

Sept. 18, 1962

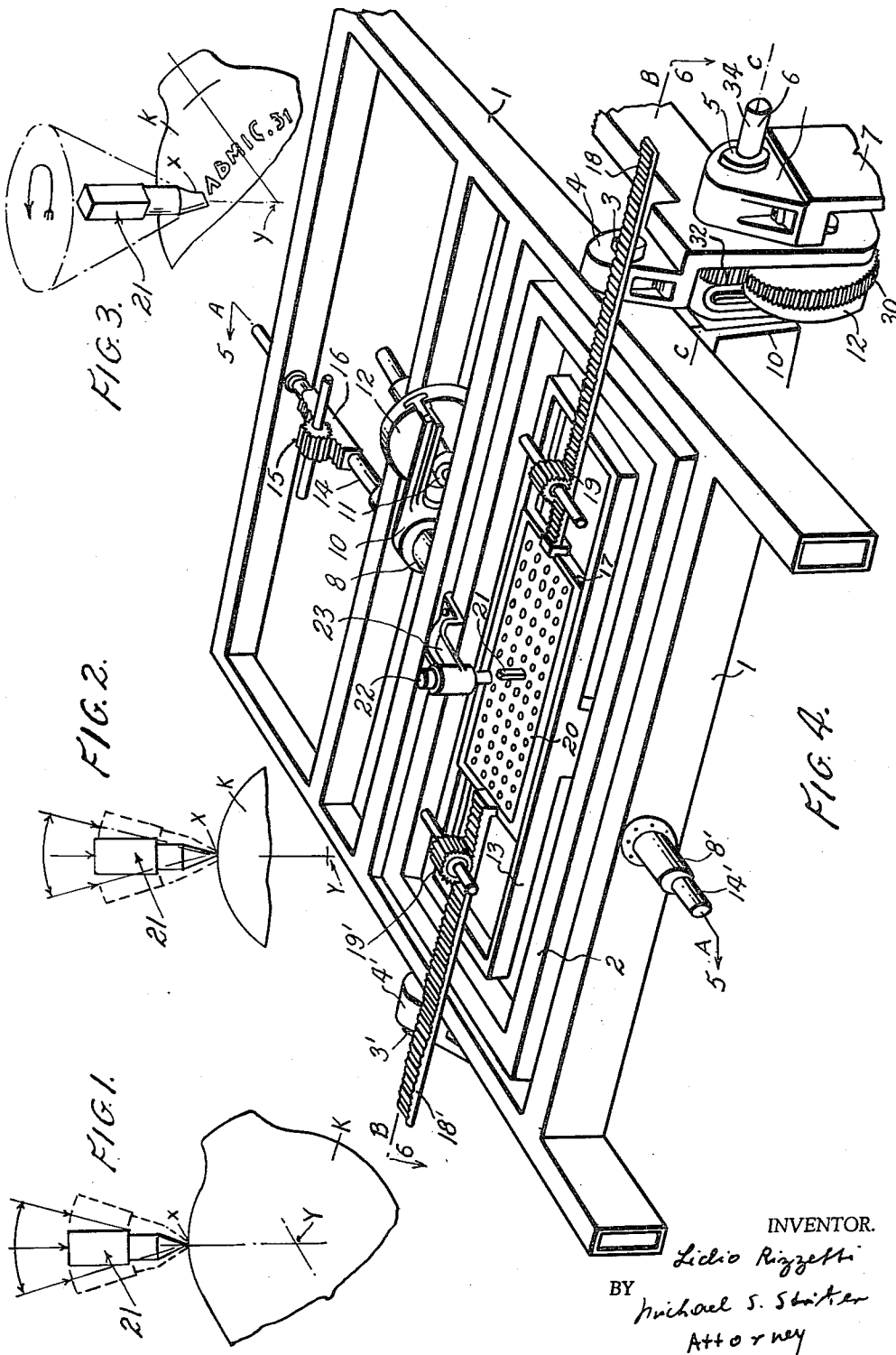
L. RIZZETTI

3,054,494

METHOD AND APPARATUS FOR MARKING CURVED SURFACES

Filed Sept. 8, 1959

2 Sheets-Sheet 1



INVENTOR.

