

March 31, 1964

T. A. McCOY

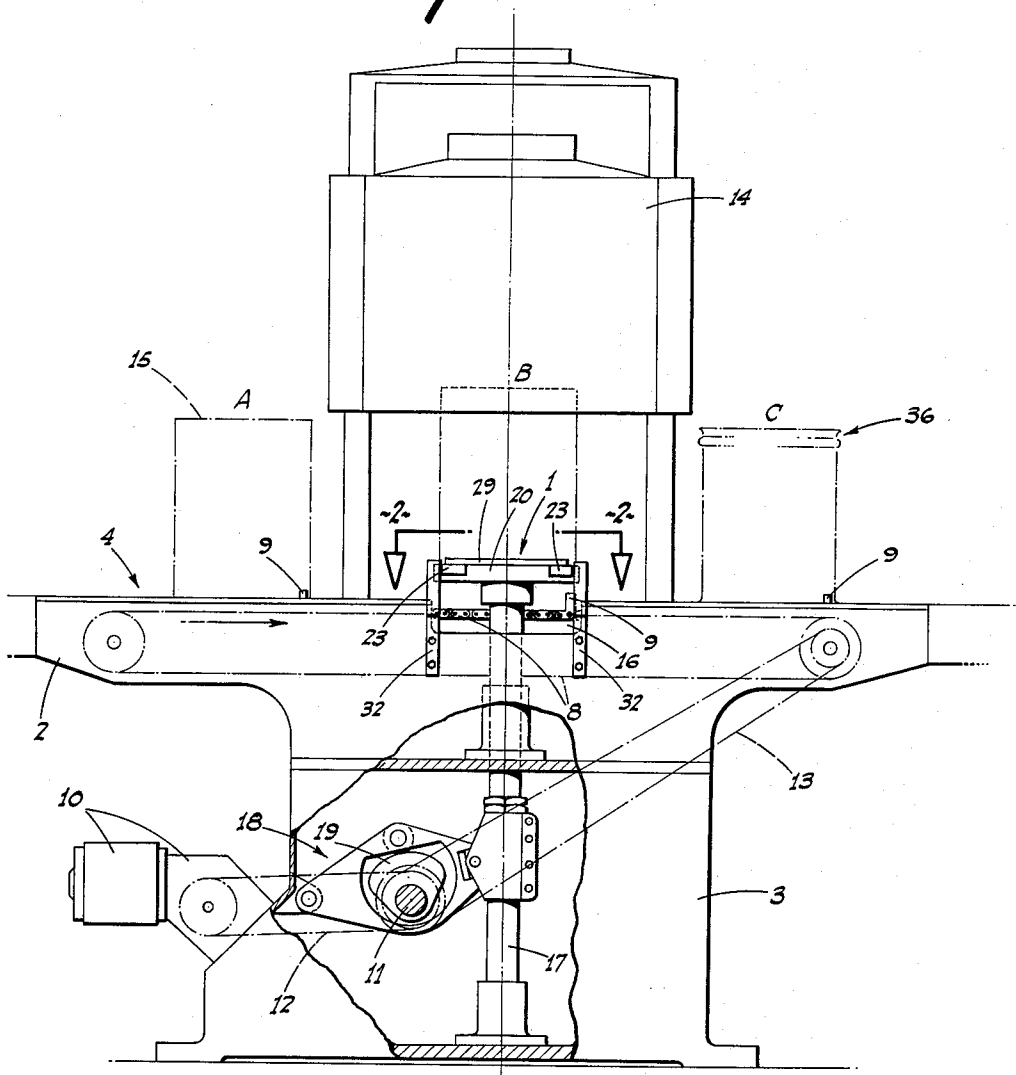
3,126,938

DRUM BODY ELEVATING PLATFORM UNIT

Filed July 30, 1962

4 Sheets-Sheet 1

FIG-1



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