Sept. 3, 1963 F. C. WORTH 3,102,468

MARKING APPARATUS

Filed March 24, 1961

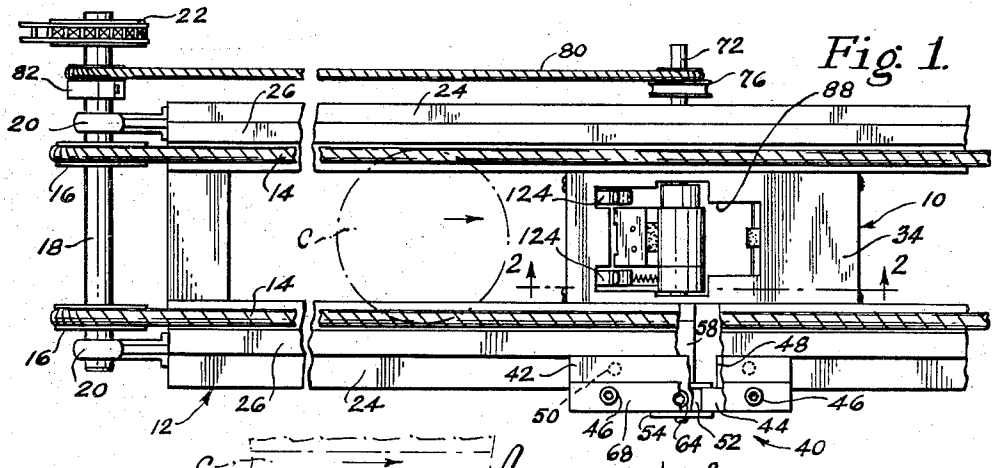


Fig. 1.

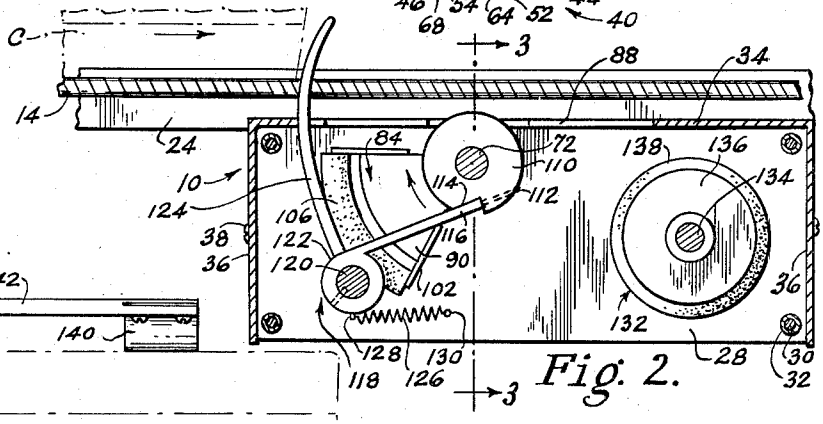


Fig. 2.

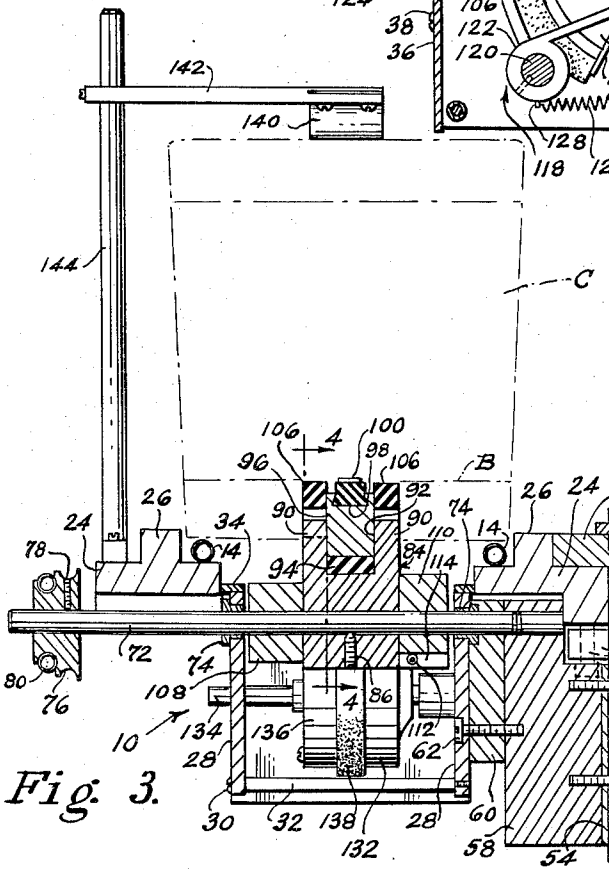


Fig. 3.

