P. KRUSE.

DOUBLE SEAMING MACHINE.

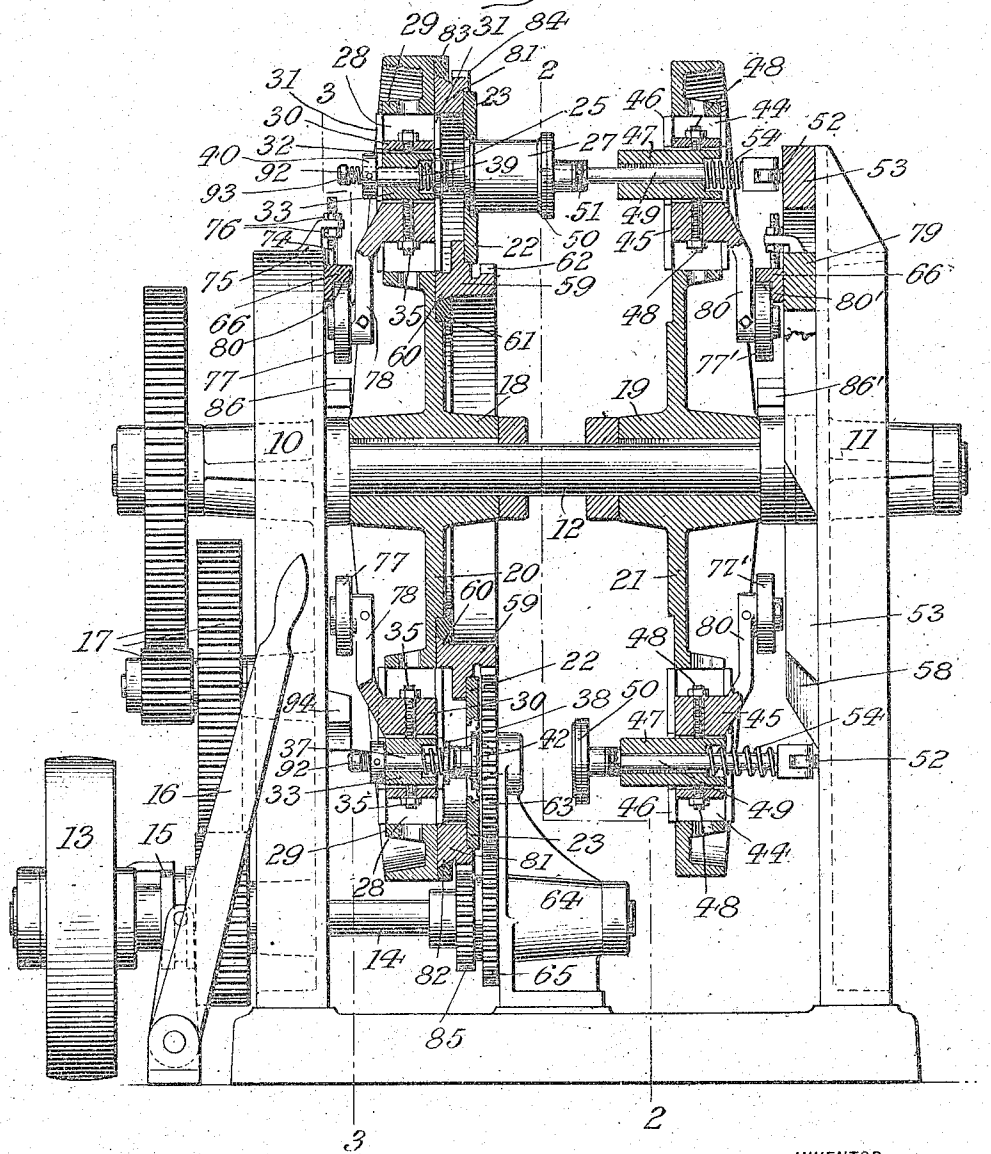
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1,143,976.

Patented June 22, 1915.