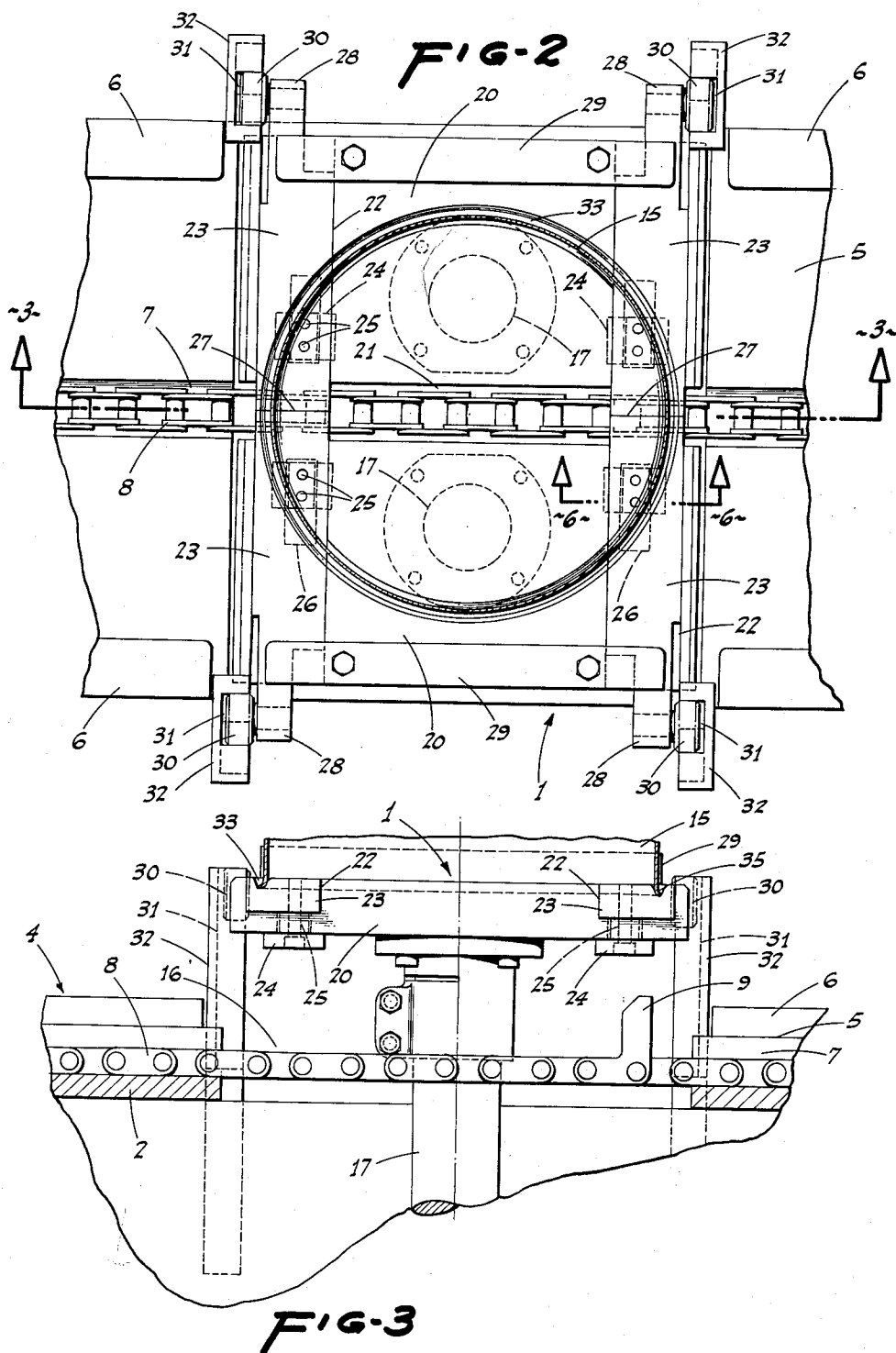
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DRUM BODY ELEVATING PLATFORM UNIT

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DRUM BODY ELEVATING PLATFORM UNIT