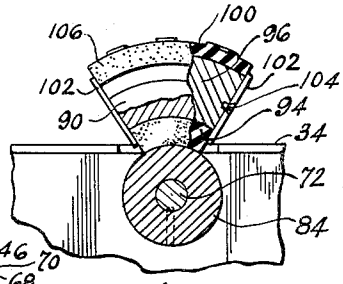


Fig. 4.

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United States Patent Office 3,102,468 Patented Sept. 3, 1963

3,102,468
MARKING APPARATUS

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Filed Mar. 24, 1961, Ser. No. 98,152
9 Claims. (Cl. 101—35)

This invention relates generally to marking apparatus, and more specifically is directed to an improved apparatus for applying inked markings or impressions to the recessed or concave bottoms of containers, cartons or the like, for example, containers of the type in which ice-cream, cottage cheese and other foods are frequently packaged.

By reason of the depth of the recess or concavity at the bottom of containers of the described character, and also by reason of the usually encountered variations in such depth, difficulty has been experienced in providing an apparatus capable of reliably applying clear markings or impressions to the bottom surfaces of the containers as the latter are advanced along a conveyor which carries the containers past successive operating stations, for example, stations at which the containers are filled and have covers applied thereto.

An object of this invention is to provide marking apparatus capable of reliably applying inked markings to the recessed or concave bottoms of containers of the described character as such containers are continuously advanced by a conveyor.

Another object is to provide marking apparatus capable of applying clear markings to the recessed or concave bottoms of containers, even though the depth of the recess or concavity may vary as between successive containers.

A further object is to provide marking apparatus of the described character which is of relatively simple, and hence inexpensive construction.

In accordance with an aspect of this invention, an apparatus for marking the recessed or concave bottoms of containers as the latter are continuously advanced on a conveyor includes a horizontal shaft rotatably mounted below the conveyor and being driven from the latter by a transmission that includes an endless spring belt capable of slipping and yielding so that rotation of the shaft can be halted while the conveyor continues to operate, a sectorial marking member fixed on the shaft and having a radially yieldable mounting for a marking element which, during rotation of the marking member with the shaft, is adapted to project upwardly into rolling and marking contact with the recessed or concave bottom of a container carried above the shaft by the conveyor, a latch mechanism for holding the marking member and shaft against rotation in a position where the marking member is disposed below the path of travel of the containers on the conveyor and including latch releasing means actuated by each of the successive conveyed containers to release the shaft and marking member for rotation through a single complete revolution during which a marking or impression is applied to the recessed or concave bottom of the container effecting release of the latch mechanism, and inking means for applying ink to the marking element during such revolution of the marking member.

In accordance with another feature of the invention, the shaft carrying the sectional marking member is mounted for vertical adjustment with respect to the conveyor carrying the containers to be marked so that the marking apparatus may be adjusted for applying markings to containers having recessed or concave bottoms of different depths.

In accordance with a further aspect of the invention,

the radially yieldable mounting of the marking element on the sectorial marking member also carries bearer rims which are frictionally engageable with the bottom surface of a conveyed container during the marking thereof, thereby ensuring accurate rolling engagement of the marking element with the surface being marked to avoid slippage and consequent blurring of the marking or impression.

The above, and other objects, features and advantages of the invention, will be apparent in the following detailed description of an illustrative embodiment thereof which is to be read in connection with the accompanying drawing forming a part hereof, and wherein:

FIG. 1 is a top plan view of a marking apparatus embodying the present invention, and shown operatively associated with a conveyor for carrying the containers, cartons or the like during the marking of the bottom surfaces thereof;

FIG. 2 is an enlarged longitudinal sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is a transverse sectional view taken along the line 3—3 of FIG. 2, but showing the marking element of the apparatus in the position occupied thereby during the marking of the bottom surface of a container; and

FIG. 4 is a detail sectional view taken along the line 4—4 of FIG. 3.