4 SHEETS—SHEET 1.

Fig. 1



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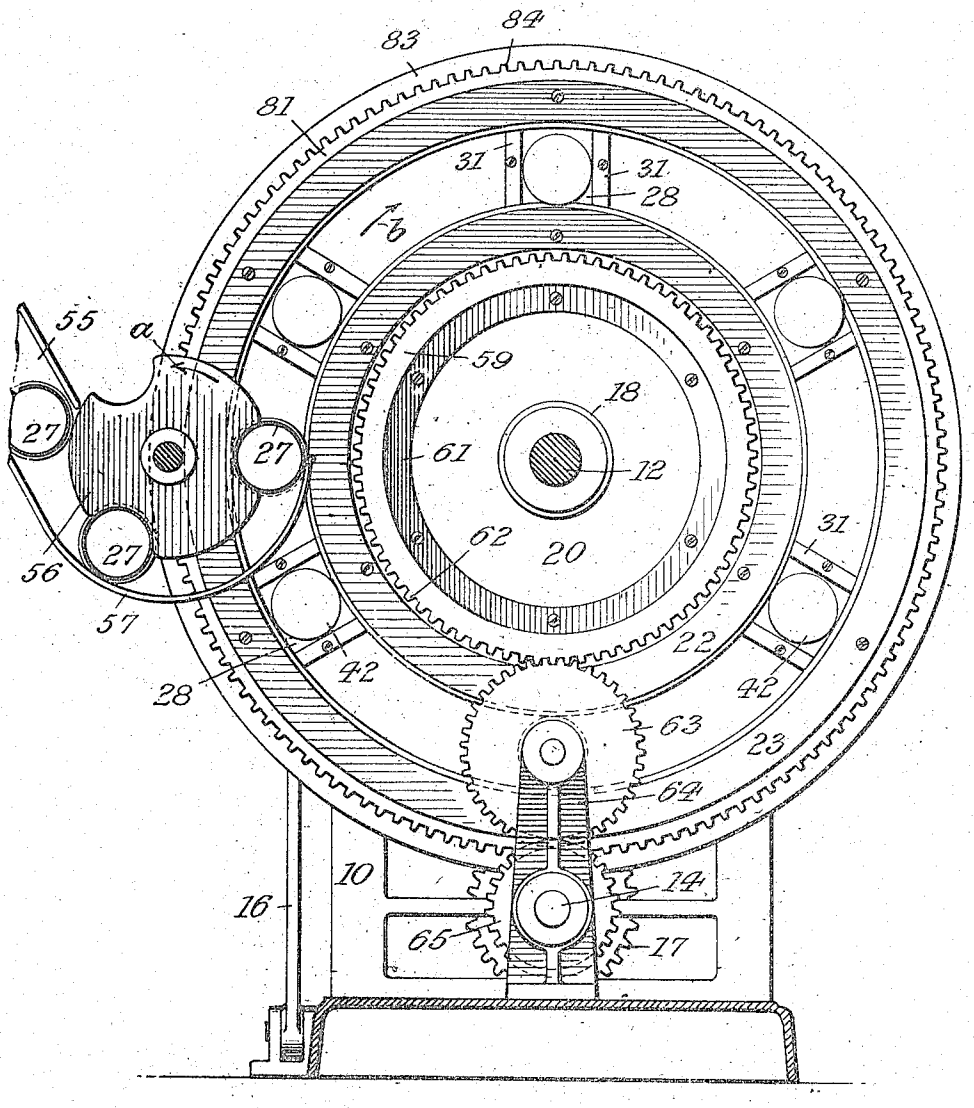
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

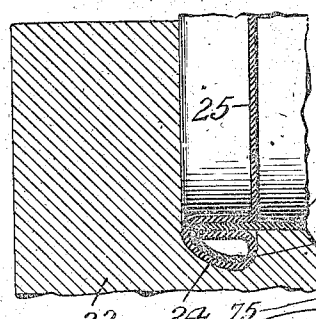


Fig. 8

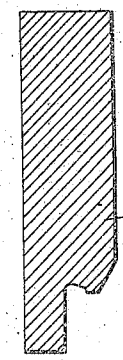


Fig. 7

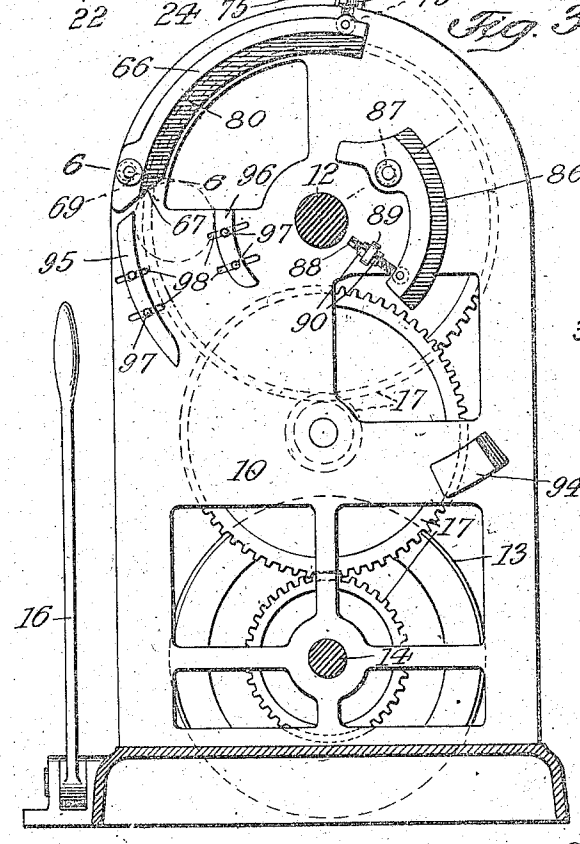
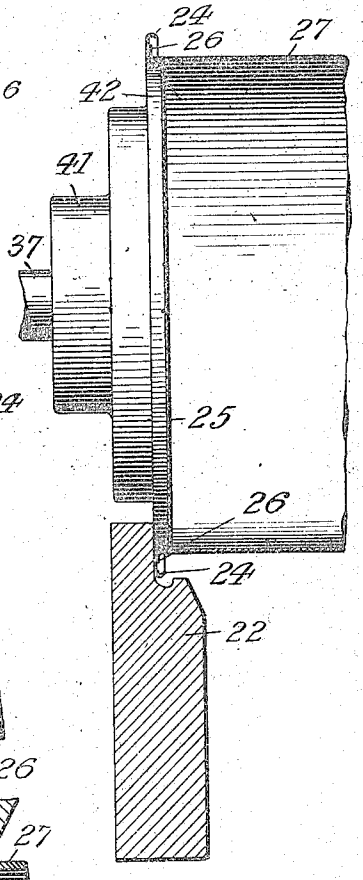


