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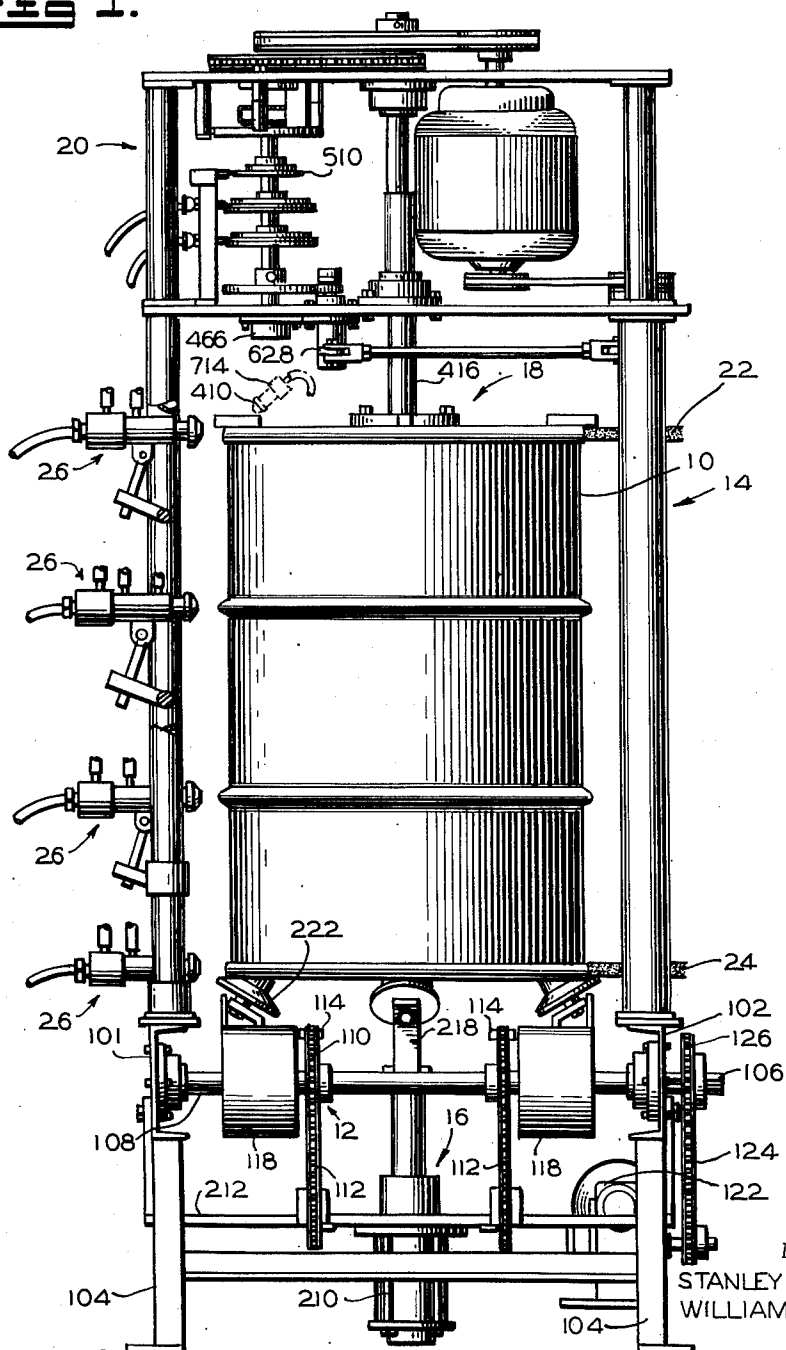
S. S. JOHNS ET AL
APPARATUS FOR PROCESSING SURFACES OF TUBULAR
ARTICLES SUCH AS STEEL DRUMS AND THE LIKE

2,613,634

Filed Sept. 29, 1950

9 Sheets-Sheet 1

FIG 1.