Referring to the drawing in detail, and initially to FIG. 1 thereof, it will be seen that a marking apparatus embodying the present invention and generally identified by the reference numeral **10** is there shown associated with a conveyor **12** that includes endless spring belts **14** passing around, and driven by grooved pulleys **16** on a drive shaft **18** supported in bearings **20**. Drive shaft **18** may be continuously rotated by a suitable drive mechanism, for example, a chain and sprocket drive **22**, and the bearings **20** supporting shaft **18** may be suitably mounted on a conveyor frame that includes side frame members **24** guiding the horizontal upper runs of spring belts **14** and having upward projections **26** extending therealong to act as side guides for the successive containers, cartons or the like C which are conveyed continuously by frictional engagement with the upper runs of belts **14**. It will be understood that the conveyor **12** is completed by pulleys (not shown) similar to the pulleys **16** disposed at the end of the conveyor remote from drive shaft **18** and around which the endless spring belts **14** also run.

The successive containers, cartons or the like advanced continuously by the conveyor **12** in the direction of the arrow on FIG. 1 may have various operations performed in connection therewith, for example, the successive containers may be filled with a food product, such as, cottage cheese, ice-cream or the like, and then have covers or lids applied thereto, prior to reaching the location of marking apparatus **10**. As is apparent in FIG. 3, each of the containers C has a recessed or concave bottom B, that is, a bottom surface that is spaced substantially upward, at least at the center thereof, from the lower edge of the side wall of the container, and the marking apparatus **10** embodying this invention is particularly adapted to apply an inked marking or impression to such recessed or concave bottom B as the container C is continuously advanced by conveyor **12**.

Marking apparatus **10** generally includes a housing having side walls **28** held in parallel, spaced apart relation by bolts **30** extending through tubular spacers **32** located between the side walls adjacent the opposite ends of the latter (FIGS. 2 and 3), a top wall **34** extending between the upper edges of side walls **28**, and end walls **36** integral with top wall **34**, at the opposite ends of the latter, and being secured to the end edges of side walls **28**, as by screws **38** (FIG. 2).

The housing of marking apparatus **10** is mounted on

one of the side frame members 24 of conveyor 12 by a supporting structure 40 (FIGS. 1 and 3) that preferably permits vertical adjustment of the housing relative to the conveyor. The supporting structure 40 may include an elongated upper clamping member 42 adapted to rest on the top surface of a side frame member 24 at the outside of the related upward projection 26, a pair of guide members 44 secured to clamping member 42 by screws 46 and depending therefrom at the outside of frame member 24 in parallel, spaced apart relation, and a pair of lower clamping members 48 projecting inwardly from guide members 44 under the adjacent side frame member 24 and carrying clamping screws 50, which are shown in broken lines on FIGS. 1 and 3 and which are adjusted to bear tightly against the underside of side frame member 24 for securing the supporting structure 40 to the latter. A slide 52 is movable vertically between the adjacent edges of guide members 44 and is sandwiched between wider plates 54 which slidably engage the inner and outer surfaces of guide members 44 to prevent removal of slide 52 from between the latter. Slide 52 and plates 54 are secured, as a unit, by screws 56 to an inwardly projecting block 58 secured, along with a spacing member 60, to a side wall 28 of the marking apparatus housing, as by a screw 62 (FIG. 3). Block 58 and spacing member 60 are dimensioned so that the housing of marking apparatus 10 will be centrally located between the side frame members 24 of conveyor 12.

In order to effect vertical adjustment of the housing of marking apparatus 10 relative to conveyor 12, the supporting structure 40 further includes an adjusting screw 64 which is rotatably mounted in the upper clamping member 42 and which is in threaded engagement with an upwardly opening tapped bore 66 in slide 52. The head of screw 64 is preferably countersunk in a recess formed in the top surface of clamping member 42 and is covered by a retaining strip 68 having an opening 70 above the head of screw 64 so as to permit engagement of a suitable tool with the head of screw 64 in effecting vertical adjustment of the housing of marking apparatus 10, while the strip 68 prevents vertical displacements of screw 64 with respect to clamping member 42.