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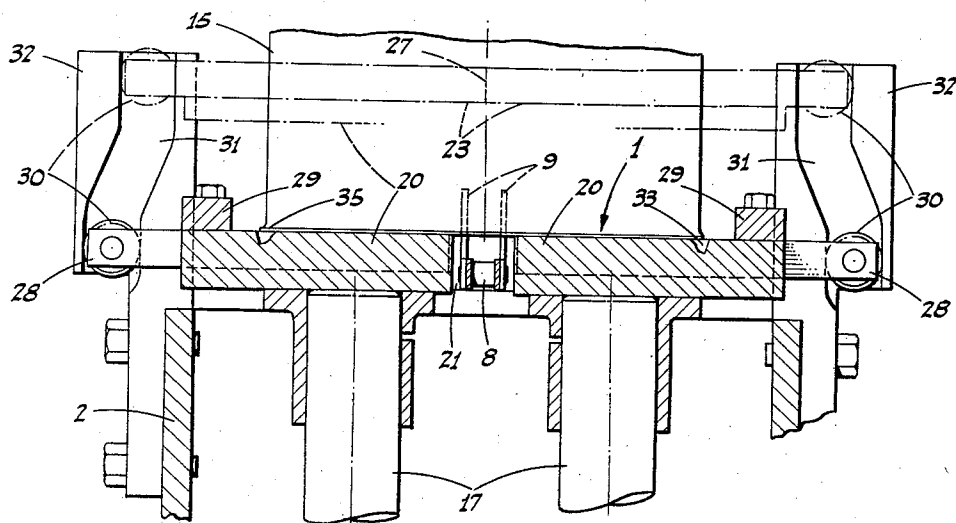
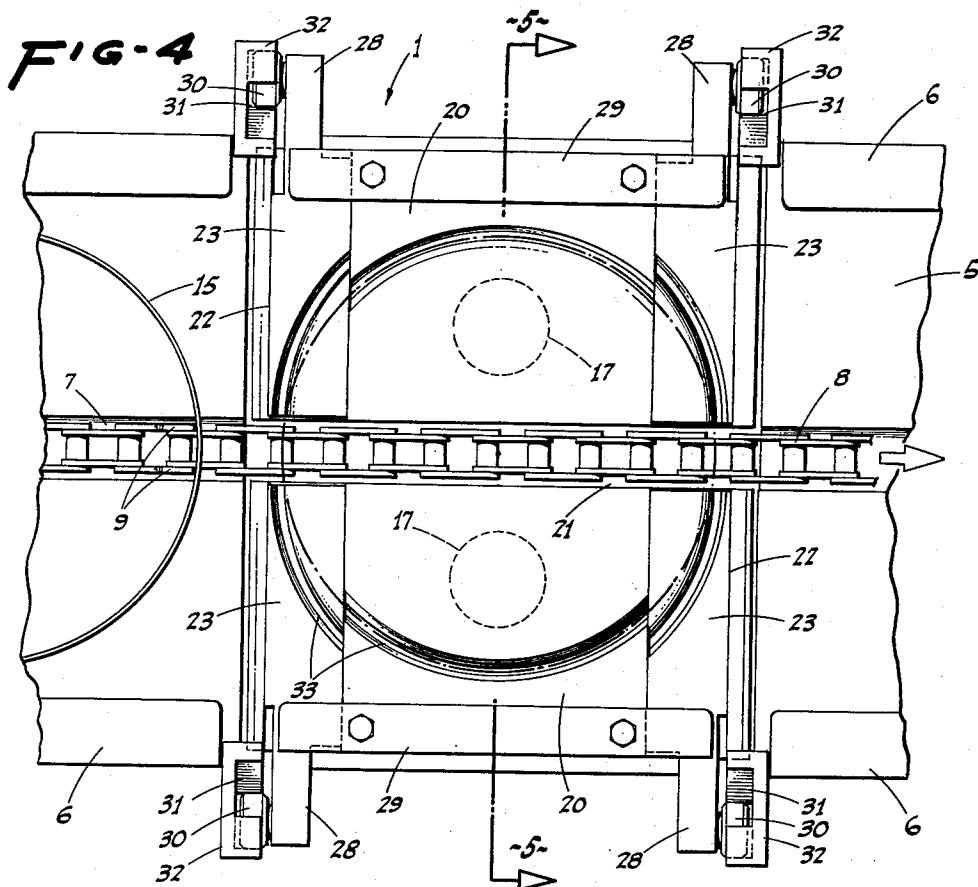


FIG-5

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DRUM BODY ELEVATING PLATFORM UNIT

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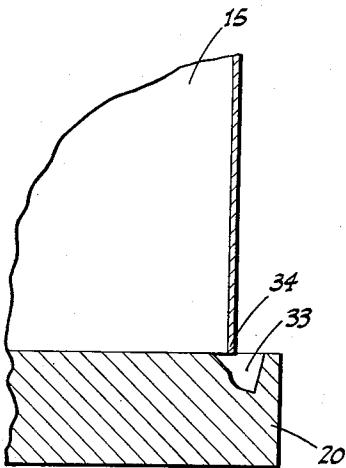