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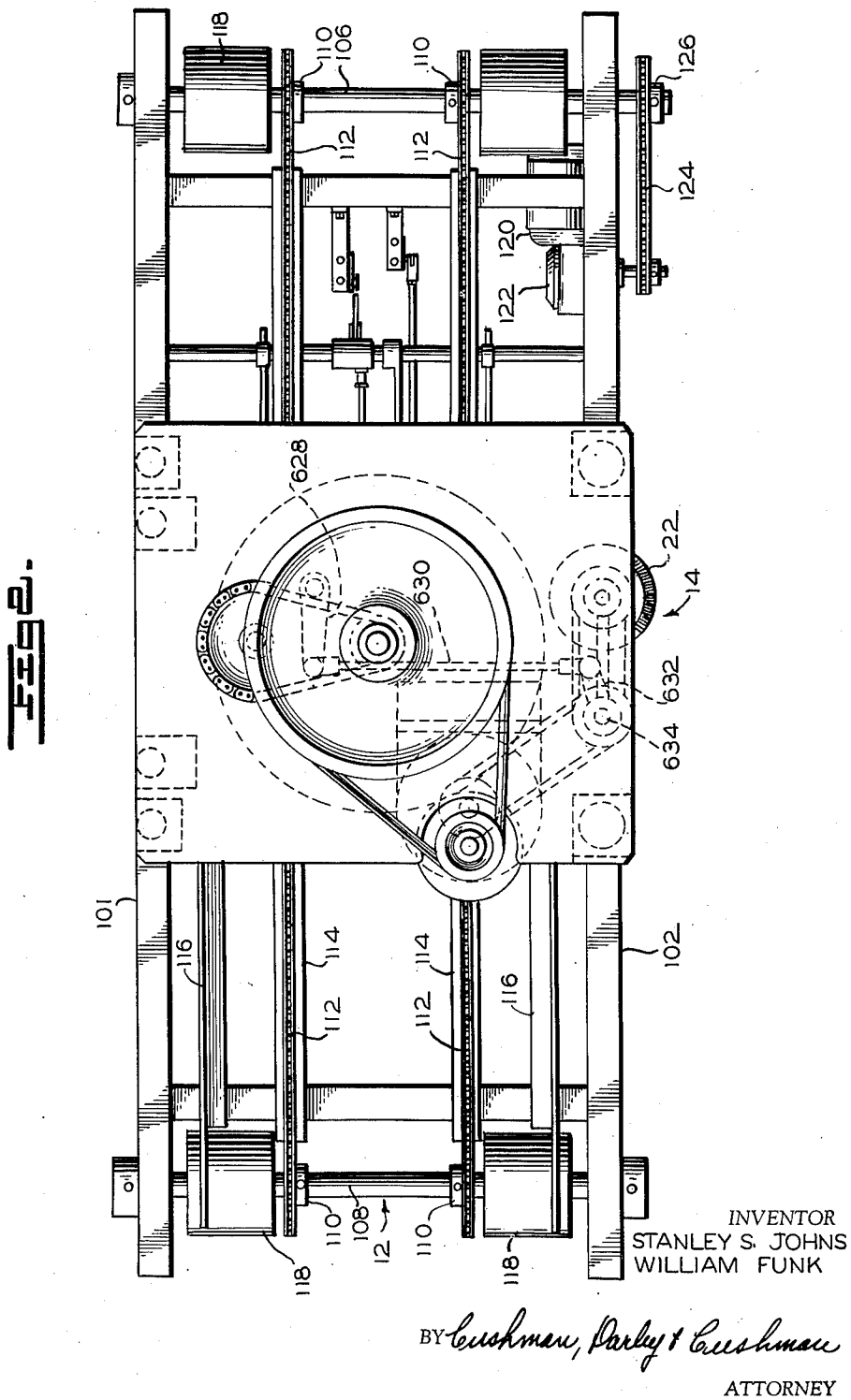
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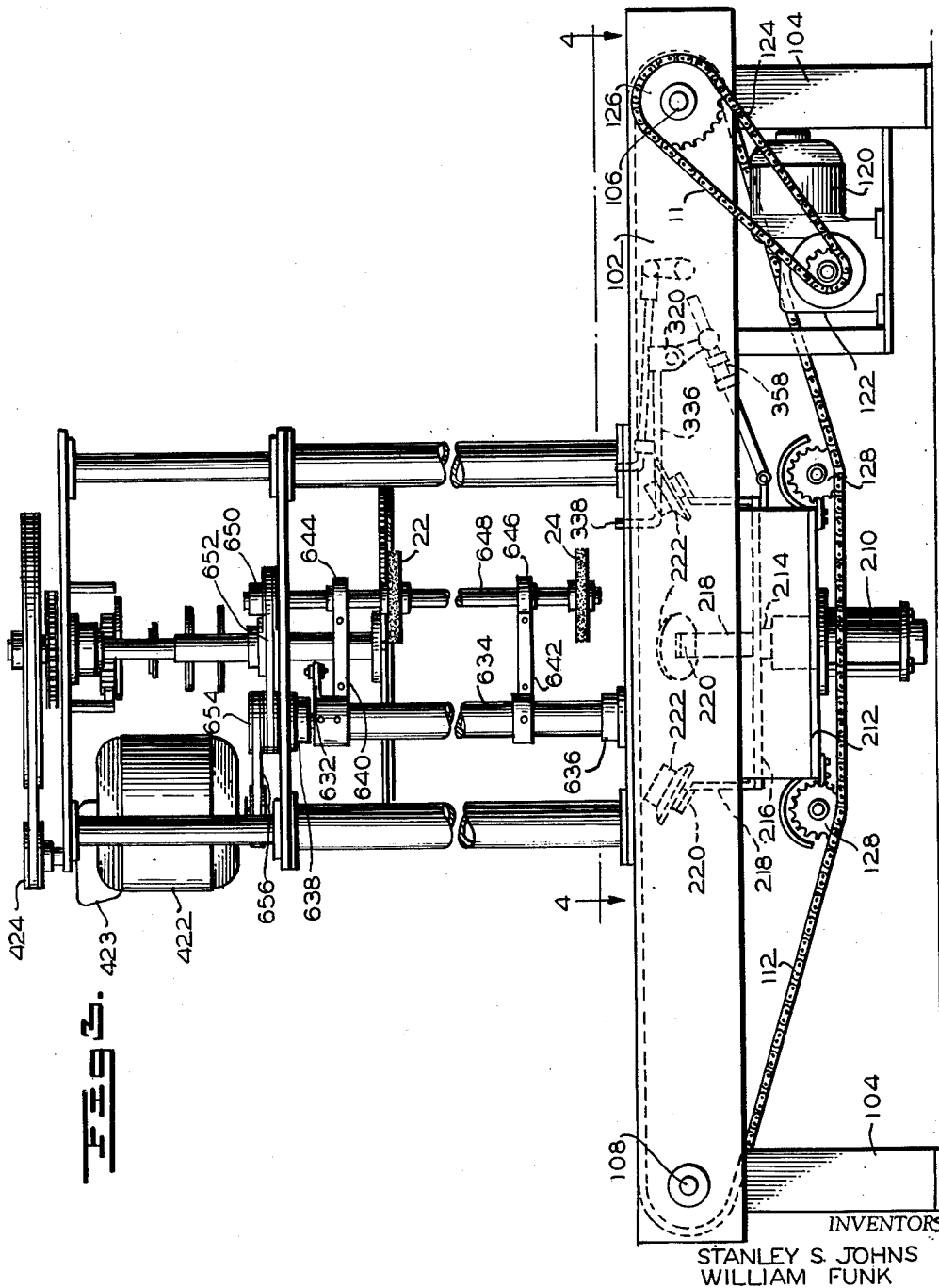