Fig. 3



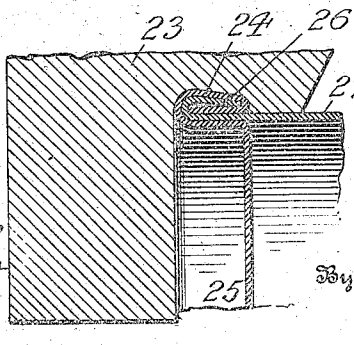


Fig. 9

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DOUBLE SEAMING MACHINE.

APPLICATION FILED JAN. 21, 1915.

1,143,976.

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4 SHEETS—SHEET 4.

Fig. 4.

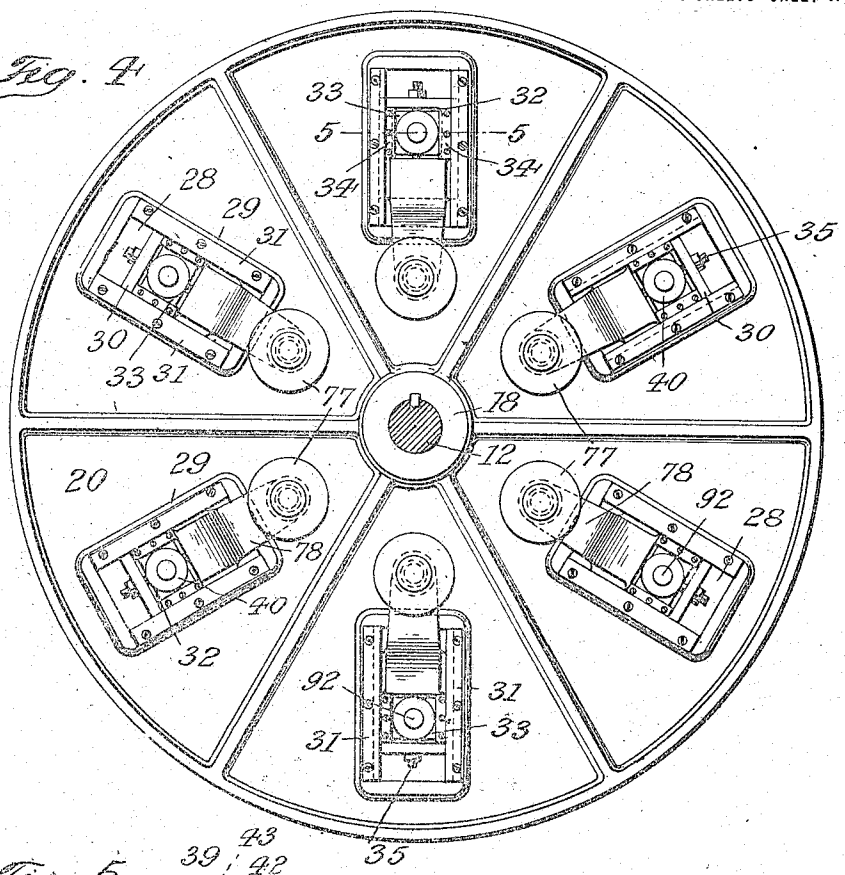


Fig. 5

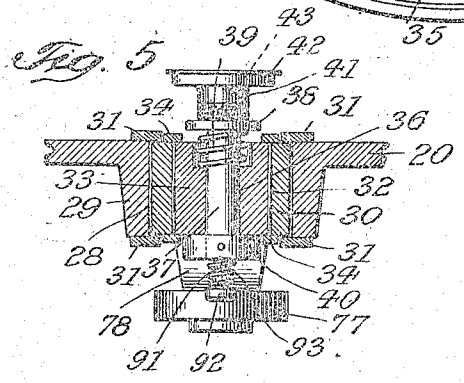
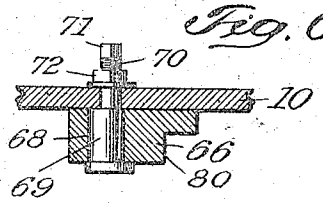


Fig. 6



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UNITED STATES PATENT OFFICE.