Marking apparatus 10 further includes a horizontal, laterally extending shaft 72 rotatably mounted in suitable bearings 74 provided in the upper portions of side walls 28. As is shown in FIG. 3, one end portion of shaft 72 projects beyond the side wall 28 into aligned bores formed in block 58 and spacing member 60 to cooperate with the screw 62 in providing a non-rotatable connection between the marking apparatus housing and the supporting structure 40. The opposite end portion of shaft 72 projects beyond the side frame member 24 of conveyor 12 and has a double grooved pulley 76 secured thereon, as by a set screw 78. An endless spring belt 80 runs around one of the grooves of pulley 76, and also around a split pulley 82 which is clamped on drive shaft 18. Thus, shaft 72 is continuously urged to rotate during operation of the conveyor 12.

A sectorial marking member 84 is secured, as by a set screw 86 (FIG. 3), on shaft 72 substantially midway between side walls 28, and is adapted to project upwardly through an opening 88 in top wall 34 of the housing during rotation of the marking member with shaft 72. The marking member 84 has a pair of axially spaced apart, radially projecting cheeks 90 defining a radially opening slot 92 therebetween, and a resilient pad 94, for example, of sponge rubber, is disposed at the bottom of slot 92. A metal block 96 of generally sectorial shape (FIG. 4) is radially slidable in slot 92 and has a dovetailed groove 98 (FIG. 3) formed in its peripheral, arcuate surface to receive a logotype or other marking element. End plates 102 which are wider than the block 96 are secured to the opposite ends of the latter, as by screws 104 (FIG. 4) and are engageable with the radially extending edges of the cheeks 90 of marking member 84, thereby to limit the radially outward movement of block 96 relative to member 84, while the pad 94 of sponge rubber or the like provides a resilient cushion against which the block 96 can be moved radially inward towards the axis of shaft 72. Block 96 also carries bearer rims 106 of rubber or other frictional material which are secured to the opposite side surfaces of block 96, as by adhesive or the like, and which extend radially beyond the arcuate peripheral surface of block 96 for frictional engagement with the surface being marked by the element 100.

On shaft 72, at the opposite sides of marking member 84, there are a loose collar 108 and a split clamping collar 110, respectively. The split clamping collar 110 has a clamping screw 112 (FIGS. 2 and 3) for tightening the collar 110 on shaft 72 in a rotationally adjusted position relative to the shaft, and the collar 110 is further formed with a notch 114 which is engageable by a latch finger 116, as in FIG. 2, to prevent rotation of marking member 84 in a position where the latter lies below top wall 34 of the marking apparatus housing. Latch finger 116 forms part of a latch mechanism 118 that further includes an axle or shaft 120 rotatably mounted, at its opposite ends, in side walls 28, and having a collar 122 pinned or otherwise secured on the shaft 120 with the latch finger 116 extending from the collar 122. Also secured on the shaft 120 are curved actuating fingers 124 which project upwardly through the opening 88 in top wall 34 and normally extend above the paths of travel of the top runs of conveyor belts 14, as in FIG. 2. A tension coil spring 126 is connected between a pin 128 extending from collar 122 and a pin 130 extending from the adjacent side wall 28 and urges the latch mechanism 118, that is, the assembly of the actuating fingers 124, shaft 120, collar 122 and latch member or finger 116 to turn in the counterclockwise direction so as to dispose the latch member 116 against the periphery of collar 110 and to project the actuating fingers 124 upwardly above the path of travel of conveyor belts 14. Thus, spring 126 normally urges the latch member 116 into engagement with the notch 114 so as to prevent rotation of the marking member 84 in the clockwise direction from the position shown in FIG. 2. However, when a container C transported by the conveyor belts 14 moves into engagement with the upwardly projecting actuating fingers 124, such container depresses the fingers 124, and thereby moves the latch mechanism 118 in the clockwise direction, as viewed in FIG. 2, to release the latch member 116 from notch 114 and thereby free the marking member 84 and shaft 72 for rotation by the transmission connecting shaft 72 to rotated drive shaft 18, and made up of the pulleys 76 and 82 and the endless spring belt 80.

During rotation of the marking member 84 in the manner described above, the marking element 100 carried by the marking member has ink applied thereto by an inking roller 132 which is rotatably mounted on an axle 134 extending between side walls 28. The inking roller 132 includes a rotatable body 136 forming a reservoir for ink, and a peripherally extending felt or other absorbent pad 138 for rolling contact with the marking element 100 and through which ink is supplied to the latter.