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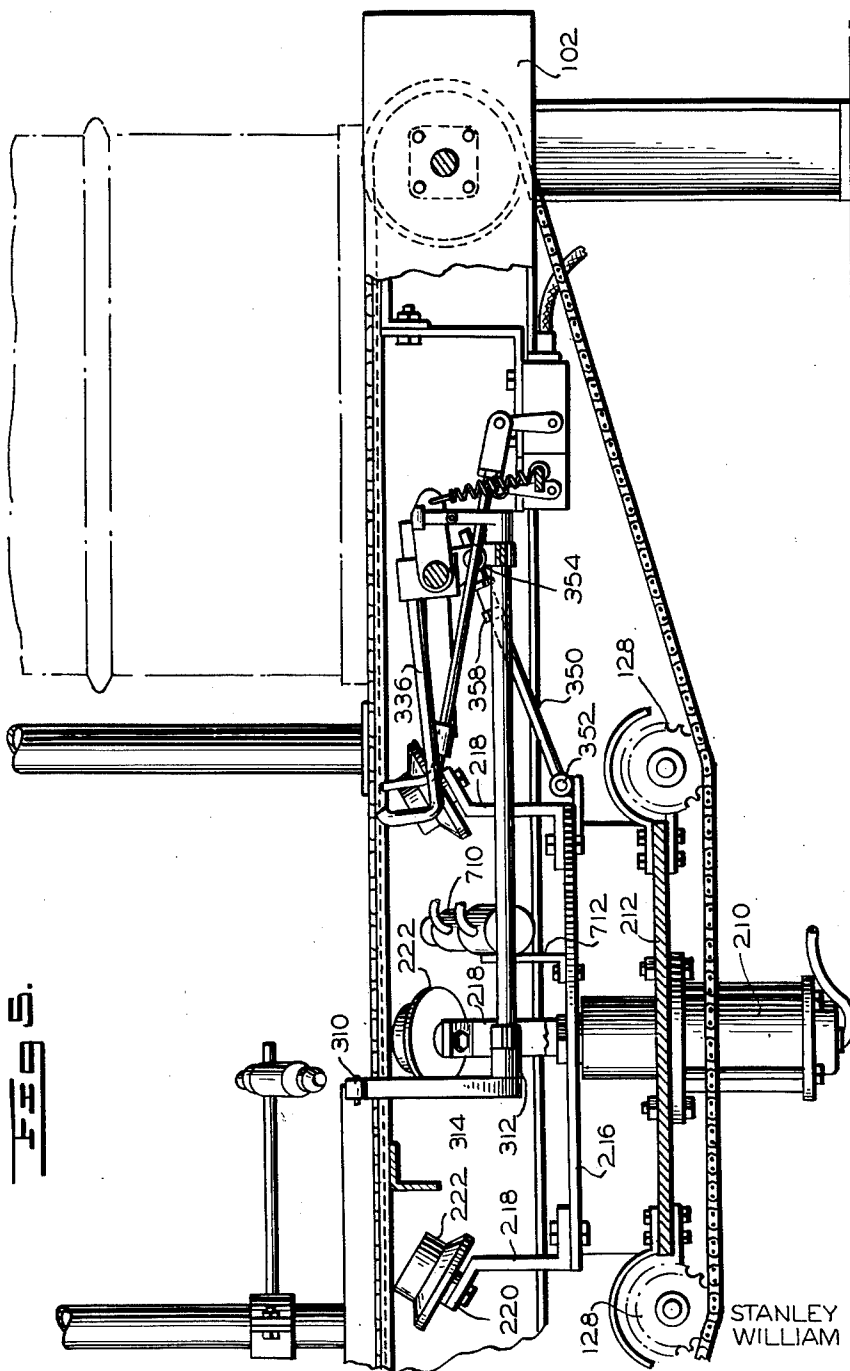
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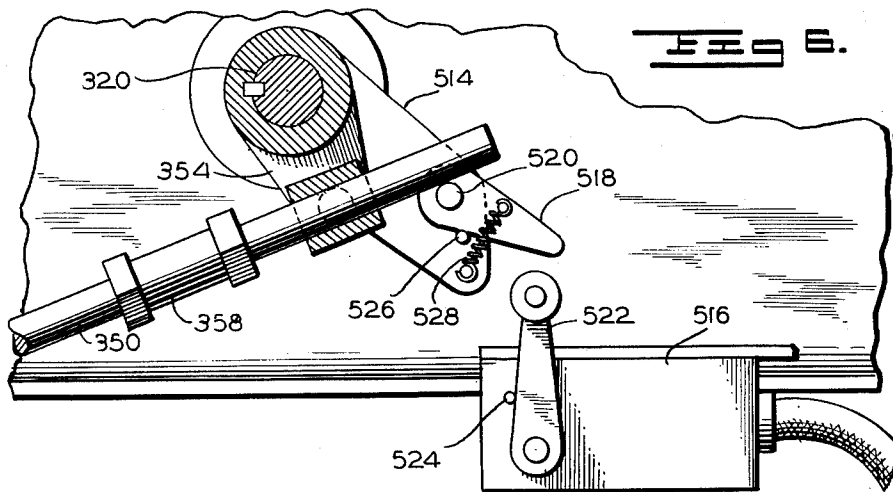
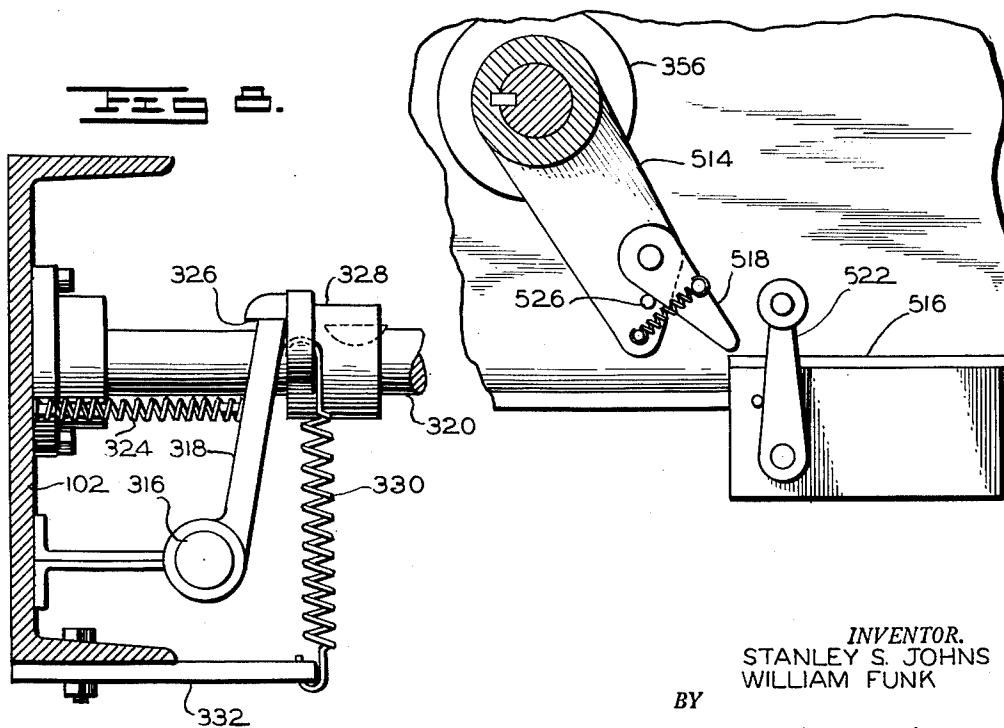