Licio Rizzetti

BY

Michael S. Smiter
Attorney

Sept. 18, 1962

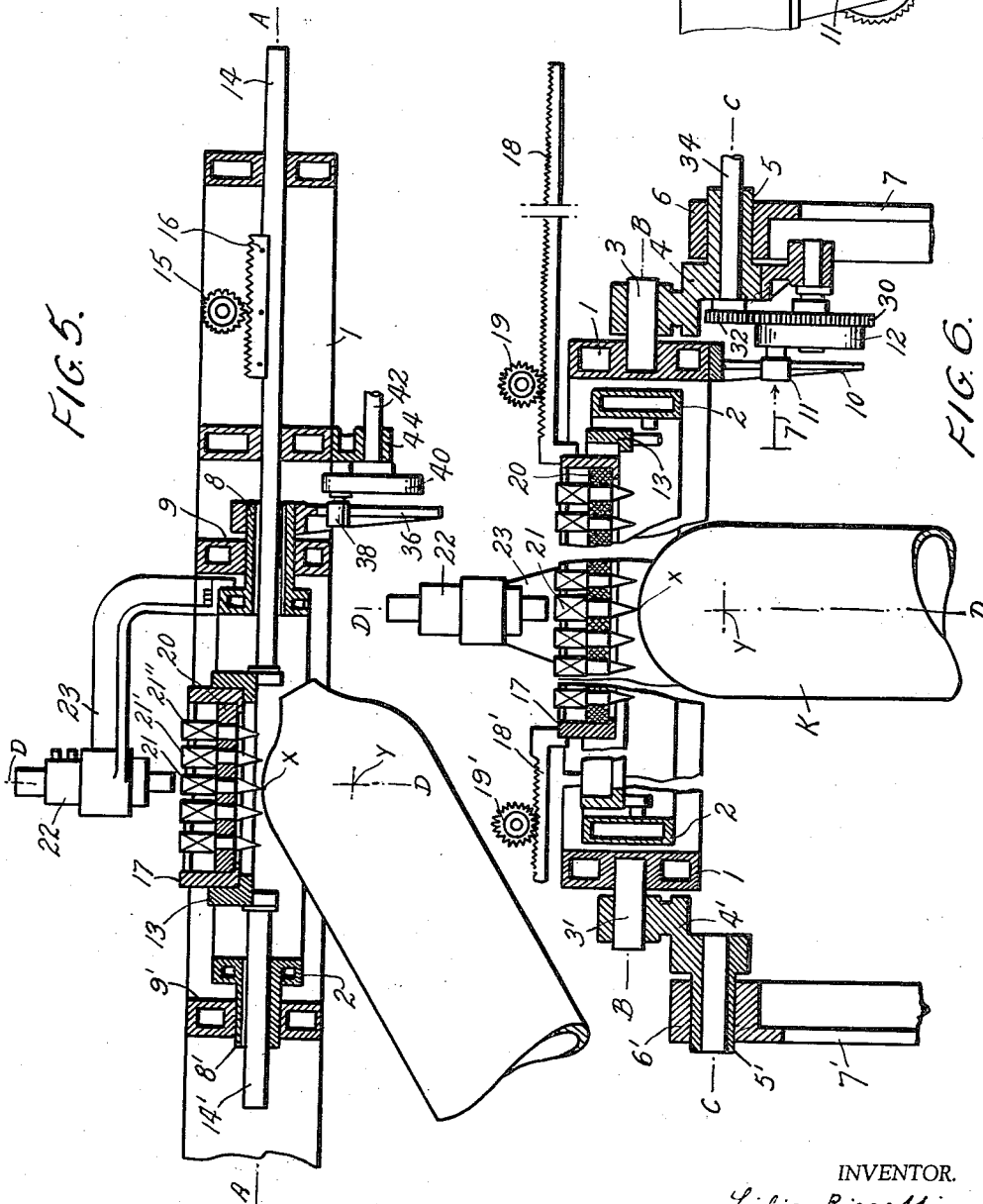
L. RIZZETTI

3,054,494

METHOD AND APPARATUS FOR MARKING CURVED SURFACES

Filed Sept. 8, 1959

2 Sheets-Sheet 2



INVENTOR.
Licio Rizzetti
BY *Michael S. Striker*
Attorney

1

3,054,494

METHOD AND APPARATUS FOR MARKING CURVED SURFACES

Lidio Rizzetti, Dalmine (Bergamo), Italy, assignor to Dalmine S.p.A., Dalmine (Bergamo), Italy
Filed Sept. 8, 1959, Ser. No. 838,473

Claims priority, application Italy Sept. 9, 1958
17 Claims. (Cl. 197—6.4)

The present invention relates to a method and apparatus for marking curved surfaces, and more particularly to a method and apparatus for providing punched letters or numerals on bodies or containers having curved walls, such as steel bottles having narrow necks.

