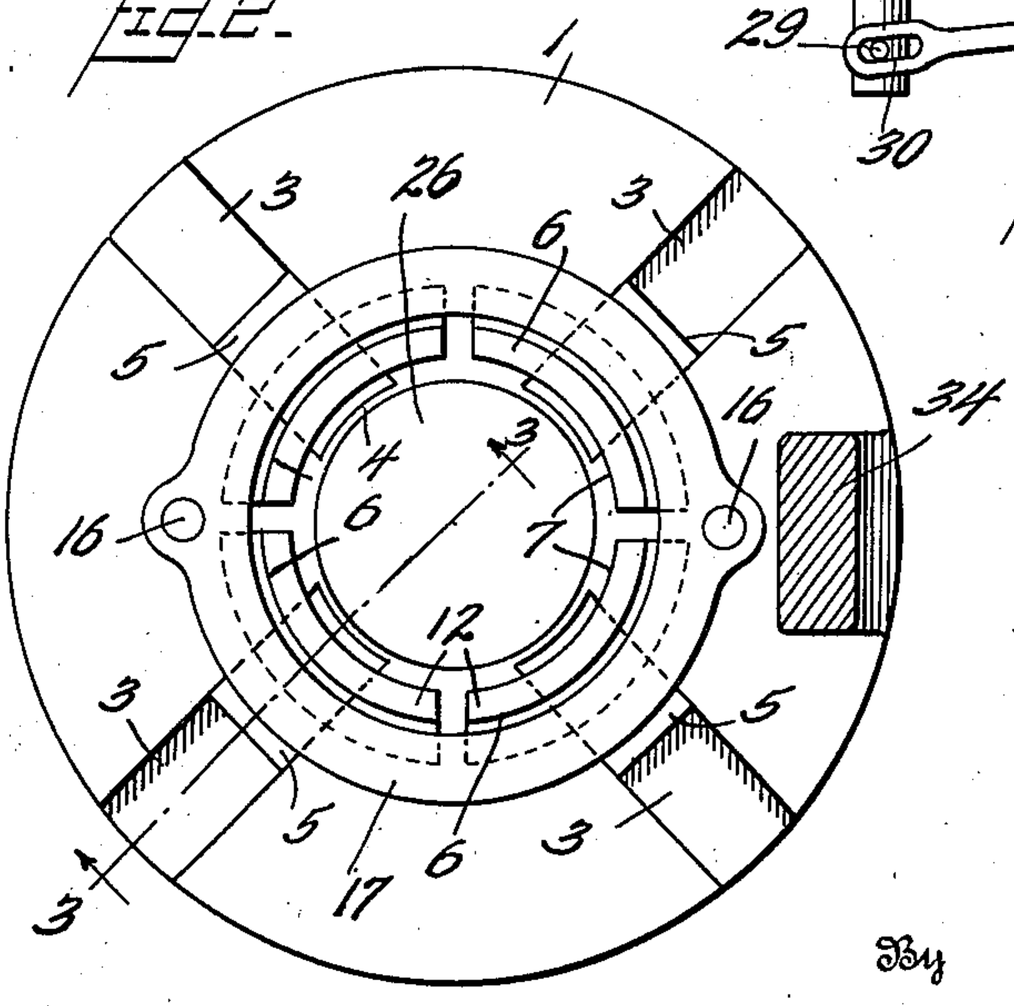
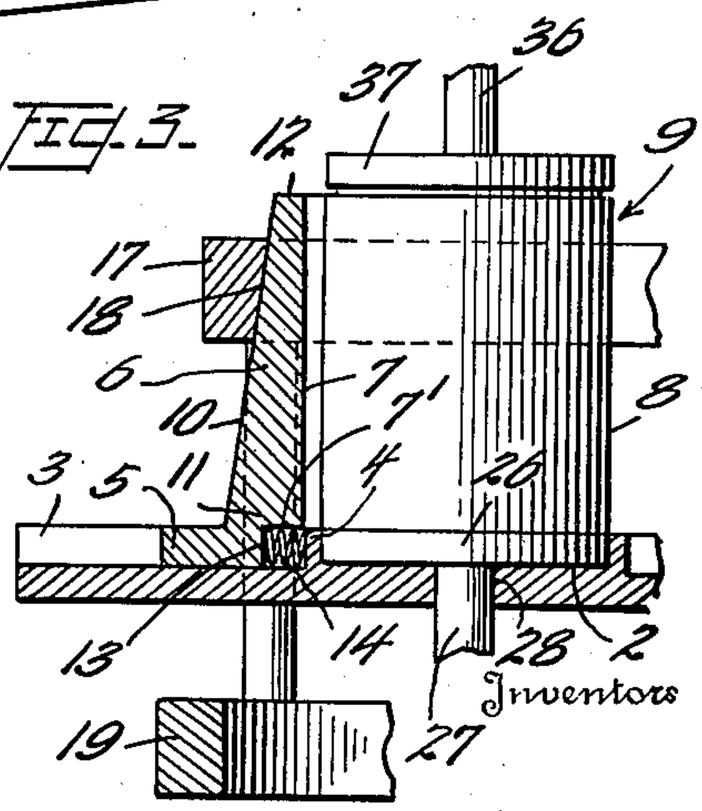