FIG. 7.



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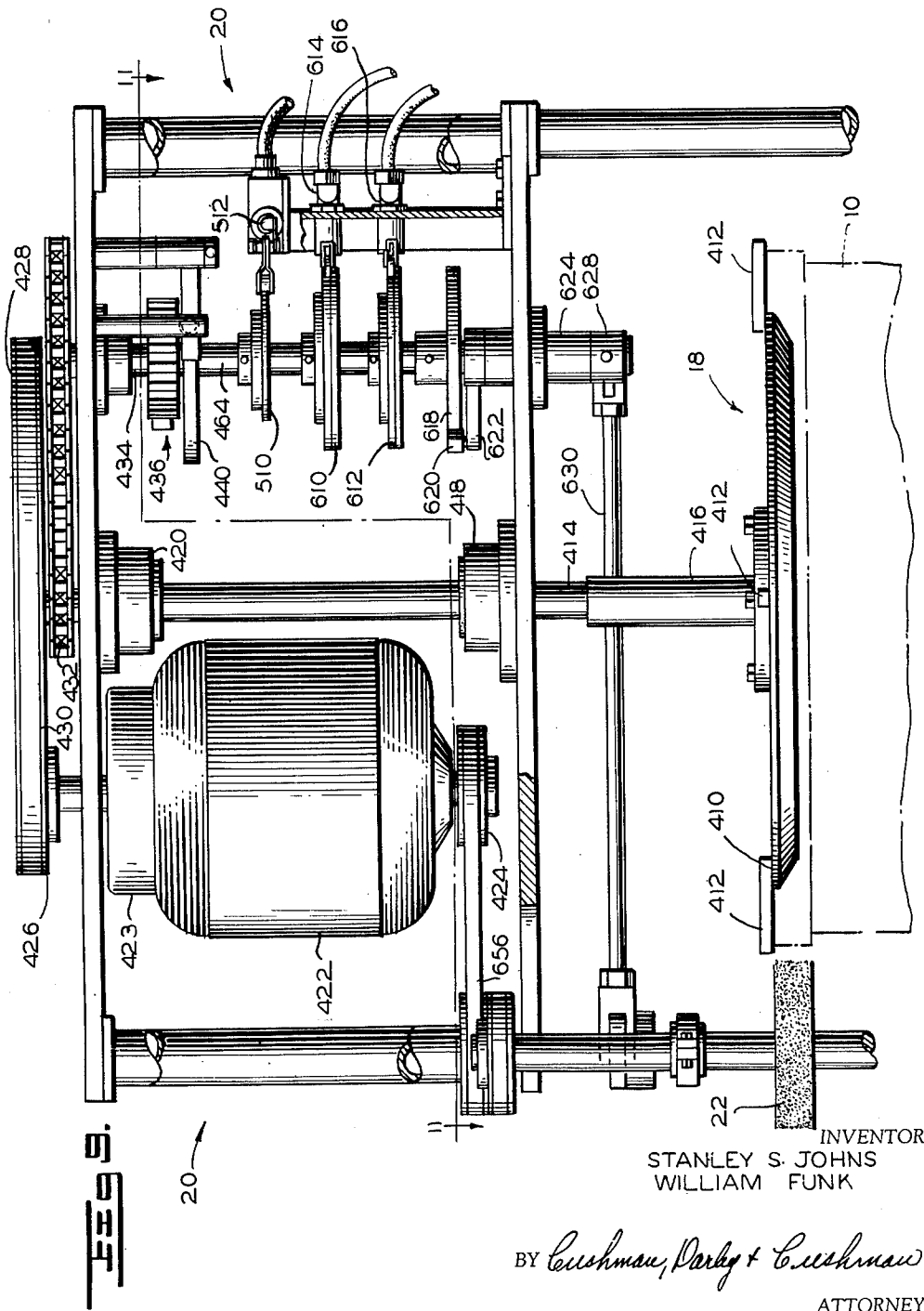
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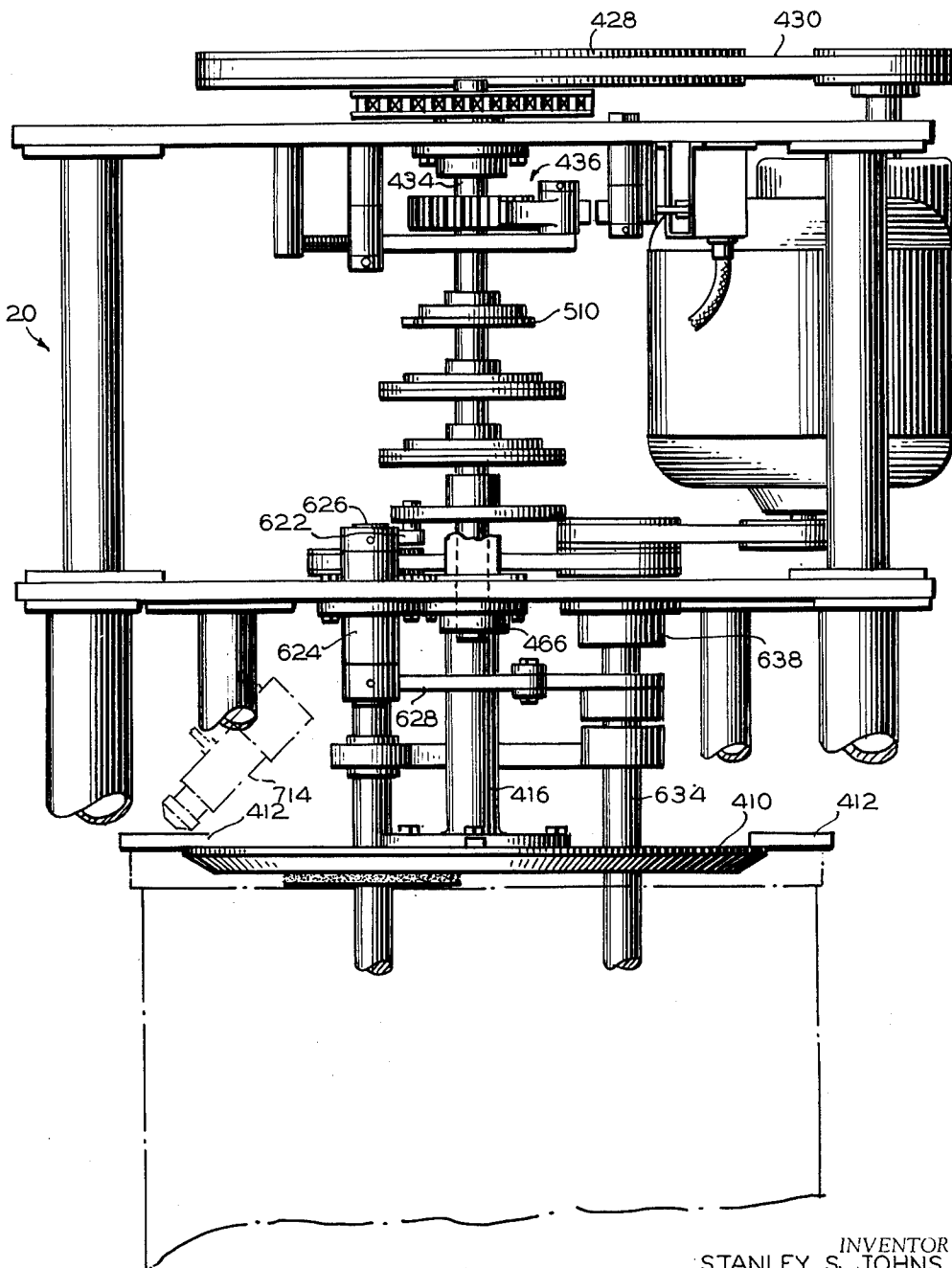


FIG. 10.