FIG-7

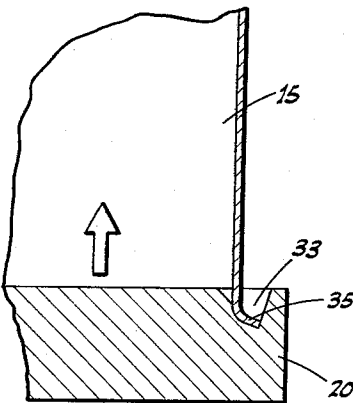


FIG-8

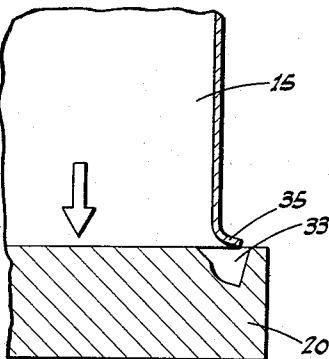
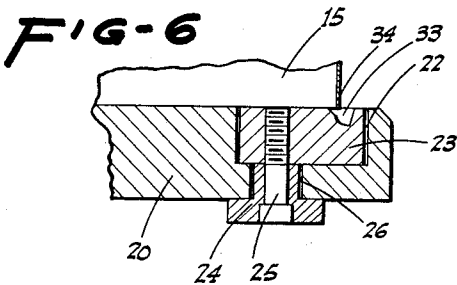


FIG-9



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DRUM BODY ELEVATING PLATFORM UNIT

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7 Claims. (Cl. 153—48)

This invention is directed in general to improvements in a machine employed in the manufacture of metallic drums or pails, and which include a cylindrical, initially open-ended shell or drum body.

The machine is of the type which embodies a horizontal conveyor to support and advance vertically disposed drum bodies in spaced-apart, single-file order, an overhead die mechanism above the conveyor intermediate its ends, and an elevating platform unit associated with the conveyor and mounted directly below such die mechanism. The elevating platform unit is movable between a lowered position and a raised position, and operative in timed relation to the conveyor to lift each drum body from, and to then return the same to, the conveyor; the upper end portion of each drum body as so lifted projecting into and being acted upon by said die mechanism to form a curl or swedge (or both) on such upper end portion of the drum body.

It is the major object of the present invention to provide, in a machine as above, an improved elevating platform unit, and to incorporate in such unit novel means to simultaneously form a flange on the lower end of each supported drum body when lifted by said unit and upon projection of the upper end portion of such drum body into the overhead die mechanism.

Another important object of this invention is to provide an improved elevating platform unit, for the purpose described, in which said flange forming means comprises members on the unit which, when the latter is in raised position, define a continuous surface having therein an upwardly opening, full-circle die channel in which the lower end of the supported drum body engages. Such members, each formed with a portion of said die channel, comprise a pair of fixed, transversely spaced platform sections, and movable bridging sections spanning the space between such platform sections when the unit is in raised position but automatically retracting clear of such space when the unit is in lowered position, whereby to then allow the longitudinal upper run of the drum body conveyor of the machine to occupy such space as is necessary in the cycle of operation.

A further object of the invention is to provide a practical, reliable, and durable drum body elevating platform unit, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

FIG. 1 is a somewhat diagrammatic elevation, partly broken away, of the machine; the elevating platform unit being shown in its raised position, and the view also illustrating a drum body in progressive positions thereof.

FIG. 2 is an enlarged top plan view of the elevating platform unit in raised position; the view being taken substantially on line 2—2 of FIG. 1.

FIG. 3 is a fragmentary longitudinal sectional elevation taken substantially on line 3—3 of FIG. 2; only the lower end portion of the drum body being shown in this view.

FIG. 4 is an enlarged top plan view of the elevating platform unit; the view being similar to FIG. 2, but shows such unit in lowered position.

FIG. 5 is a fragmentary transverse sectional elevation taken substantially on line 5—5 of FIG. 4.

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FIG. 6 is a fragmentary sectional elevation taken substantially on line 6—6 of FIG. 2.

FIGS. 7, 8, and 9 are enlarged fragmentary sectional elevations taken through the flange forming die channel of the elevating platform unit; the views showing progressive steps of the operation.