The above described marking apparatus 10 is operative to apply inked markings or impressions to the recessed or concave bottom surfaces B of the successively conveyed containers C in the following manner:

When the latch mechanism 118 is in its operative or engaged position to halt rotation of shaft 72 and marking member 84 in the position illustrated on FIG. 2, the spring drive belt 80 slips and stretches in response to the continued rotation of drive shaft 18 of conveyor 12. When a container C has been advanced, by the conveyor 12, into engagement with the actuating fingers 124 of latch mechanism 118 so as to release the latch member 116 from engagement with notch 114, as described above, the spring drive belt 80 and pulleys 76 and 82 can trans-

mit the rotation of drive shaft **18** to shaft **72** thereby to rotate marking member **84**. During such rotation, the sectorial marking member **84** enters the recess at the bottom of container C and the marking element **100** and bearer rims **106** come into frictional and rolling engagement with the bottom surface B. The supporting structure **40** of the marking apparatus **10** is adjusted so that the foam rubber cushion or pad **94** which radially supports the body **96** carrying marking element **100** and bearer rims **106** is normally compressed slightly in response to engagement of the marking element and bearer rims with the bottom surface B. Thus, the radially resilient mounting of block **96** ensures firm contact of the marking element **100** with bottom surface B even though there may be slight differences in the depth of the recesses at the bottom of successive containers.

During the rolling and marking contact of element **100** with the bottom surface B of the container C, the bearer rims **106** ensure that the peripheral speed of the marking element will be exactly equal to the speed of advancement of the container by the conveyor, while the spring drive belt **80** which transmits the rotational drive to shaft **72** can accommodate any difference between the rotational speed of shaft **72** as a result of the drive from shaft **18** and the rotational speed of shaft **72** resulting from rolling and frictional contact of bearer rims **106** with the bottom surface B. Accordingly, blurring of the applied inked marking or impression is avoided.

When the marked container C has moved out of engagement with the actuating fingers **124** of latch mechanism **118**, the spring **126** is operative to return the latter in the counterclockwise direction, as viewed in FIG. 2, that is, to urge the latch member or finger **116** against the periphery of collar **110**, so that the latch member **116** will again engage in notch **114** when marking member **84** has returned to its original illustrated position. During such return of the marking member to its original position, that is, during the completion of a single revolution, the surface of marking element **100** effects rolling contact with the pad **138** of inking roller **132** and thereby has ink applied thereto for use in marking the next container carried by conveyor **12**.

If the containers are to be marked while empty, or if the contents of the containers are relatively light, a resilient hold-down member **140** (FIG. 3) may be supported, as by an arm **142** adjustable on a post **144**, at a location above the marking apparatus **10** for yieldably resisting upward displacement of each container during the marking thereof.

It will be apparent that, with the marking apparatus embodying the invention, the adjustable supporting structure **40** makes it possible to mark the bottom surfaces of containers having recessed or concave bottoms of different depths. Further, minor variations in the depths of the recesses or concavities at the bottoms of successive conveyed containers are accommodated by the resilient mounting of the marking element and bearer rims. The combination of the yieldable spring belt drive for the marking member and the bearer rims representing a frictional drive by the container being marked makes it possible to employ a sectorial marking member which can reach into deeply recessed bottoms of containers for marking the bottom surfaces, while ensuring that slippage will not occur between the container and the marking member during the actual marking operation.

Although an illustrative embodiment of the invention has been described in detail herein with reference to the accompanying drawing, it is to be understood that the invention is not limited to that precise embodiment, and that various changes and modifications may be effected therein without departing from the scope or spirit of the invention, except as defned in the appended claims.