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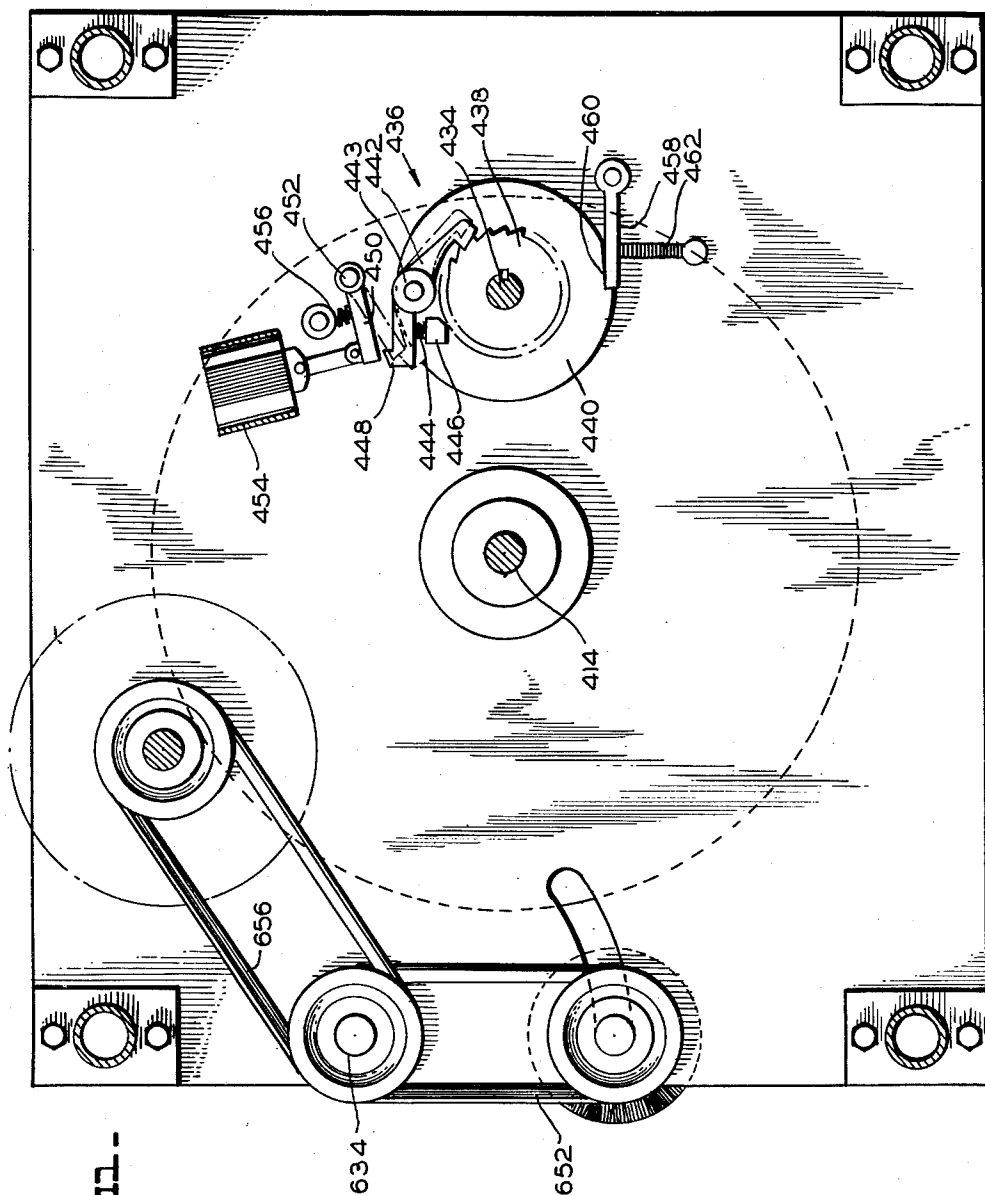
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UNITED STATES PATENT OFFICE

2,613,634

APPARATUS FOR PROCESSING SURFACES
OF TUBULAR ARTICLES SUCH AS STEEL
DRUMS AND THE LIKE

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Application September 29, 1950, Serial No. 187,572

10 Claims. (Cl. 118—315)

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This invention relates to apparatus for processing manufactured articles in conjunction with conveyor systems.

The invention will be described in its application to the processing of containers and primarily with respect to the finishing and/or coating of the peripheral surfaces of cylindrical steel drums. This mode of description will most readily lend the invention to clear understanding and the many other objects which may be similarly processed will be immediately apparent.

By the invention containers which may be moving along a continuous conveyor line are lifted from the line and engaged with apparatus which rotates the containers for a time period during which processing devices mounted adjacent the periphery perform operations about the circumference of the containers.

It is a primary object of our invention to provide a method and apparatus of processing objects, such as containers, while these objects are in general motion along conveyor systems.

It is a further object of our invention to provide means for automatically removing objects from a conveyor system at a predetermined point to permit processing operations thereon.

It is a further object of our invention to provide means for automatically rotating a container or like object adjacent processing devices for a predetermined cycle of operation.

It is a further object of our invention to provide means for automatically removing objects such as containers from a continuously moving conveyor adjacent a processing device for a predetermined cycle of operation.

It is a further object of our invention to provide means for automatically cleaning and coating the upper and lower chimes of steel drums and applying a coating of wax to the beads of such drums.

Further objects and the entire scope of the invention will be further apparent from the following detailed description and from the appended claims. It is to be understood that this detailed description is meant only for purpose of illustrating and is not intended to limit our invention.

A complete understanding of the invention may be best had with reference to the accompanying drawings in connection with the written description.

In the drawings:

Figure 1 shows an end view of the general arrangement of our invention.

Figure 2 shows a plan view of the apparatus of Figure 1.

Figure 3 shows a side view of the apparatus of Figures 1 and 2 with the central portion of the upright structure cut away.

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Figure 4 is a sectional plan view taken along the line 4—4 of Figure 3.

Figure 5 is a partial sectional view of operating mechanism included in our invention.

Figure 6 is a detail sectional view taken along the line 6—6 of Figure 4.

Figure 7 shows the structure of Figure 6 in another position.

Figure 8 is a detail sectional view taken along the line 8—8 of Figure 4.

Figure 9 is a general side view of the apparatus comprising the upper portion of Figures 1—3.

Figure 10 is another side view of the apparatus of Figure 9.

Figure 11 shows a clutch incorporated in the apparatus of Figures 9 and 10.

Referring now to Figures 1 and 2, containers or other objects indicated as 10 are placed upon a conveyor arrangement indicated generally as 12 and are moved thereon until they arrive within a processing apparatus indicated generally as 14. Upon arrival at the apparatus 14 the drum is lifted by action of a platform arrangement indicated generally as 16 until the upper end of the drum engages a preferably continuously rotating head structure indicated generally as 18. The lifting of the drum into engagement with the head 18 is also arranged to place in operation a control unit indicated generally as 20, this control unit causing (in the illustrated embodiment) wire brush wheels 22 and 24 to be applied to the upper and lower chimes of the drum, and also causes an application of a spray of wax or the like through spray units indicated generally as 26. It will be understood that the wire wheels or the sprays can be operated at any position on the surface of the drum, including the inner chime surfaces.

After a predetermined number of revolutions of the drum have occurred, means associated with the control unit 20 will cause the platform arrangement 16 to return the drum to the conveyor system 12, and after the drum has moved away the apparatus will be ready to receive the next drum which appears on the conveyor.

It will be understood that external conveyor sections may supply and remove objects from the abovementioned conveyor 12, or, in fact, the conveyor 12 may be a continuous system of ample length.

The details of the construction of the components of the illustrated apparatus will now be described in greater detail. With additional reference to Figures 3—5 the apparatus is generally mounted upon two side rails 101 and 102. These side rails are suitably supported from the floor by uprights 104. Extending between rails 101 and 102 at the ends thereof are conveyor axles 106 and 108, these axles being mounted for rotation in

suitable bearings on the side rails 101 and 102. Chain sprockets 110 are keyed to the axles 106 and 108 and spaced apart sufficient distance to permit the conveyor chains 112 running thereon to form suitable supports for the drums as they proceed along the system. The chains 112 are arranged to ride in channels 114 so that the chains will not sag under the weight of the drums. The drums are further guided by L-shaped rails 116 to prevent their sidewise movement. The axles 106 and 108 are further provided with rollers 118 keyed thereto, which are located adjacent the sprockets 110 and adjacent the rails 116. These rollers serve the purpose of aiding the drums in becoming positioned on the conveyor chains 112.