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DOUBLE-SEAMING MACHINE.

1,143,976. Specification of Letters Patent. Patented June 22, 1915.

Application filed January 21, 1915. Serial No. 3,442.

To all whom it may concern:

Be it known that I, PETER KRUSE, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Double-Seaming Machines, of which the following is a specification.

This invention relates to a machine for producing sanitary cans and more particularly for securing the head or cover to a can body by means of a double seam in a novel, quick and effective manner.

Briefly stated the invention comprises a pair of concentric seaming rings of comparatively large diameter and arranged in a common plane, the radial distance between said rings being somewhat larger than the diameter of the cans to be sealed, so that the latter can be in operative engagement with but one of said rings at a time. These rings or annular seamers receive continuous rotary movement in opposite directions while the cans together with their covers are freely rotatable between said rings and do not receive any positive rotary movement whatsoever. During operation, the means for supporting the cans are automatically moved toward one of the rotary rings so that the cans engaging said ring will be rotated on their axes during which operation the flange of the can head is curled about the flange of the can body. This operation being completed, the supporting means are moved toward the other ring that rotates in the opposite direction, so that the preliminarily seamed cans, after their engagement with the second ring continue to rotate in the same sense as before, the second ring compressing or flattening out the seam so as to provide the desired tight closure for the can. The invention also comprises numerous other novel features of construction as fully brought out in the annexed specification and claims.

In the accompanying drawings Figure 1 is a side view partly in section of a double seaming machine embodying my invention; Fig. 2 a vertical section on line 2—2, Fig. 1; Fig. 3 a similar section on line 3—3, Fig. 1, looking toward the left; Fig. 4 a section on line 3—3, Fig. 1, looking toward the right, with some of the parts omitted; Fig. 5 an enlarged cross section on line 5—5, Fig. 4; Fig. 6 a cross section on line 6—6, Fig. 3; Fig. 7 an enlarged cross section through the seaming rings, a can to be seamed, and part of the can supporting means; Fig. 8 a cross section through the seam as produced by the preliminary seaming ring, and Fig. 9 a cross section through the seam as finished by the closing ring.

Within a pair of standards 10, 11 forming part of the machine frame, is journaled a horizontally extending main shaft 12 which receives rotary movement from a driving pulley 13 loosely mounted upon a shaft 14.

Pulley 13 is adapted to be coupled to shaft 14 by a clutch 15 operated by hand lever 16 which shaft in turn, transmits motion through a train of gears 17 to the main shaft 12. Upon the latter are firmly mounted the hubs 18, 19 of a pair of opposed circular can carriers 20, 21, respectively. Of these, carrier 20 is shown to have the additional function of rotatably supporting two concentric seaming rings 22, 23, arranged in a common plane. One of these rings, say ring 22 is so profiled as to curl the flange 24, of the can head 25 about the flange 26 of the can body 27 (Fig. 8), while the other ring 23 is profiled for compressing or tightening the preliminary seam formed by ring 22 (Fig. 9), whereby the desired hermetical sanitary can seal is obtained.

As is clearly apparent from Figs. 1 and 7, the radial distance between the rings 22, 23 exceeds the outer diameter of the cans to be seamed, so that while a can engages ring 22, it clears ring 23 and vice versa.

The means for rotatably supporting the can bodies together with their heads and for consecutively presenting them to the action of seamers 22, 23 are as follows:—

Carrier 20 is provided with a plurality of—say six—oblong openings 28 surrounded by similarly shaped bosses 29. Within each opening 28 is radially movable a slide 30 which is guided by gibs 31. Each slide 30 is in turn provided with an opening 32 adapted for the reception of a bearing block 33, which is guided along gibs 34 secured to both sides of slide 30, and may be radially adjusted by a pair of set screws 35 or otherwise.

Block 33 is provided with a central bore 36 that extends in parallelism with shaft

12. Within this bore is slidably mounted a spindle 37 between a fixed collar 38 of which and block 33, is interposed a coiled spring 39 tending to force spindle 37 toward carrier 21, this movement of the spindle being limited by a collar 40 of the spindle. To the latter is rotatably secured the hub 41 of a disk 42 adapted to engage the recessed can head 25 (Fig. 7), between said hub and spindle 37 being interposed a ball race 43.