FIG. 3.



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DEVICE FOR STRAIGHTENING FILLED CANS

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Application November 9, 1939, Serial No. 303,666

8 Claims. (Cl. 153—48)

Generically this invention relates to straightening devices for cylindrical objects, but it is more especially directed to an apparatus for removing dents and irregularities from the surface contour of filled cans and constitutes an improvement on our co-pending application Serial No. 279,362, filed June 15, 1939, for Method and apparatus for straightening and testing filled cans.

Filled cans by reason of various kinds of accidents during course of handling frequently become dented and likewise bulged, rendering the cans unfit for sale except at reduced prices, thereby not only entailing extra expense in handling but net loss and, therefore, one of the principal objects of this invention is the provision of an apparatus for removing irregularities from the surface contour of a filled can, including means for holding and confining the ends of the can, and impact means adapted to contactingly embrace the cylindrical surface of said filled can, said means including sets of diametrically opposed radially movable contact elements adapted to simultaneously impact the surface of the can from opposite directions.

Another important object of this invention is the provision of an apparatus of this character consisting of radially movable dies adapted to embracingly impact the circumferential surface of a filled can, means for normally maintaining said impacting dies out of engagement with said can, and means for effecting simultaneous and radial movement of the dies into sharp impact with the cylindrical surface of the can to remove irregularities from the surface.

A further object of this invention is the provision of an apparatus of this character consisting of an end die and means for maintaining and moving said die into and out of contact with the upper end of a filled can, a normally stationary can end engaging and supporting base die, a plurality of impacting segmental dies radially movable with respect to the vertical or longitudinal axis of the can, a complementally formed ring member engageable with said die member, and means for operating said ring to effect simultaneous impact of said segmental dies with respect to the cylindrical surface of the can to remove irregularities therefrom, means adapted to automatically return said segmental members to their open position upon removal of said ring, and means in connection with said base die to elevate said can in ejecting direction with respect to said segmental dies.

In cans filled with foodstuffs of various types, by reason of unforeseen contamination during the can filling operation or in connection with the food itself, not infrequently causes bacterial action to develop, rendering the contents unfit for consumption, and such action causing swells or bulging of the can, usually at its ends. This situation gives rise to a rigid inspection and in the past it has been difficult to determine whether such irregularities in the contour of the can are caused by bacterial action or by jolts, knocks, dents, and the like, and by reason of which fact many good cans are discarded as condemned and unsalable stock in error, and, therefore, an important object of this invention is its utilization as a testing machine not only for straightening out the irregularities but in so doing constituting a testing means for determining whether the irregularities were caused by external forces or by deterioration of the contents.

With these and other objects in view, which will become apparent as the description proceeds, the invention resides in the construction, combination and arrangement of parts, hereinafter more fully described and claimed, and illustrated in the accompanying drawing, in which like characters of reference indicate like parts throughout the several figures, of which:

Fig. 1 is a side view of our improved can straightening device.