The conveyor system as thus far described is then arranged to be driven by an electric motor 120 through reduction gearing 122 and drive chain 124. Chain 124 drives the drive sprocket 126, which is keyed to the axle 106. Idler sprockets 128 are rigidly mounted to the frame comprising the side rails 101 and 102 and are mounted beneath these rails. This arrangement serves the purpose of providing a return path for the conveyor chains 112 and at the same time keeping these chains clear of the platform operating apparatus, which will be described more fully below.

The platform apparatus 16 previously mentioned will now be described in detail. This apparatus comprises a hydraulic piston-cylinder unit 210, which is fixedly mounted upon a transverse support member 212, which extends between and is mounted from the side rails 101 and 102. The piston rod 214 which extends from the unit 210 is connected to a circular platform 216, this platform having four uprights 218 attached at its circumference. The upper end of each of the uprights is bent outwardly to form inclined faces 220 and upon these inclined faces are mounted flanged rollers 222. The layout of these rollers is determined by the diameter of the drums to be processed and is such that when the unit 210 is actuated to drive the platform 216 upwardly the flanges of the rollers will engage the lower rim of the drum, thus lifting the drum from the conveyor chains 112 and also permitting the drum to then be rotated. As has been previously indicated rotation of the drum will occur when it is lifted sufficiently to have the head arrangement 18 engage the upper end of the drum.

While it is clearly possible that the conveyor chains 112 could be stopped at the moment necessary to place a drum directly above the rollers 220, it is also possible and preferable to keep the conveyor in motion and to otherwise raise the platform 216 and rollers 220 at the proper moment to engage the drum. Apparatus for carrying out this function will now be explained in detail. Referring primarily to Figure 4, as the drums move in from the left-hand side, the lower outside edge of the drum will engage a detector arm 310. This detector arm forms a part of a detector hub 312, which comprises an upwardly extending portion 314. The hub 312 is keyed to a rocker shaft 316, and this shaft is mounted in suitable bearings on the side rail 102. When a drum engages the detector arm 310 the result is that shaft 316 is rotated clockwise (looking left to right Figure 4), and a latch arm 318 keyed to the other end of shaft 316 permits a transverse shaft 320 to rotate under the action of a tension spring 322. The detector arm 310 is normally

held in position to engage the drums by reason of compression spring 324, acting between the latch arm 318 and the side rail 102. A more complete understanding of the latch arm arrangement may be had with reference to Figure 8. It will be apparent from this showing that as latch arm 318 is rotated counterclockwise (Figure 8) by action of the detector arm 310 the spring 324 will yield, and the arm 318 will become disengaged with the shoulder 326. The shoulder 326 is integral with hub 328, the latter being keyed to the transverse shaft 320. A tension spring 330 acting between the hub 328 and the mounting member 332 extending from the rail 102, will then cause shaft 320 to turn clockwise.

Two stop rods 336 are fixedly mounted on transverse shaft 320 at spaced points along the shaft 320, and when the latter is rotated under the action of spring 330, the upturned ends 338 of the stop rods 336 extend into the path of the oncoming drums. This may be clearly understood from the showing in Figure 3. As thus far described it will now be apparent that the drums proceeding along the conveyor 12 will first engage the detector arm 310 to cause the shaft 320 to rotate and place the stop rods 336 in the path of the drum. The drum continues its movement until it arrives at the ends 338, where it stops, and if nothing else were done would permit the chains 112 to slide in relation to the drums. The transverse shaft 320, however, also has mounted thereon a trigger enabling arm 340. This arm is keyed to the shaft 320 and rotates in the same manner as do the stop rods 336. The outermost end of the enabling arm 340 is provided with a lug 342 having an aperture therethrough. A trigger rod 344 rides loose in the aperture of the lug 342 and extends at one end to a limit switch 346 and at its other end to an upturned trigger end 348. This trigger end 348 thus moves upward with the rods 336 when the shaft 320 is operated and also assumes a position in the path of the oncoming drums. As shown in Figure 4 the trigger end 348 is slightly in advance of the stop rod ends 338 (in relation to the contour of the drum), and therefore the trigger rod 344 is reciprocated through the aperture in lug 342 until the drum comes in contact with the stop rod ends 338. The movement of the trigger rod 344 actuates the limit switch 346 to actuate the piston-cylinder unit 210 to raise the platform 216. The energizing of the unit 210 by the switch 346 may be by any convenient electrically operated valve means, for example, and it is believed unnecessary to show these details. It will thus be apparent that in actual operation the trigger rod 344 will cause the drum to be lifted by the platform 216 practically simultaneously with the engagement of the drums with the stop rods 336.

The platform 216 is interconnected with the shaft 320 in such manner that the latch 318 will be reset as the platform rises. This action is provided for by means of a connecting rod 350 (Figure 5) pivotally connected at one end by pin 352 to the platform 216 and at its other end sliding in an aperture in a lug 354, which extends from a hub 356 keyed to the shaft 320. The connecting rod 350 is also equipped with adjustable stop means 358 located on the connecting rod adjacent the lug 354. Since the previously mentioned detector arm 310 is located in advance of the final stop point of the drums, this arm will be clear to return to its engageable position when the drum is stopped. This can be appreciated from the showing in Figure 4. Therefore, with

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the stop 358 on rod 350 set to almost engage the lug 354 when the shaft 320 is in its unlatched position, as the platform 216 is raised by the unit 210, the stop 358 will engage the lug 354 and cause the shaft 320 to be rotated counter-clockwise (Figure 5). This action will raise the shoulder 326 and permit the latch arm 318 to again assume the latched position under the action of spring 324. The stop rods 336 and the trigger 334 are accordingly reset, and when the drum is subsequently lowered to the conveyor, the drum will proceed down the line without interference with the said stop and trigger rods and also will not again actuate the detector arm 310. The arrangement will furthermore be reset and ready to receive the next drum which comes along the line.

The control unit 20 employed to automatically establish a processing cycle will now be explained in detail. The rotating head structure indicated generally as 18 consists of a round disk member 410, which is of proper size to fit well within the upper chime of the container 18 and is equipped with lugs 412 spaced about the outer edge of the disk, these lugs being fastened in over-hanging relation whereby the lugs bear upon the upper edge of the drum chime and provide frictional engagement between the head and the drum. The disk 410 is mounted on an axle 414 by means of a flange hub member 416. The axle 414 is set in suitable bearings 418 and 420, which are in turn mounted on suitable framework, which extends upward from the rails 101 and 102. A motor 422 is also mounted upon the framework and is equipped with an upper drive pulley 426. The motor 422 drives the axle 414 by means of a pulley 428 mounted on the axle 414; the drive being through a suitable belt 430.