Referring now more particularly to the drawings, and to the characters of reference marked thereon, the drum body elevating platform unit—which will hereinafter be described in detail—is indicated generally at 1; such unit being mounted in connection with a machine comprising the following:

An elongated horizontal frame 2 is rigidly supported from the floor by a hollow pedestal 3; such frame being provided with an endless chain type horizontal conveyor, indicated generally at 4.

The conveyor 4 comprises a horizontal, longitudinally bed 5 fitted with side rails 6 and formed, centrally of its sides, with a longitudinal guide channel 7 which receives the upper run of an endless conveyor chain 8, and which upper run travels in the direction indicated by the arrow in FIG. 1.

The endless conveyor chain 8 includes, at longitudinally spaced points, pusher lugs 9 which project upwardly from the upper run of said chain and to a point above the top surface of the bed 5.

An electric motor and gear box unit 10 is mounted beyond one end of the pedestal 3 and actuates a cross shaft 11 by means of an endless drive 12; the cross shaft 11 being journaled in said pedestal. In turn, the cross shaft 11 drives the conveyor chain 8, from one end thereof, by means of an endless drive 13.

An overhead die mechanism 14—which is conventional and therefore not described in detail—is suitably supported in vertical alinement above the elevating platform unit 1; such die mechanism 14 having its lower end disposed in a horizontal plane above the path of movement of the upper end of a drum body 15 supported on, and being advanced by, the conveyor 4. Such drum body 15—which is vertically disposed on the conveyor 4—is metallic, cylindrical, and initially open-ended.

The drum body 15 rests at its lower end on the bed 5, and is advanced by means of one of the pusher lugs 9 projecting into the drum and engaging the same centrally at the front thereof.

The conveyor bed 5, including the frame 2, is formed centrally of its ends with a full-width transverse recess 16 which receives the elevating platform unit 1 when the latter is in lowered position; such elevating platform unit 1 being reciprocated between its lowered position in the recess 16 and a raised position as in FIG. 1 by means of the following:

A pair of transversely spaced posts 17 are vertically reciprocally mounted in the hollow pedestal 3; such posts 17 being fixed to the under side of the elevating platform unit 1, and being reciprocated by means of a rocker arm assembly, indicated generally at 18, cam actuated as at 19, from the cross shaft 11. As both the conveyor 4 and the posts 17 derive their motion from the cross shaft 11, it will be understood that the elevating platform unit 1 is recurrently raised and then lowered in timed relation to the conveyor chain 8.

The drum body elevating platform unit 1, and which embodies the essence of the present invention, comprises a pair of rectangular, transversely spaced platform sections 20, each fixed on the upper end of the corresponding one of the posts 17. The gap or space 21 between said platform sections 20 is slightly greater in width than the upper run of the conveyor chain 8 so that when the unit 1 is in its lowered position, and at which time the platform sections 20 are flush with the bed 5, said upper run of conveyor chain 8 travels in and through such space

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21 without obstruction. In other words, the space 21 then forms an intermediate portion of the channel 7.

Each of the rectangular, transversely spaced platform sections 20 is formed, adjacent the ends thereof, with a full-width transverse groove 22; such grooves 22 being rectangular in cross section and each having a transverse slide 23 disposed therein. The upper surfaces of the platform sections 20 and slides 23 are flush, and such slides are each maintained against escape from the corresponding groove 22—while remaining slidable therein—by means of an inverted T-member 24 secured to the bottom of the slide 23 by cap screws 25; each such T-member being movable in a transverse slot 26 in the related platform section 20.

When the elevating platform unit 1 is in its lowered position the slides 23 are retracted so that they do not project into the gap or space 21 between the platform sections 20, and thus do not interfere with the upper run of chain 8 traveling in said space 21. However, upon movement of the elevating platform unit 1 from its lowered position to its raised position it is requisite that the transversely corresponding or aligned slides 23 be advanced so as to bridge or span the gap or space 21 at opposite ends of said unit 1; the slides 23 as so advanced to bridge the space 21 having a line of abutment indicated at 27.

Slides 23 are automatically advanced to bridge or span the space 21 when the elevating platform unit 1 is raised, and automatically retracted clear of such space 21 when said unit 1 is lowered, by means of the following:

Each slide 23 is formed at its outer end with a laterally outwardly projecting ear 28, which ear extends beyond a longitudinal side rail 29 on the related platform section 20; such side rails 29 being aligned with the side rails 6 and at the ends lapping the slides 23 in hold-down relation.