It is the object of the present invention to provide a method and apparatus for the above described purpose which does not require manual operation of punches.

Another object of the present invention is to provide a method and apparatus for punching words, numerals, or other signs on curved walls of containers in such a manner that the marked characters are uniform.

The outer surface of conventional metal bottles and similar containers suitable for containing fluids under pressure, is generally provided with markings by means of punches which are placed on the surface of the container, and hammered by a skilled operator. Markings obtained by this manual operation are not completely uniform, and the work takes considerable time, particularly since the speed of the operation depends on the skill of the operator. Furthermore, the punches are worn and sometimes break, which adds to the cost of the operation.

In accordance with the present invention, a body is marked by moving a marking punch repeatedly into marking engagement with the surface of the body, while the marking punch is angularly oscillated, preferably in two intersecting planes, so that the apexes of the angles in the planes coincide and are located at the surface point to be marked. The axis of the punch assumes positions corresponding to generatrices of a cone which has its apex at the punching point. The punch is subjected to repeated rapid blows by reciprocating hammer means. In a preferred embodiment of the invention, first and second supports or frames are mounted for angular oscillation about two perpendicular axes which intersect at an intersecting point, holding means for marking punch means are mounted on one of the frames, the marking punch means are mounted for movement toward and away from the intersecting point of the axes, and hammer means apply repeated blows against the marking punch means during the angular oscillations of the two frames. A body, such as a container for fluid under pressure, which has a curved surface, is placed with the surface point to be marked located at the intersecting point, and is marked when the marking punch means engages the respective surface point.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIGS. 1, 2 and 3 are fragmentary schematic perspective views illustrating a punch operating on the outer surface of a hollow container;

FIG. 4 is a fragmentary perspective view of an embodiment of the invention;

FIG. 5 is a fragmentary sectional view taken on line 5—5 in FIG. 4;

2

FIG. 6 is a fragmentary sectional view taken on line 6—6 in FIG. 4; and

FIG. 7 is a fragmentary elevation taken in the direction of the arrow 7 in FIG. 6, and illustrating a detail.

Referring now to the drawings, the apparatus according to the present invention comprises two supports or frame means 1 and 2 of rectangular shape, frame means 2 being located within the larger frame means 1. Frame means 1 is mounted by a pair of pivot means 3 and 3' on corresponding supporting bearings 4 and 4' for angular oscillation about a first axis B—B. Bearing supports 4 and 4' carry pivot means 5 and 5' which are supported for turning movement by further supports 6 and 6' which rest on supporting columns 7 and 7' which are part of the supporting base of the apparatus.

Frame means 2 has hollow pivot means 8, 8' located in bearing supports 9 and 9' secured to frame means 1 so that frame means 2 is mounted for angular oscillation about an axis A—A which extends perpendicularly to the axis B—B.

Frame means 1 has a forked arm 10, best seen in FIGS. 6 and 7 defining a slot in which a roll 11 is slidably located. Roll 11 is eccentrically mounted on a disk 12 which is fixed to a large gear 30. A pinion 32 is secured to a shaft means 34 so that rotation of shaft means 34 effects a movement of roll 11 about a circular path, and oscillation of frame means 1. Consequently, the apparatus comprises moving means for oscillating support means or frame means 1 about the axis B—B.

A corresponding fork means 36 is secured to frame 2, as best seen in FIG. 5, and cooperates with a roll 38 which slidably engages the slot in the forked arm 36, as best seen in FIG. 5. Roll 38 is eccentrically mounted on a disc 40 which is connected to a shaft means 42 turnably mounted on frame means 1. When shaft means 42 is rotated, the moving means 36, 38, 40 effect an angular oscillation of frame means 2 about the axis A—A. A fixed bearing portion 44 secured to frame means 2 supports shaft means 42.

The amplitude of the oscillations performed by frames 1 and 2, respectively, depend on the distance between the roll 11 or 38 from the axis of rotation of disc 12 or 40, respectively, and rolls 11 and 38, respectively are preferably adjustable for varying effective radius between the axis of the disc 12 or 40, and the axis of the roll.

Shafts 34 and 42 may be driven from any suitable conventional power source, or through a suitable transmission.