Also mounted on the axle 414 immediately below the pulley 428 is a chain sprocket 432, this chain sprocket being arranged to drive the input shaft 434 of a one-revolution clutch indicated generally as 436. The one-revolution clutch may be best understood from Figure 11, which is a view taken along line 11-11 of Figure 9. The shaft 434 drives a ratchet wheel 438, which in turn drives a clutch plate 440 by means of a ratchet pawl 442. This pawl is pivotally mounted at 443 on the disk 440 and is normally biased into engagement with the ratchet 438 by means of a compression spring 444. Spring 444 acts between the pawl 442 and a post 445 mounted on the disk 440.

To provide one-revolution operation the pawl 442 is provided with a latch shoulder 448, this shoulder cooperating with a latch arm 450 pivotally mounted at pin 452 to the framework of the apparatus. The latch arm 450 is operated from latched to unlatched position by means of a solenoid 454, the solenoid together with the latch arm 450 being normally biased into engagement with pawl shoulder 448 by means of a compression spring 456 acting between the arm 450 and a suitable fixed support. To prevent backlash of the structure (to be described) associated with the disk 440 a second pawl 458 is provided to cooperate with a detent 460 in the disk 440. This pawl is normally biased into engagement with the disk 440 by means of a compression spring 462 acting between the pawl and a suitable fixed support.

The driven clutch disk 440 is keyed to a cam shaft 464, this shaft being mounted in a suitable bearing 466 at its lower end and at its upper end having a stud riding in a socket in the driving

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shaft 434. This cam shaft may carry a plurality of cams, which may be of any shape required to carry out control operations for whatever processing devices may be employed to work on the surface of the container being rotated by the head assembly 18. While it is not intended to illustrate all the processing arrangements which may be employed with our apparatus, nevertheless, the cams to be employed in the particular embodiment which we have illustrated will be described in some detail.

Cam 510 is arranged to operate a limit switch 512, this cam and switch being adapted to automatically control the lowering of the containers from engagement with the head assembly 18. It will be recalled that when the trigger rod 344 is operated by the arrival of the container on the conveyor 12 the limit switch 346 will operate through a suitable solenoid valve to actuate the lift unit 210 to raise the container; and as the container is being raised the connecting rod 350 serves to reset the transverse shaft 320 to its latched position. The hub 356, which is keyed to the shaft 320, is equipped with an extending arm 514 (Figure 6 and 7), which is adapted to operate a switch 516 to momentarily energize the solenoid 454 to initiate a revolution of the clutch 436. The action is as follows: When a container approaching on the conveyor 12 operates the detector arm 310 to unlatch the latch arm 318 and permit the shaft 320 to turn clockwise (Figure 6) to set the stop arms 336 etc. a yieldable nose 518 pivotally mounted on the arm 514 at 520 engages but does not move the operating arm 522 of the switch 516. The switch 516 is normally open with the operating arm 522 resting against an abutment 524, which prevents the operation of the switch under the action of the nose 518. The nose 518 is arranged to be normally biased against an abutment 526 by reason of a tension spring 528.

When the lift unit 210 is energized, however, and the connecting rod 350 serves to rotate the hub 356 counter-clockwise (Figures 6 and 7) the nose 518 on the arm 514 will positively engage the operating arm 522 and, because of the abutment 526, will rotate the switch operating arm 522 a short distance clockwise as viewed in Figure 7. This clockwise movement will momentarily close the switch 516 and a suitable circuit extending to the solenoid 454 will cause the latch 448 to release, and the pawl accordingly will engage the ratchet 438 under the action of spring 444. Since the shaft 438 is being continuously driven by the motor 422 the cam shaft 464 will undergo one revolution, at the end of which the arm 450, having returned to its normal position, will engage the pawl 442 and drive it into latching engagement at 448, which engagement also removes the pawl from engagement with the ratchet 438.

The solenoid valve (not shown), which was operated to one of its positions by the trigger switch 346, is keyed to and operated to its other position by the previously mentioned cam 510 and switch 512. This operation is carried out by having the cam 510 provided with a short detent at one point about its periphery into which the operating arm of the switch 512 follows just before the clutch 436 stops the cam shaft 464. In other words, the solenoid (not shown), which applies lowering pressure to the unit 210, is given an impulse to shift its position just before the end of the revolution of the cam shaft 464.

It will be understood that while the clutch 436 disengages itself automatically after each revolution of the shaft 434, this does not mean that

the container 10 under the action of the revolving head 410 only goes through one revolution. The container 10 may, in fact, go through any predetermined number of revolutions for every revolution of the shaft 434 by a proper selection of sprocket sizes associated with the chain drive 432. If, for example, it is desired to brush the chimes of the container with wheels 22 and 24 for the first revolution of the container and then to spray paint on these chimes for the next two revolutions, the drive 432 can be such that the drum makes three complete revolutions for each revolution of the shaft 434. The remaining cams upon the cam shaft 464, to be described, will then be cut accordingly to keep associating control devices in operation during the predetermined portions of the cam shaft 464.

Insofar as the spraying of wax, paint, or the like on the surface of the container, it is believed sufficient to explain that the necessary spraying equipment, such as indicated generally as 26 in Figure 1, may be mounted on any suitable portion of the framework of the apparatus and may be moved up and down or may be duplicated to spray any desired section of the drum.

Cams 610 and 612 with associated control switches 614 and 616 are shown as also keyed to the cam shaft 464, and its units may be duplicated as required to operate spraying apparatus or other devices in the conventional manner.

The wire brush wheels 22 and 24 are arranged to be out of contact with the container as it is raised into position and be applied to the chimes of the container under the action yet of another cam keyed to the shaft 464. This is the cam designated as 618, against the outer periphery of which rides a cam roller 620. The cam roller 620 is in turn mounted on a cam follower arm 622, which is pivoted to the framework of the apparatus in a bearing 624 spaced apart from the lower bearing of the cam shaft 464. The arm 622 is keyed at its upper end to shaft 626, which extends through the bearing 624 and has attached thereto at its lower end an operating arm 628. The operating arm 628 is interconnected by means of a connecting rod 630 to an operating crank 632, which controls the swinging of the wheels 22 and 24 about a shaft 634. The shaft 634 extends between suitable bearings 636 and 638 on the framework of the apparatus. The arrangement of the shaft 634 and the just mentioned bearings may be best understood with reference to Figure 3.

As previously mentioned, the wheels 22 and 24 are mounted for movement on the shaft 634 in the following manner: Support arms 640 and 642 are keyed to the shaft 634 at one of their ends and at their other ends form bearings 644 and 646 in which a brush mounting shaft 648 revolves. The brushes 22 and 24 are keyed to the shaft 648 at such positions that will enable the brushes to engage the upper and lower chimes 10 when the cam follower arm 622 is enabled by reason of the contour of the cam 618 to operate the connecting rod 630. The cam 618 is cut in such fashion that the cam follower arm 622 will rotate the shaft 634 to move the wheels 22 and 24 into operating position during a predetermined portion of the cycle of operation, which is under control of the cam 510.