Carrier 21 is in similar manner provided with six openings 44 along each of which is movable a slide 45 guided by gibs 46. A central opening of this slide accommodates a bearing block 47 which is radially adjustable by set screws 48. Within a bore of block 47 is axially slidable a spindle 49 carrying at its inner end a disk 50 that is adapted to engage the bottom of a can, a ball race 51 being interposed between said disk and spindle.

At its outer end, spindle 49 carries a cam roller 52 adapted to engage a stationary cam 53 attached to standard 11, the cam roller being forced toward said standard by a spring 54. It will thus be seen that as long as roller 52 rides along cam 53, a can 27 and its head 25 will be firmly clamped between the freely rotatable disks 42, 50 (upper part of Fig. 1), so as to permit the seaming operation to be properly performed, as will hereinafter be more fully described, while upon leaving said cam (lower part of Fig. 1), disk 50 is retracted in order to permit the discharge of the seamed can and the introduction of a fresh can to be seamed.

The cans together with the heads loosely applied thereto, are shown to be fed through a chute 55 to a recessed turret 56, a curved guard 57 keeping the cans in engagement with said recesses during the rotation of the turret in the direction of the arrow *a* (Fig. 2). Slightly prior to the arrival of a can in horizontal alinement with main shaft 12, cam roller 52 will ride along the bevel 58 of cam 53 to finally clamp the can and its cover between disks 42, 50. Immediately after a can has thus been properly grasped, the two coöperating slides 30, 45 are unisonally moved toward the preliminary seaming or clenching ring 22. The latter is firmly secured to a flanged ring 59 having a tapering inner rim 60 that is rotatably held to carrier 20 by means of a correspondingly tapering guide ring 61 attached to said carrier in suitable manner. Ring 59 is furthermore toothed as at 62 for engagement with a toothed reversing wheel 63 loosely mounted in a bracket 64 that also supports the inner end of shaft 14. Toothed wheel 63 engages in turn a similar wheel 65 fast on shaft 14, so that continuous rotary movement is imparted to seaming ring 23.

The means hereinabove referred to for moving slides 30, 45 toward seamer 23 comprise essentially a substantially quadrantal cam 66 adjustably secured to the inner face of standard 10, and provided with a beveled end 67. One end of cam 66 is perforated as at 68 for the reception of an eccentric headed collar 69 of a threaded pin 70 having a squared end 71 and adapted to be fixed in the position to which it has been set, by clamp nut 72. To the other end of cam 66 is connected the eye 73 of a screw bolt 74 loosely passing through a perforated lug 75 of standard 10 and held in position by clamp nuts 76. Cam 66 is adapted to be consecutively engaged by the cam rollers 77 of the several slides 30, cam rollers 77 being rotatably supported by the radially extending arms 78 of said slides (Figs. 1 and 4). In like manner, standard 11 is provided with a quadrantal cam 66^1 between which and the standard, is interposed a spacing segment 79 so as to expose the cam 66^1 in front of cam 53, the means for radially adjusting cam 66^1 being in all respects duplicates of the means described in conjunction with cam 66. Cam 66^1 is adapted to be consecutively engaged by cam rollers 77^1 of the several slides 45 cam rollers 77^1 being rotatably supported by the radially extending arms 80 of these slides.

As thus far described, it will be seen that as soon as a can 27 and its head 25 have been properly placed between disks 42, 50 by turret 56, disk 50 is advanced by cam 53 toward disk 42 so as to firmly clamp the can and its head in position while nevertheless permitting a free rotation of said can and head owing to the interpolation of the ball races 43, 51 between disks 42, 50, and their respective spindles. As soon as the can has thus been firmly grasped, rollers 77, 77^1 engage the beveled faces of cams 66, 66^1 whereupon they will roll along the cam faces 80, 80^1 of such cams, so that slides 30, 45 are drawn inward. In this way the flange 24 of the can head 25 is brought into engagement with the preliminary seaming ring 22 to curl said flange about the flange 26 of the can body until the flanges have been shaped as illustrated in Fig. 8. After this operation has been performed, slides 30, 45 are forced outward to cause a disengagement between the curled flange 24 and ring 22, and to bring said flange into engagement with the seam-closing ring 23. The latter is firmly secured to a ring 81, having a tapering outer rim 82 that is rotatably held to the carrier 20 by a tapering guide ring 83. Ring 81 is toothed as at 84 for engagement with a pinion 85 fast on shaft 14. In order to bring the can into engagement with ring 23, standards 10, 11 are respectively provided with substantially quadrantal cams 86, 86^1 the cams 86^1 being duplicates of cams 86. One end of each cam 86 is, by eccentric stud 87, adjustably secured to standard 10, while its other

end is connected to a screw bolt 88 loosely passing through a perforated lug 89 of standard 10 and adapted to be clamped in position by nuts 90. Upon the engagement of rollers 77, 77¹ with cams 86, 86¹, slides 30, 45 are forced outward so as to bring the preliminary seam formed by ring 22 into engagement with the closing ring 23. The latter causes a flattening or closing of the double seam as illustrated in Fig. 9 thereby providing the necessary hermetical sanitary seal between the can and its head. The double seam being thus completed, roller 52 of disk 50 leaves cam 53 thereby permitting spring 54 to withdraw said disk from the can bottom, the seamed can being thus free to drop off disk 42 into a suitable discharge chute (not shown).