Fig. 2 is a plan view taken on the line 2—2 of Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a detail section on the line 4—4 of Fig. 1.

The devices with which we are familiar for removing the irregularities from filled cans have proven deficient for many reasons, some of which are: incapable of satisfactory operation, too complex and costly to manufacture and operate, affecting the normal condition of the contents, as, for instance by a centrifugal device, which in certain types of foodstuffs effects changes in their physical characteristics and consistency; and it was to overcome such disadvantages by providing an annular base member constituting a centrally disposed vertically adjustable can supporting end die, a vertically adjustable can top engaging die, and a plurality of annularly arranged segmental radially movable spring controlled impacting dies tapering towards their upper ends, and a vertically adjustable die engaging ring member adapted when moved in downward direction to effect simultaneous im-

pact of said dies with the cylindrical surface of a filled can, whereby the forces generated by the impact function to remove irregularities from all surfaces of the can.

In the illustrated embodiment characterizing this invention there is shown a supporting annular base 1 which in turn may be suitably supported as desired. Said base is formed with a centrally disposed countersunk annular portion 2 and with a series of countersunk dovetail channels 3 radially extending from the circumferential edge of base 1 toward said central cut-out portion 2 and with their inner ends separated therefrom by the flange or supporting stop portion 4 for a purpose directly appearing. In the present instance there are four of these radiating channels which include two sets, each set comprising oppositely positioned channels at right angles with respect to the other set. Slidably mounted in each of the respective channels is a complementally formed dovetail base portion 5 of a segmental impacting die member 6, the face 7 of which is correspondingly curved to engage the circumferential surface 8 of a filled can 9. Each vertical die portion 6 is formed integral with or suitably secured to its base 5 and is formed with a downwardly and outwardly inclined arcuate cam surface 10 so that said die is thicker at its lower end 11 than at its upper end 12. The surface 7 of said die extends beyond base 5 forming a space or cut-out portion 13 of a depth sufficient to permit the lower edge 7' to slidably move over the surface of stop flange 4 and member 26. Mounted in said space is a compression spring 14 adapted to normally maintain die 6 out of can engaging position, as will directly more fully appear.

Movably extending through suitable openings 15 formed in base 1 on opposite sides of opening 2 are the spacer rods 16 on the upper ends of which is suitably mounted die ring 17 formed with an annular surface 18 complementally inclined with respect to cam surface 10 of dies 6 which said ring is adapted to embrace for sliding movement with respect thereto as will be well understood. Suitably mounted on the lower ends of rods 16 is a ring member 19 formed with a lateral pin 20 adapted to extend through slot 21 formed in the end of operating lever 22 fulcrumed on pin 23 extending through the end 24 of the depending standard 25 integrally formed with or suitably secured to the under surface of base 1.

Adapted to seat in the countersunk opening 2 is a can end supporting and elevating member 26. Said member 26 is mounted on and suitably secured to the upper end of the vertically movable rod 27 extending through opening 28 formed in base 1, said rod extending below ring 19 and formed with a lateral lug or pin 29 adapted to extend through slot 30 in one end of hand lever 31 fulcrumed on pin 32 extending through the end of the depending standard 33, which may be suitably secured to the under surface of base 1 or may constitute a continuation of the upright standard 34 extending through said base 1. While standard 34 may extend through base 1, if desired it may be mounted on said base with its lower end suitably secured thereto, and extending inwardly at its upper end to a point in alignment with rod 27 terminating in an apertured head 35 through which extends for reciprocating movement rod 36 on the lower end of which is suitably mounted the can end engaging member 37 corresponding to member 26, except being adapted to engage the top end of can 9. The upper end of said rod or shaft 36 is formed with a lateral lug 38 adapted to engage in slot 39 formed in one end of hand lever 40, the said lever being fulcrumed on pin 41 extending through the bifurcated end 42 of stationary arm 43 formed integral with or suitably secured to standard 34.