Frame means 1 and 2 are simultaneously oscillated about the respective axes A—A and B—B. Pivot means 3, 3' and 8, 8' are located in such a manner that the axes intersect in a plane at a point X, and during the punching operation, the surface point to be marked on the outer surface of the body or container is placed at the point of intersection X.

A third frame means 13 is located within frame means 2, and is mounted on the same to extend parallel to the same during sliding movement on two supporting bars 14 and 14' which pass through corresponding aligned bores in frame means 1, and also through the hollow pivot means 8 and 8' of frame means 2. A rack bar 16 is fixed on guide bar 14, and meshes with a pinion 15 which can be driven to displace the third frame means 13 in a direction of the axis A—A. A conventional power source may drive pinion 15 through a suitable transmission.

A holding means 17 for punches 21 is mounted for sliding movement in the direction of the axis B—B in guide ways of frame means 13, and includes an inner punch holder plate 20 having guide holes in which a set of punches 21, 21', 21" etc. are detachably mounted.

The guide holes are arranged in two sets of perpendicular rows extending, respectively in the direction of the axes A—A and B—B. The outer frame of holding means 17 is secured to a pair of rack bars 18 and 18' meshing with pinions 19 and 19', respectively so that when pinions 19 and 19' are driven by suitable means, not shown, the holding means 17, 20 are displaced in the direction of the axis B—B. Since frame means 13 can be displaced with holding means 17, 20 in the direction of the axis A—A, any guide hole of the punch holder 20 can be placed in an axis D—D extending through the point of intersection X of axes A—A and B—B and perpendicular to the same. A hammer means 22 is located in the axis D—D and reciprocable along the same. A bracket arm 23 is rigidly fixed to frame 2 and supports the hammer means 22 for reciprocating movement in the direction of the axis D—D.

The surface point X of the container or body to be marked by the punch means 21 is placed in the axis D—D and in engagement with the point of punch 21. The character on punch 21 will produce a corresponding marking on the point X on the outer surface of the body K, while the punch assumes positions inclined to the axis D—D, with the axis of the punch 21 extending through generatrices of a cone, as best seen in FIGS. 1 to 3. These positions of the punch means 21 is obtained by simultaneously angularly oscillating frames 1 and 20 corresponding to the curvature of the outer surface of the body K so that the resulting marking will be uniform and of constant size and depth in successive markings.

Conventional mechanical means are provided for synchronizing and coordinating the movements of the hammering means, as well as the inclination of the frames and punches in order to obtain the continuous punching of a selected word, number, or other signs according to a circular or circumferential alignment of a portion of the outer surface of the body K. The body or container K is intermittently displaced, and the entire apparatus is preferably inclined a selected angle to the surface corresponding to an axis C—C passing through the point Y which is the focal point of the geometrical configuration of the outer surface to be punched, for example a spherical, elliptical, conical, parabolical, or hyperbolical surface. In this manner, a selected group of words, numbers or other signs can be marked in successive parallel rows in circumferential direction of the marked body.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of marking methods and apparatus differing from the types described above.

While the invention has been illustrated and described as embodied in an apparatus employing punches oscillating in two perpendicular planes, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. A method for marking a body comprising the steps of moving a marking punch repeatedly into marking engagement with the surface of said body while angularly oscillating said marking punch with the apex of the angle located at the surface point to be marked.

2. A method for marking a body comprising the steps of moving a marking punch repeatedly into marking en-

gagement with the surface of said body while angularly oscillating said marking punch in two perpendicular planes with the apexes of the angles in said planes coinciding and located at the surface point to be marked.

3. A method for marking a body comprising the steps of holding a body having an axis and a curved surface; and moving a marking punch repeatedly into engagement with the curved surface of said body while angularly oscillating said marking punch in two perpendicular planes with the apexes of the angles in said planes coinciding and located on a surface point to be marked on said curved surface, one of said planes passing through said axis.

4. A method for marking a body comprising the steps of holding a body having an axis and a curved surface of revolution; moving a marking punch repeatedly into engagement with the curved surface of said body while angularly oscillating said marking punch in two perpendicular planes with the apexes of the angles in said planes coinciding and located on a surface point to be marked on said curved surface, one of said planes passing through said axis; and rotating said body stepwise about its axis so that surface points around the periphery of said body are marked.