The wheels 22 and 24 are arranged to be continuously rotated by drive means obtained from the previously mentioned lower output pulley 426 of the motor 422. The shaft 648 has keyed to its

upper end a pulley 650, this pulley being driven by a belt 652, which is in turn driven by a double groove pulley 654, which runs freely about an extension of the axis of the mounting shaft 634. The other groove of the pulley 654 receives a belt 656, which receives its motion from the previously mentioned pulley 426. From the arrangement, as described, it will thus be apparent that as the shaft 634 is pivoted under the action of the cam 618 the position of the pulley 654 on the axis of the shaft 634 will permit the brush wheels 22 and 24 to be swung about the axis of shaft 634 without either of the belts 652 or 656 being changed in length. The continuous drive is therefore provided.

An additional feature of our invention may be the provision of means for spraying the inner surfaces of the upper and lower chimes of the containers. This may be best understood from inspection of Figures 4, 5, and 10. Figures 4 and 5 show a paint or wax spraying unit or the like 710 mounted upon an upright 712 extending from the platform 216. The spraying end of the device 710 is accordingly positioned to be in operative relation to the inside chime of the container when the rollers 222 engage the container as the platform 216 is lifted.

The upper inside spraying operation is carried out by means of spraying or like unit 714 which may be fixedly mounted in any convenient manner to the stationary framework of the apparatus. The spraying end of this unit is positioned to clear the lugs 412 on the rotating head 410, but the diameter of the head 410 is sufficiently less than the inner diameter of the chime to permit the sprayed material to coat the chime except where the lugs 412 interrupt the spray. As a practical matter, the lugs 412 are quite narrow and the unpainted areas may be rapidly touched up by hand.

It is a further additional feature of the invention that the one revolution clutch means 436 may be dispensed with by wiring the motor 422 of the control unit so that it is only intermittently energized. That is, the motor may be started when the container is raised into engagement with the head 410 and may be automatically stopped when one revolution of the cam shaft 464 is completed. The manner of so connecting the motor 422 will be apparent to those skilled in the art and no detail description is believed necessary here.

The apparatus may be further simplified without departing from the invention by dispensing with the automatic raising means and providing instead means to manually actuate the raising cylinder 210 after a container has been placed by hand in the correct position immediately above the platform 216.

From the foregoing description of a preferred embodiment of the invention it will be apparent that we provide a means for rapidly and efficiently processing the sides of cylindrical objects, and particularly in coordination with a conveyor or so-called assembly line.

It is intended to be understood that the above description is made for purposes of illustration only. The scope of the invention is to be determined from the appended claims.

This application is related to the copending application of Eugene J. Anderson, Serial No. 201,033, filed December 15, 1950.

We claim:

1. In conveyor line apparatus for processing cylindrical objects moving in upright position

along the conveyor, head means, lift means located at a predetermined position along the conveyor to remove the objects from the conveyor, trigger means for detecting the presence of containers at said predetermined position and arranged to operate the lift means, means for actuating the lift means to move an object from the conveyor and into engagement with the head means for retaining the object between the said lift and head means with the axis of the object extending in a line therebetween, means for rotating the head means to rotate the object about said axis while it is retained in engagement with the head means by the lift means, and processing means positioned adjacent the peripheral surface of the object when the latter is rotated for performing a processing operation on at least a portion of the surface of the object.

2. In conveyor line operation, means for performing a processing operation on objects moving along the line, said means comprising detector means for detecting the arrival of an object adjacent a predetermined position along the line, trigger means adapted to be enabled by the detector means, the trigger means when enabled being positioned to be operated by the object when it reaches the said predetermined position, lift means actuated by the trigger means for lifting the objects from the line for a processing operation thereon, and linkage means operated by the lift means for resetting the trigger means, whereby at the completion of the processing operation the object when returned to the line will continue to move along the line and the next object on the line will actuate the detector means to enable the trigger means for a following cycle.

3. In conveyor line apparatus for performing processing operations on the cylindrical surfaces of a cylindrical object, conveyor means, means for continuously moving the conveyor means, the cylindrical containers adapted to ride on their ends along the conveyor, stop means for stopping successively each container at a predetermined position along the conveyor, platform means adapted to be elevated to engage the lower end of the container and lift the latter from the conveyor, means to elevate the platform means, trigger means associated with the stop means, means to actuate the platform elevating means energized under the control of the trigger means, rotatable head means, the head means being so located that the upper end of the container engages the head means when the platform means is operated, the platform means being adapted to permit the rotation of the container therein, whereby when the container is engaged with the head means the container will rotate about the axis extended between the head and platform means, means for rotating the head means while the container engages the head means, and a processing device located adjacent the periphery of the container whereby as the container rotates the processing device may operate upon the circumference of the container.

4. Apparatus as in claim 3 wherein cam means are provided for detecting the completion of a predetermined number of revolutions of the container for discontinuing the processing operation and for lowering the platform means to permit the container to continue on the conveyor.

5. Apparatus as in claim 3 wherein the processing device comprises a fluid spray unit.

6. Apparatus as in claim 3 wherein the processing device comprises an abrasive wheel.

7. In apparatus for removing objects from a conveyor system for performing a processing operation thereon, platform means located adjacent the conveyor at a predetermined position along the conveyor, means to raise the platform to engage the under side of the container to raise the latter above the conveyor line and to subsequently return the container to the conveyor, said means comprising detector means for detecting the approach of a container along the conveyor, stop means normally out of the way of the containers on the conveyor, latch means operated by the detector means for placing the stop means in a position to be engaged by the container, trigger means associated with the stop means and adapted upon engagement with the stop means to energize the platform raising means, linkage means operated by the platform means to replace the stop and trigger means to their latched positions when the platform is raised, whereby when the platform is lowered the container will continue to move along the conveyor and the detector means is ready to initiate a lift operation upon the next container.

8. In automatic apparatus for performing a processing operation upon a cylindrical object, a head member adapted for rotary operation, a platform member, means for actuating the platform member to raise a container for engagement with the said head, the arrangement being such that the container will rotate about an axis extending between the head and the platform, a cam driving means connected for rotation with the head means, a cam shaft, one revolution clutch means for engagement between the cam drive means and the cam shaft, a processing device located adjacent the periphery of the container, a cam on the cam shaft, for controlling the processing device, cam follower means in engagement with said cam, a second cam on the cam shaft, and cam follower means in engagement with the second cam for lowering the platform after the revolution of the cam shaft.

9. Apparatus as in claim 8 wherein the processing device comprises an abrasive wheel, and wherein the said one cam on the cam shaft is adapted to move the abrasive wheel into operative relationship with the container for at least a portion of the period during which the container is held between the platform and the head.

10. Apparatus as in claim 7 in which the platform means comprises a plurality of rollers arranged to engage the lower peripheral edge of the container for supporting the latter in an upright position and at the same time permitting rotational movement of the container by the rolling action of the rollers on the peripheral edge.

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WILLIAM FUNK.

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