Arm 43 is formed with plunger unit *a* comprising a barrel lug 44 adapted to house a spring 45 suitably mounted on plunger 46 with one end seating on washer 47 suitably secured on said plunger and the other end on cap washer 48 suitably secured in the end of barrel lug 44. Said plunger 46 has a knurled head 49 by means of which said plunger may be withdrawn from opening 50 in arm 43 and opening 51 in lever 40 to effect removal of member 37 from engagement with the end of can 9 and to permit rotative movement of said lever on pin 41 as desired. Formed on the upper edge of arm 40 is ear 52 having an opening 51' which when brought into registration with opening 50 will be engaged by plunger 46 under the action of spring 45 to maintain member 37 in elevated position, as will be well understood. It is apparent that further vertical adjustment of member 37 may be effected by plunger 46 engaging over the upper edge of ear 52 and the under surface of lever 40, if desired in connection with cans 9 of different lengths. This range of adjustment may be further extended by providing an additional ear 52 on the opposite edge of lever 40 and extending the series of openings 51—51'.

From the above it will be clear that the ends of standards 25 and 33 may be bifurcated and the ends of levers 22, 31, and 40 may be yoke constructed to engage on opposite sides of ring 19 and rods 27 and 36, respectively, as desired.

Although the operation of the device would seem to be clear from the above description, it might be well to further state that initially the free end of lever 40 is in depressed and member 37 in elevated position, the free end of lever 22 is depressed causing elevation of the die engaging ring 17, and dies 6 under the action of springs 14 are in expanded position, and member 26 is seated in the countersunk portion 2. A filled can 9 to be straightened is positioned on member 26, plunger 46 is withdrawn from opening 51' and the free end of lever 40 moved upwardly to effect engagement of member 37 with the top or exposed end of can 9 and secured in such position by the spring controlled plunger 46 engaging in openings 51 and 50. Upward movement of the free end of lever 22 effects downward movement of ring 17 on the cam or inclined faces 10 of dies 6 causing them to effect sudden impact with the circumferential surface of can 9, thereby effecting by the forces set up by the impact reacting with the various surfaces of the can, straightening or removal of irregularities from the surface contour of said can. Reverse or downward movement of lever 40 effects elevation of member 37 to its initial position; downward movement of lever 22 effects elevation of ring 17 permitting dies 6 to automatically move in radial slots 3 in expanding direction under the action of springs 14 away from said can; downward movement of the free end of lever 31 effects elevation of support 26 and can 9 thereby facilitating the latter's removal from the device, and upon removal of force from lever 31 member 26 will be returned by gravity to its seating position,

whereupon the device is ready for the next straightening operation.

By virtue of the construction of the device as above described and with special reference to the fact that, the movement of dies 6 in impacting direction are not limited to a can corresponding in diameter to that of member 26, but may move in contacting or impacting direction beyond the edge and above the surface of said member 26 to engage the cylindrical surface of a can of less diameter than said member 26, it is evident that the device is not limited to cans of a given diameter or length, since not only are the dies 6 adapted to automatically adjust themselves to cans of different diameters, but the construction of lever 40 and plunger unit *a* is such as to effect adjustment of member 37 in accordance with cans 9 of different heights or lengths, as hereinbefore described.

The instant invention in addition to effecting the removal of surface irregularities from filled cans, constitutes a testing device for determining whether surface irregularities are caused by handling of the can or from deterioration of their contents; if the irregularities are caused from knocks and the like in course of handling their removal will be permanent, but if from deterioration of the contents they will instantly return.

From the above it is apparent that we have designed a can straightening apparatus compact in form, simple in construction, manufacturable at a reasonable cost, adjustable to filled cans of varying diameters and lengths, and efficient not only to remove irregularities from the contour of the can but also as a testing device to determine whether the irregularities, especially with reference to the ends of the can, are caused from the application of exterior force such as dropping the can, denting it, etc., or from the deterioration of the contents so that only the cans damaged from the latter cause may be discarded.