5. A method for marking a body comprising the steps of holding a marking punch in a position located opposite a point to be marked on the surface of said body while angularly oscillating said marking punch in two perpendicular planes with the apexes of the angles in said planes coinciding and located at said surface point; and directing successive hammer blows against said marking punch so that the same is moved into marking engagement with said surface point.

6. An apparatus for marking a body having a curved surface, comprising, in combination, a first support means; first moving means for angularly oscillating said first support means about a first axis; second support means mounted on said first support means for movement about a second axis perpendicular to said first axis and intersecting the same at an intersecting point; second moving means for angularly oscillating said second support means about said second axis and being operative simultaneously with said first moving means; holding means mounted on said second support means; marking punch means mounted on said holding means for movement toward and away from said intersecting point and in a direction transverse to said axes; hammer means for applying blows against said marking punch means during angular oscillations of said first and second support means whereby a body having a curved surface with a surface point to be marked located at said intersecting point is marked when said marking punch means is brought into marking engagement with the surface point while marking punch means is moving in directions differently inclined to said curved surface.

7. An apparatus for marking a body having a curved surface, comprising, in combination, a first frame means; first moving means for angularly oscillating said first frame means about a first axis; second frame means mounted on said first frame means within the same for movement about a second axis perpendicular to said first axis and intersecting the same at an intersecting point; second moving means for angularly oscillating said second frame means about said second axis and being operative simultaneously with said first moving means; holding means mounted on said second frame means; marking punch means mounted on said holding means for movement toward and away from said intersecting point and in a direction transverse to said axes; hammer means for applying blows against said marking punch means during angular oscillations of said first and second frame means whereby a body having a curved surface with a surface point to be marked located at said intersecting point is marked when said marking punch means is brought into marking engagement with the

5

surface point while said marking punch means is moving in directions differently inclined to said curved surface.

8. An apparatus as set forth in claim 7 and including means for moving said holding means on said second frame means in the directions of said first and second axes.

9. An apparatus as set forth in claim 7 and including rack bar and pinion means for moving said holding means on said second frame means in the directions of said first and second axes.

10. An apparatus as set forth in claim 7 wherein said hammer means are mounted on one of said frame means and located in a plane passing through the axis of the respective frame means.

11. An apparatus as set forth in claim 10 wherein said holding means includes a plurality of guide means; wherein said marking punch means includes a plurality of marking punches respectively guided in said guide means of said holding means; and wherein said holding means is mounted on said second frame means for movement relative to the same between positions in which different marking punches are located under said hammer means.

12. An apparatus as set forth in claim 11 wherein said guide means are arranged in a plurality of crossing rows so that said guide means are located in a first set of rows extending parallel to said first axis and in a second set of rows extending parallel to said second axis; wherein said holding means includes a third frame means movable on said second frame means in direction of said second axis and a punch holder movable on said third frame means in direction of said first axis.

13. An apparatus as set forth in claim 12 wherein each of said first and second frame means includes forked arm means; and wherein each of said first and second moving means includes a rotary member having an eccentric part engaging the said forked arm means of the respective frame means.

14. An apparatus as set forth in claim 12 wherein said

6

second frame means includes hollow axle means mounted on said first frame means for turning movement about said second axis; and wherein said third frame means includes guide shaft means slidably passing through said hollow axle means and being also slidably supported on said first frame means so that said third frame means is movable in direction of said second axis.

15. An apparatus as set forth in claim 14 including rack bar means connected to said third frame means and to said punch holder; and pinion means meshing with said rack bar means for moving said third frame means and punch holder to positions in which selected punches of said marking punches cooperate with said hammer means.

16. An apparatus as set forth in claim 6 and including means for turnably supporting a body having a body axis and a surface of revolution in a position in which said body axis extends at an angle to a plane defined by said first and second axes, and in which position a point of said surface is located at said intersecting point of said first and second axes so that successive surface points are placed at said point of intersection when said body is turned about said body axis.

17. An apparatus as set forth in claim 6 and including means for turnably supporting a body having a body axis and a surface of revolution in a position in which said body axis extends at an angle to a plane defined by said first and second axes, and in which position a point of said surface is located at said intersecting point of said first and second axes so that successive surface points are placed at said point of intersection when said body is turned about said body axis, and in which position a tangential plane at said surface point coincides with said plane of said first and second axes.

References Cited in the file of this patent

UNITED STATES PATENTS

2,654,311 Costanzo ----- Oct. 6, 1953