Each laterally outwardly projecting ear 28 is fitted, on the outer side, with a roller 30 whose axis extends longitudinally of the machine.

Each roller 30 runs in a laterally opening, upstanding cam groove 31 formed in a fixed post 32 mounted on and upstanding from the frame 2. Each of the grooves 31 is, as shown in FIG. 5, formed with a straight upper and lower portion, and an intermediate portion which extends downwardly at an outward incline. Hence, when the elevating platform unit 1 is in raised position the rollers 30 have advanced the slides 23 in spanning relation to the space 21, but when said unit is in lowered position the rollers 30 have retracted such slides clear of said space 21.

The elevating platform unit 1, in its raised position as in FIG. 1, defines—in the top surface thereof—a full-circle die channel 33, circumferential portions of which channel are in both the platform sections 20 and slides 23. In the lowered position of the elevating platform unit 1, and when the slides 23 are retracted, the portions of the die channel 33 in the slides 23 are out of register with the portions of such die channel in the platform section 20 (see FIG. 4). However, in the raised position of the elevating platform unit 1, and when the slides 23 are advanced, all portions of said die channel 33 are in register and so as to complete the full-circle form—in a then continuous surface—of such channel (see FIG. 2).

In operation of the machine each drum body 15 as advanced on the conveyor 4 by the engaged pusher lug 9 first approaches the overhead die mechanism 14, occupying a position indicated at A in FIG. 1. With continued advance of the drum body 15 from position A, the elevating platform unit 1 moves to its lowered position and said drum body moves to a position, indicated at B, on the unit 1 and in direct alinement with but below the overhead die mechanism 14.

Upon the drum body 15 reaching position B on the elevating platform unit 1 the latter moves from its

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lowered position to its raised position, projecting the upper end portion of the drum body 15 into said mechanism 14, which functions to curl or swedge (or both) the upper end portion of such drum body.

Simultaneously with movement of the elevating platform unit 1 from its lowered to its raised position, which lifts the drum body 15 and projects it into the mechanism 14 as aforesaid, the slides 23 advance, bridging or spanning the space 21 and bringing all portions of the die channel 33 into register to complete the full circle of such die channel.

With such completion of the full circle of die channel 33 the lower end 34 of the drum body 15 first registers with such full-circle die channel (see FIG. 7) and is then forcefully driven thereinto, whereby to die-form an out-turned circumferential flange 35 on the lower end of the drum body 15 (see FIG. 8). This occurs when the drum body reaches its "stop" position in the die mechanism 14, and which is followed by slight continuing upward movement of the elevating platform unit 1.

Nextly, the elevating platform unit 1 returns to its lowered position, and which is accompanied by retraction of the slides 23; such retraction of the slides causing the drum body 15 to ride out of all portions of the die channel 33 and to rest on the top surface of the unit 1 (see FIG. 9).

As the elevating platform unit 1 reaches its lowered position, with the slides 23 retracted and the upper run of the chain 8 passing in the space 21 between platform sections 20, a lug on such upper run engages in the drum body 15 centrally at the front thereof and continues the advance of said drum body on the conveyor 4, and to a position indicated at C in FIG. 1 beyond the overhead die mechanism 14.

In position C of the drum body 15 the die formation made by mechanism 14 on the upper end portion of the drum body 15 is indicated at 36.

While the foregoing has described the progression of a single drum body 15 through the cycle of operation, it will be understood that the machine, which operates quite fast, is adapted—in practice—to receive and act upon a plurality of drum bodies individually but in rapid succession; the drum bodies being fed to and removed from the ends of the conveyor 4 by appropriate apparatus.

With the improved elevating platform unit 1, incorporated in a machine of the type described, each drum body 15 is effectively and substantially simultaneously die-formed at both its upper and lower ends; this being of particular advantage in that the flanging of the lower end of each drum body was heretofore accomplished in a separate machine.