Although in practice we have found that the form of our invention illustrated in the accompanying drawing and referred to in the above description as the preferred embodiment, is the most efficient and practical; yet realizing the conditions concurrent with the adoption of our invention will necessarily vary, we desire to emphasize that various minor changes in details of construction, proportion, and arrangements of parts, may be resorted to within the scope of the appended claims without departing from or sacrificing any of the principles of this invention.

Having thus described our invention, what we desire protected by Letters Patent is as set forth in the following claims:

1. A device of the character described for removing surface irregularities from filled cans including means for engaging the opposite ends of a filled can, a plurality of die means for simultaneously imparting a series of impacts to the circumferential surface of the can while the first mentioned means are retained in non-yielding and co-extensive engagement with the opposite ends of the can, means operable to effect simultaneous movement of said die means in can impacting direction, and means for automatically moving said die means to expanded position upon removal of said operable means.

2. An apparatus for removing surface irregularities from filled cans, means for engaging the respective ends of a filled can with co-extensive non-yielding surfaces, means adapted to embrace the circumferential surface of the can, means operable to effect impact of said embracing means with said surface while said surfaces are being held in compressing engagement with the ends of the can, and means for automatically removing said impact means from contact with said surface upon removal of said operable means.

3. An apparatus for removing surface irregularities from filled cans comprising means for engaging the respective ends of a filled can with co-extensive non-yielding surfaces, an annular series of radially movable dies adapted to embrace said can, means operable to effect sharp impact of said dies with the circumferential surface of said can while said surfaces are being held in compressing engagement with the ends of the can, and means for automatically returning said dies to their initial position.

4. An apparatus for removing surface irregularities from filled cans comprising means for clamping the respective ends of a filled can with non-yieldable surfaces co-extensive with said ends, means adapted to embrace the circumferential surface of the can, means operable to effect sharp impact of said embracing means with said surface while said non-yieldable surfaces are in compressing engagement with the ends of the can, means for automatically removing said impact means from contact with said surface, and means for elevating said can in ejecting direction with respect to said embracing means.

5. An apparatus for removing surface irregularities from filled cans comprising means for clamping the respective ends of a filled can with non-yieldable surfaces co-extensive with said ends, means including sets of diametrically opposed radially movable contact elements adapted to embracingly and simultaneously impart a series of impacts to the circumferential surface of the can while said surfaces are in compressing engagement with the ends of the can, and means controlling the movement of said elements.

6. A device for removing irregularities from filled cans including a base portion, means for engaging one end of a filled can supportingly associated with said base, means carried by said base and operable to effect movement of said can and its engaging means upwardly in can ejecting direction, means for compressingly engaging the other end of said can, means supported by said base for effecting vertical adjustment of said last mentioned can engaging means and operable to maintain the same in can engaging or disengaging positions, and additional means for simultaneously imparting a series of impacts to the circumferential surface of the can, whereby the forces generated by said impacts are adapted to remove the surface irregularities from said can.

7. A device for removing irregularities from filled cans including a base portion, means for supportingly engaging one end of a filled can associated with said base, said means being vertically adjustable, means for compressingly engaging the other end of said can, means supported by said base for effecting vertical adjustment of said last mentioned can engaging means and operable to maintain the same in can engaging or disengaging positions, automatically expansible die means adapted to embracingly and simultaneously impart a series of impacts to the circumferential surface of the can while the ends of the can are engaged by, respectively, said supporting and compressing means, ring means operable to control the movement of the dies in can engaging direction, and means for elevating said

can supporting means to effect ejection of the can after the removal of its surface irregularities.

8. A device for removing surface irregularities from filled cans including a can lower end engaging and supporting means, means for effecting elevation of said supporting means and can, means engageable with the upper end of the can, means for effecting vertical adjustment and compressing engagement of said upper and engaging means with said upper end, means for locking said upper end engaging means in can engaging or disengaging positions, impact means for simultaneously imparting a series of impacts to the circumferential surface of said can while the ends of the can are being engaged by said supporting and compressing means, and means controlling said impact means, said elevating means adapted to cause elevation of said supporting means to effect ejection of the can after it has been operated upon by said impact means and the surface irregularities removed therefrom.

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