In order to prevent an accidental sticking of cans to disks 42, spindles 37 are made tubular for the accommodation of push pins 91 provided with heads 92 between which and collars 40, springs 93 are interposed. Heads 92 are adapted to engage a short cam 94 of standard 10, said cam being so located that as soon as a roller 52 has cleared cam 53, and disk 50 has been retracted from the seamed can, the head 92 of the corresponding pin 91 is forced inward by cam 94 thereby causing a similar movement of the pin so as to kick the double seamed can off disk 42.

In order to insure a subsequent true axial alinement of the disks 42, 50 with the cans as presented by turret 56, a pair of centering cams 95, 96 are secured to standards 10, 11 by screw bolts 97 passing through corresponding slots 98 of the standards so as to render said cams adjustable relatively to the center of the can-supporting turret-pockets, and also for the purpose of adapting the machine to cans of different diameters.

It will be seen that a machine constructed as above described has numerous advantages over the double seaming machines heretofore known. Although the carriers for the cans to be seamed simultaneously support a plurality of cans, all of such cans are acted upon by the same seaming means so as to insure a positively uniform output. Should an inspection of the delivered headed cans show that the seam is either excessively flattened or not sufficiently tight, this deficiency may be readily corrected without necessitating a stopping of the machine, by correspondingly adjusting the cams 66, 66¹. The machine may also be readily adapted to cans of different diameters by employing cam rollers 77, 77¹ of different diameters, and thereby correspondingly varying the radial strokes of slides 30, 45. Of course the distance between cams 95, 96 should also be adjusted to the proper diameters of the cans.

When the cans to be seamed are consecutively brought into contact with rings 22, 23, they are taken along by friction to be rotated as desired, without requiring any positive driving means. In order not to change the direction and speed of rotation of the cans after they have been shifted from contact with the crimping ring 22 into contact with the closing ring 23, said rings are so driven as to rotate in opposite directions and at a different speed. As with the construction described the cans travel along the space formed between the seaming rings in the direction of arrow 5 (Fig. 2) and as ring 22 rotates in the same direction it is obvious that this ring should travel at a higher speed than the cans, while ring 23 which rotates in a direction opposite to the can travel should be rotated at a lower speed, in which respect also the difference in the operative diameters of rings 22, 23 should be taken into consideration.

Although the machine is shown in the drawings to be designed for double seaming the cans in a horizontal position, it is obvious that the arrangement of the parts may be so altered as to permit the seaming of cans containing a fluid, in an upright position, and that other changes may be made without departing from the spirit of my invention. It is obvious that the machine may also be employed for clenching can heads to can bodies, in which case one of seaming rings, may be omitted.

I claim:—

1. A machine of the character described, comprising a pair of concentric annular seamers arranged in a common plane, means for rotating said seamers, and means for bringing a can into consecutive engagement with said seamers.

2. A machine of the character described, comprising a pair of spaced concentric annular seamers arranged in a common plane, means for rotating said seamers, means for advancing a can along the space formed between the seamers, and means for moving the can into consecutive engagement with said seamers.

3. A machine of the character described, comprising a pair of concentric annular seamers, arranged in a common plane, the radial distance between the seamers exceeding the diameter of a can to be seamed, means for rotating said seamers in opposite directions, means for advancing said can along the space formed between the seamers, and means for radially reciprocating the can whereby it is brought consecutively into engagement with said seamers.

4. A machine of the character described, comprising a pair of spaced concentric annular seamers, means for rotating said seamers in opposite directions, means for rotatably supporting a can, means for rotating said can-supporting means thereby advancing the can along the space formed between the seamers, and means for radially recipro-

cating the can-supporting means, thereby bringing the can into consecutive engagement with the seamers.

5. A machine of the character described, comprising a pair of spaced concentric annular seamers, means for rotatably supporting a can, means for rotating said can-supporting means thereby advancing the can along the space formed between the seamers, means for radially reciprocating the can-supporting means thereby bringing the can into consecutive engagement with the seamers, and means for rotating the seamers in opposite directions, the seamer that rotates in the same sense as the can-supporting means exceeding the speed of said last named means and that of the seamer rotating in the opposite direction.

6. A machine of the character described, comprising a pair of concentric annular seamers arranged in a common plane, and means for rotating said seamers in opposite directions.