What is claimed is:

1. An apparatus for marking the recessed bottoms of containers as the latter are continuously advanced on a conveyor, comprising a sectorial marking member mounted for rotation about a horizontal, transversely extending axis below the path of travel of the conveyed containers, marking means rotationally fixed on said member and adapted, upon rotation of the latter, to reach above said path of travel and into marking contact with the recessed bottom of a container as the latter passes thereabove, resiliently yieldable drive means urging said marking member to rotate, latch mechanism operative to halt rotation of said marking member in a position where the latter is disposed below said path of travel of the conveyed containers and including latch releasing means actuable by a container conveyed over the marking apparatus to permit rotation of said marking member through said drive means for moving said marking means into marking contact with the recessed bottom of the container, and bearer means also rotationally fixed on said marking member for frictional engagement with the recessed bottom of the container simultaneously with said marking means, thereby to adjust the peripheral speed of the latter to the speed at which the container is conveyed during the marking thereof.

2. An apparatus for marking the recessed bottoms of containers as the latter are continuously advanced on a conveyor, comprising a sectorial marking member mounted for rotation about a horizontal, transversely extending axis below the path of travel of the conveyed containers, radially resilient mounting means on said marking member and rotatable with the latter, marking means and bearer means on said mounting means urged resiliently by the latter in the radially outward direction into marking and frictional contact, respectively, with the recessed bottom of a container passing over the apparatus during rotation of said marking member, resiliently yieldable drive means urging said marking member to rotate, and latch mechanism operative to halt rotation of said marking member in a position where the latter is disposed below the path of travel of the conveyed containers and including latch releasing means actuable by a container conveyed over the apparatus to permit a complete revolution of said marking member during which said radially resilient mounting means urges the marking means into marking contact with the recessed bottom of the container while said bearer means simultaneously frictionally engage the recessed bottom of the container to adjust the peripheral speed of the marking means to the conveyed speed of the container during marking of the latter.

3. An apparatus as in claim 2; wherein said yieldable drive means includes a pulley connected to said marking member, and a continuously driven spring drive belt running around said pulley to slip and stretch relative to the latter when said latch mechanism halts rotation of said marking member.

4. An apparatus as in claim 2; wherein said marking member has two axially spaced apart cheeks defining a radially opening slot therebetween, and said mounting means includes a block slidable in said slot and carrying both said marking and bearer means, and a resilient pad at the bottom of said slot to urge said block radially outward.

5. An apparatus as in claim 4; wherein said cheeks have radial end edges, and said block has relatively wider end plates engageable against said end edges of the cheeks to limit the radially outward movement of said block in said slot.

6. The combination of conveyor means operative continuously to transport containers with recessed bottoms along a horizontal path and including a rotated drive shaft; and apparatus for marking the recessed bottoms of the containers as the latter are successively transported along said path comprising a horizontal, transversely extending axle rotatably mounted below said horizontal path, a sectorial marking member fixed on said axle and having radially resilient mounting means rotatable therewith, marking means and bearer means both carried by said mounting

means and projecting radially from said marking member, resiliently yieldable transmission means between said drive shaft and said axle and tending to rotate the latter so that said marking means and bearer means are moved to extend above said horizontal path for rolling contact with the recessed bottom of a container passing over said apparatus, and a latch mechanism normally holding said marking member against rotation in a position where said marking means and bearer means are disposed below said horizontal path and being releasable by a container passing over said apparatus whereupon said yieldable transmission means can rotate said axle to move said marking means into rolling marking contact with the recessed bottom of the container while said bearer means simultaneously frictionally engages the recessed bottom to ensure that the peripheral speed of said marking means is equal to the linear speed of the conveyed container.

7. The combination as in claim 6, wherein said yieldable transmission means includes pulleys on said drive shaft and axle, respectively, and an endless spring belt running around said pulleys and stretching and slipping relative to the latter when said latch mechanism halts rotation of said marking member.

8. The combination as in claim 6; wherein said marking member has two axially spaced apart cheeks defining a radially opening slot therebetween, and said mounting means includes a block slidable in said slot and carrying both said marking and bearer means, and a resilient pad at the bottom of said slot to urge said block radially outward.

9. The combination as in claim 8; wherein said cheeks have radial end edges, and said block has relatively wider end plates engageable against said end edges of the cheeks to limit the radially outward movement of said block in said slot.

References Cited in the file of this patent

UNITED STATES PATENTS

875,092	Merrell	Dec. 31, 1907
2,195,173	Jackson	Mar. 26, 1940
2,425,249	Lacy-Hulbert	Aug. 5, 1947
2,631,535	Mumma	Mar. 17, 1953
2,631,536	Riley	Mar. 17, 1953