From the foregoing description it will be readily seen that there has been produced such a device as will substantially fulfill the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention the following is claimed as new and useful, and upon which Letters Patent are desired:

1. In a machine which includes a longitudinal conveyor adapted to support and advance a vertically disposed cylindrical metallic drum body, the conveyor having a driven endless chain with a drum body-advancing upper run, an overhead die mechanism above the conveyor, and an elevating platform unit associated with the conveyor and in timed relation to the endless chain being vertically reciprocable between a lowered position and a raised position, the elevating platform unit upon movement to raised position lifting the drum body from the conveyor and projecting the upper end of said drum body into forming engagement with the overhead die mechanism and upon movement to lowered position returning

the drum body to the conveyor; said elevating platform unit embodying a pair of transversely spaced platform sections, the upper run of the chain being disposed in the space between said platform sections when the elevating platform unit is in lowered position, and means to automatically bridge such space upon movement of the elevating platform unit to raised position, the platform sections and bridging means then providing a continuous surface having therein an upwardly opening full-circle die channel in which the lower end of the lifted drum body is received, and said die channel forming a flange on the lower end of the drum body when lifted and upon its upper end being projected into forming engagement with said overhead die mechanism.

2. A machine, as in claim 1, in which the conveyor includes longitudinally spaced drum body-supporting beds along and below the upper surface of which the upper run of the conveyor chain extends; the platform unit being disposed between the beds and when in a lowered position being flush with said beds.

3. In a machine which includes a longitudinal conveyor adapted to support and advance a vertically disposed cylindrical metallic drum body, the conveyor having a driven endless chain with a drum body-advancing upper run, an overhead die mechanism above the conveyor, and an elevating platform unit associated with the conveyor and in timed relation to the endless chain being vertically reciprocable between a lowered position and a raised position, the elevating platform unit upon movement to raised position lifting the drum body from the conveyor and projecting the upper end of said drum body into forming engagement with the overhead die mechanism and upon movement to lowered position returning the drum body to the conveyor; said elevating platform unit embodying a pair of transversely spaced platform sections, the upper run of the chain being disposed in the space between said platform sections when the elevating platform unit is in lowered position, bridging sections transversely slidably mounted on the platform sections, and means to automatically retract the bridging sections clear of said space when the elevating platform unit is in lowered position and to advance the bridging sections to bridge such space when the elevating platform unit is in raised position whereby to then provide a continuous surface having therein an upwardly opening full-circle die channel in which the lower end of the lifted drum body is received, and said die channel forming a flange on the lower end of the drum body when lifted and upon its upper end being projected into forming engagement with said overhead die mechanism.

4. An elevating platform unit, as in claim 3, in which the bridging sections are slides, the upper surface of the platform sections and the slides being flush, and said platform sections and slides each having a circumferential portion of the die channel therein; said die channel portions being out of register when the slides are retracted and in register when the slides are advanced,

5. An elevating platform unit, as in claim 3, in which the bridging sections are slides, and said retracting and advancing means comprises fixed upstanding members beyond the sides of the elevating platform unit, and cam instrumentalities between such slides and members.

6. In a machine which includes a longitudinal conveyor adapted to support and advance a vertically disposed cylindrical metallic drum body, the conveyor having a driven endless chain with a drum body-advancing upper run, an overhead die mechanism above the conveyor, and an elevating platform unit associated with the conveyor and in timed relation to the endless chain being vertically reciprocable between a lowered position and a raised position, the elevating platform unit upon movement to raised position lifting the drum body from the conveyor and projecting the upper end of said drum body into forming engagement with the overhead die mechanism and upon movement to lowered position returning the drum body to the conveyor; said elevating platform unit embodying a pair of transversely spaced platform sections, the upper run of the chain being disposed in the space between said platform sections when the elevating platform unit is in lowered position, each platform section having spaced upwardly opening transverse grooves therein open at one end to the inner side of such section, slides disposed in such grooves of each platform section, and means to simultaneously retract the slides into the grooves and clear of said space when the elevating platform unit is in lowered position and to simultaneously advance the slides in part out of the grooves and into said space when the elevating platform unit is in raised position, corresponding slides on the platform sections being in alinement transversely of the latter, the slides when advanced end-abutting in said space, the platform sections and slides then providing a continuous surface having therein an upwardly opening full-circle die channel in which the lower end of the lifted drum body is received, and said die channel forming a flange on the lower end of the drum body when lifted and upon its upper end being projected into forming engagement with said overhead die mechanism.

7. An elevating platform unit, as in claim 6, in which the slide retracting and advancing means comprises an element projecting from the outer end of each slide in a direction transversely of the elevating platform unit, a fixed post upstanding adjacent but laterally of each such element, a vertical cam groove in each post opening toward the corresponding element, and a longitudinal axis roller on each element riding in the related cam groove; each cam groove having the upper portion thereof inwardly offset relative to the lower portion.

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