7. A machine of the character described, comprising a pair of concentric annular seamers, means for rotating said seamers in opposite directions at different rates of speed.

8. A machine of the character described, comprising a rotary shaft, a carrier fast thereon, a pair of concentric annular seamers supported by the carrier, means for rotating said seamers in opposite directions independent of the carrier, and means also supported by said carrier for consecutively presenting a can to the seamers.

9. A machine of the character described, comprising a rotary shaft, a carrier fast thereon, a rotary annular seamer mounted coaxially with said carrier, means for rotating said seamer independent of the carrier, means on said carrier for rotatably supporting a can, and means for reciprocating said can-supporting means whereby the can is consecutively brought into and out of engagement with the seamer.

10. A machine of the character described, comprising a rotary shaft, a carrier fast thereon, a rotary annular seamer mounted coaxially with said carrier, means for rotating said seamer independent of the carrier, a slide engaging the carrier, a disk rotatably supported by said slide and adapted to engage a can, means for holding said can to said disk, and means for reciprocating said slide whereby the can is consecutively brought into and out of engagement with the seamer.

11. A machine of the character described, comprising a rotary shaft, a carrier fast thereon, a rotary annular seamer mounted coaxially with said carrier, means for rotating said seamer independent of the carrier, a slide engaging the carrier, a disk rotatably supported by said slide and adapted to engage a can, means for holding said can to said disk, a cam roller on the slide, and a stationary cam adapted to be engaged by the cam roller for bringing the can into operative engagement with the seamer.

12. A machine of the character described comprising a shaft, a carrier fast thereon, a rotary annular seamer mounted coaxially with said carrier, means for rotating said seamer independent of the carrier, a slide engaging the carrier, means rotatably supported by said slide and adapted to engage a can, means for holding said can to said can-engaging means, a cam roller on the slide, a stationary cam adapted to be engaged by the cam roller for bringing the can into operative engagement with the seamer, and means for varying the distance between the axis of the can-supporting means and the axis of the cam roller.

13. A machine of the character described, comprising a shaft, a carrier fast thereon, a rotary annular seamer mounted coaxially with said carrier, means for rotating said seamer independent of the carrier, a slide engaging the carrier, means rotatably supported by said slide and adapted to engage a can, means for holding said can to said can-engaging means, a cam roller on the slide, a stationary cam adapted to be engaged by the cam roller for bringing the can into operative engagement with the seamer, and means for adjusting the cam.

14. A machine of the character described, comprising a shaft, a carrier fast thereon, a rotary annular seamer mounted coaxially with said carrier, means for rotating said seamer independent of the carrier, a slide engaging the carrier and having an opening, a centrally perforated block adjustably mounted in the slide-opening, a spring-influenced spindle slidably fitted into the block-perforation, can-supporting means rotatably mounted on said spindle, a cam roller carried by the slide, and a stationary cam adapted to be engaged by said roller.

15. A machine of the character described, comprising a shaft, a carrier fast thereon, a pair of rotary annular seamers located in a common plane and mounted coaxially with said carrier, means for rotating said seamers in opposite directions, means on said carrier for rotatably supporting a can, and means for reciprocating said can-supporting means whereby the can is brought into consecutive engagement with said seamers.

16. A machine of the character described comprising a shaft, a carrier fast thereon, a member movably mounted on said carrier and provided with rotatable means adapted to engage a can, means for holding said can to said can-engaging means, a pair of spaced rotary annular seamers located in a common plane and mounted coaxially with said carrier, the radial distance between the

seamers exceeding the diameter of the can, means for rotating said seamers in opposite directions, and a pair of stationary cams coacting with the movable member for radially reciprocating said member whereby the can is brought into consecutive engagement with said seamers.

17. A machine of the character described comprising a shaft, a carrier fast thereon, a member movably mounted on said carrier and provided with rotatable means adapted to engage a can, means for holding said can to said can-engaging means, a pair of spaced rotary annular seamers located in a common plane and mounted coaxially with said carrier, the radial distance between the seamers exceeding the diameter of the can, means for rotating said seamers in opposite directions, a cam roller on the movable member, and a pair of stationary cams adapted to be consecutively engaged by said roller for reciprocating said movable member whereby the can is brought into consecutive engagement with said seamers.

18. A machine of the character described comprising a shaft, a carrier fast thereon, a member movably mounted on said carrier and provided with rotatable means adapted to engage a can, means for holding said can to said can-engaging means, a pair of spaced rotary annular seamers located in a common plane and mounted coaxially with said carrier, the radial distance between the seamers exceeding the diameter of the can, means for rotating said seamers in opposite directions, a cam roller on the movable member, a pair of stationary cams adapted to be consecutively engaged by said roller for reciprocating said movable member, whereby the can is brought into consecutive engagement with said seamers, and means for setting said cams.

19. A machine of the character described, comprising a rotary shaft, a carrier fast thereon, a plurality of can-engaging members movably mounted on said carrier, a plurality of means for holding the cans to said can-engaging means, a pair of spaced rotary annular seamers arranged in a common plane and mounted coaxially with the carrier, and a pair of stationary cams adapted to consecutively coact with the can-supporting members.

20. A machine of the character described, comprising a rotary shaft, a carrier fast thereon, means on said carrier for rotatably supporting a can, a pair of spaced annular seamers concentrically mounted on said carrier, means for rotating said seamers in opposite directions and independent of the carrier, and automatic means for reciprocating the can-supporting means, thereby bringing said can into consecutive engagement with said seamers.

21. A machine of the character described, comprising a rotary shaft, a carrier fast thereon, a pair of spaced annular seamers arranged in a common plane and concentrically mounted on said carrier, means for rotating said seamers in opposite directions, a plurality of radially movable slides engaging the carrier, a spindle slidably supported by each slide, a disk freely rotatable on said spindle, means for feeding a can toward said disk, means movable radially in unison with each slide for clamping said can to said disk, a cam roller carried by each slide, a pair of stationary cams adapted to be consecutively engaged by said roller, whereby the can is brought into consecutive engagement with the seamers, and a pair of additional stationary cams adapted to be engaged by the cam roller for bringing the disk into proper axial alinement with a can supplied by the feeding means.

22. A machine of the character described, comprising a rotary shaft, a carrier fast thereon, a pair of spaced annular seamers arranged in a common plane and concentrically mounted on said carrier, means for rotating said seamers in opposite directions, a plurality of radially movable slides engaging the carrier, a spindle slidably supported by each slide, a disk freely rotatable on said spindle, means for feeding a can toward said disk, means movable radially in unison with each slide for clamping said can to said disk, a cam roller carried by each slide, a pair of stationary cams adapted to be consecutively engaged by said roller, whereby the can is brought into consecutive engagement with the seamers, means for removing the can from the disk, a pair of additional stationary cams adapted to be engaged by the cam roller for bringing the disk into proper axial alinement with a can supplied by the feeding means.

23. A machine of the character described, comprising a rotary shaft, a pair of opposed carriers fast thereon, a pair of spaced annular seamers arranged in a common plane, means for rotating said seamers in opposite directions, a pair of opposed slides radially movable on said carriers, means on said slides for rotatably clamping a can therebetween, and means for unisonally reciprocating said slides in radial direction, whereby the can is brought into consecutive engagement with said seamers.

24. A machine of the character described, comprising a rotary shaft, a pair of opposed carriers fast thereon, a pair of spaced annular seamers concentrically mounted on one of said carriers, means for rotating said seamers in opposite directions, a pair of opposed slides radially movable on said carriers, means on said slides for rotatably clamping a can therebetween, and means for

unisonally reciprocating said slides in radial direction, whereby the can is brought into consecutive engagement with said seamers.

25. A machine of the character described, comprising a rotary shaft, a pair of opposed carriers fast thereon, a pair of spaced annular seamers arranged in a common plane, means for rotating said seamers in opposite directions, a first disk yieldingly and rotatably mounted on one of said carriers, an axially movable rotatable second disk mounted on the other carrier in axial alinement with the first disk, means for interposing a can between said disks, means for moving the second disk toward the first disk to firmly clamp the can therebetween, and means for unisonally reciprocating the disks in radial direction, whereby the can is brought into consecutive engagement with the seamers.

26. A machine of the character described, comprising a rotary shaft, a pair of opposed carriers fast thereon, a pair of spaced annular seamers arranged in a common plane, means for rotating said seamers in opposite directions, a first disk yieldingly and rotatably mounted on one of said carriers, an axially movable rotatable second disk mounted on the other carrier in axial alinement with the first disk, means for interposing a can between said disks, a cam roller operatively connected to the second disk, a fixed cam adapted to be engaged by said cam roller for firmly clamping the can between said disks, and means for unisonally reciprocating the disks in radial direction, whereby the can is brought into consecutive engagement with the seamers.

27. A machine of the character described, comprising a rotary shaft, a pair of opposed carriers fast thereon, a pair of spaced annular seamers arranged in a common plane, means for rotating said seamers in opposite directions, a pair of opposed slides radially movable on said carriers, a first disk yieldingly and rotatably supported by one of said slides, an axially movable and rotatable second disk supported by the other slide in axial alinement with the first disk, means for interposing a can between said disks, a cam roller operatively connected to the second disk, a fixed cam adapted to be engaged by said cam roller for firmly clamping the can between said disks, and means for unisonally reciprocating the slides in radial direction, whereby the can is brought into consecutive engagement with the seamers.

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