

July 6, 1965

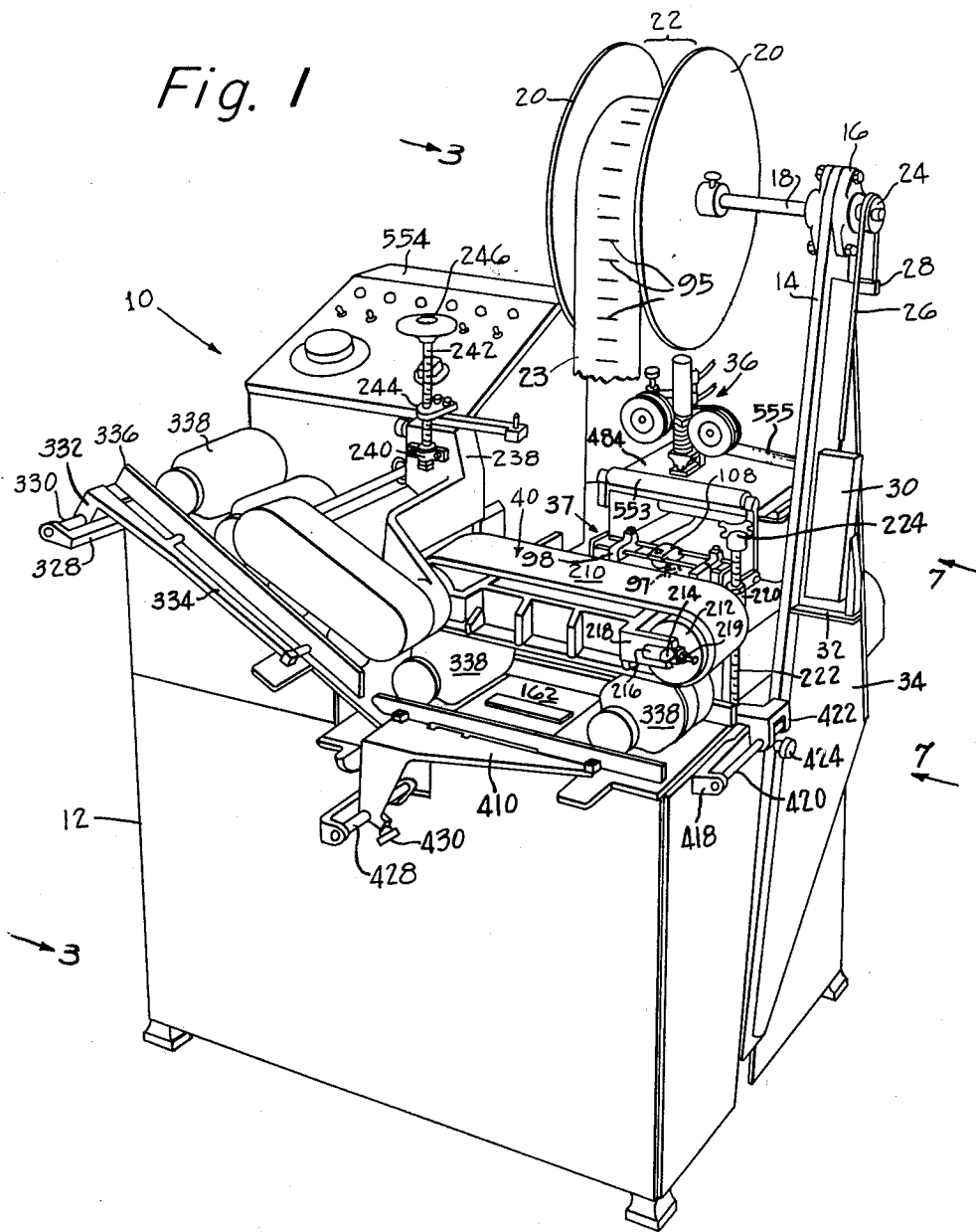
M. SEIFERT

3,193,431

LABELING MACHINE

Filed June 7, 1961

7 Sheets-Sheet 1



INVENTOR.

MAURICE SEIFERT

BY

Arthur A Jacobs

ATTORNEY

July 6, 1965

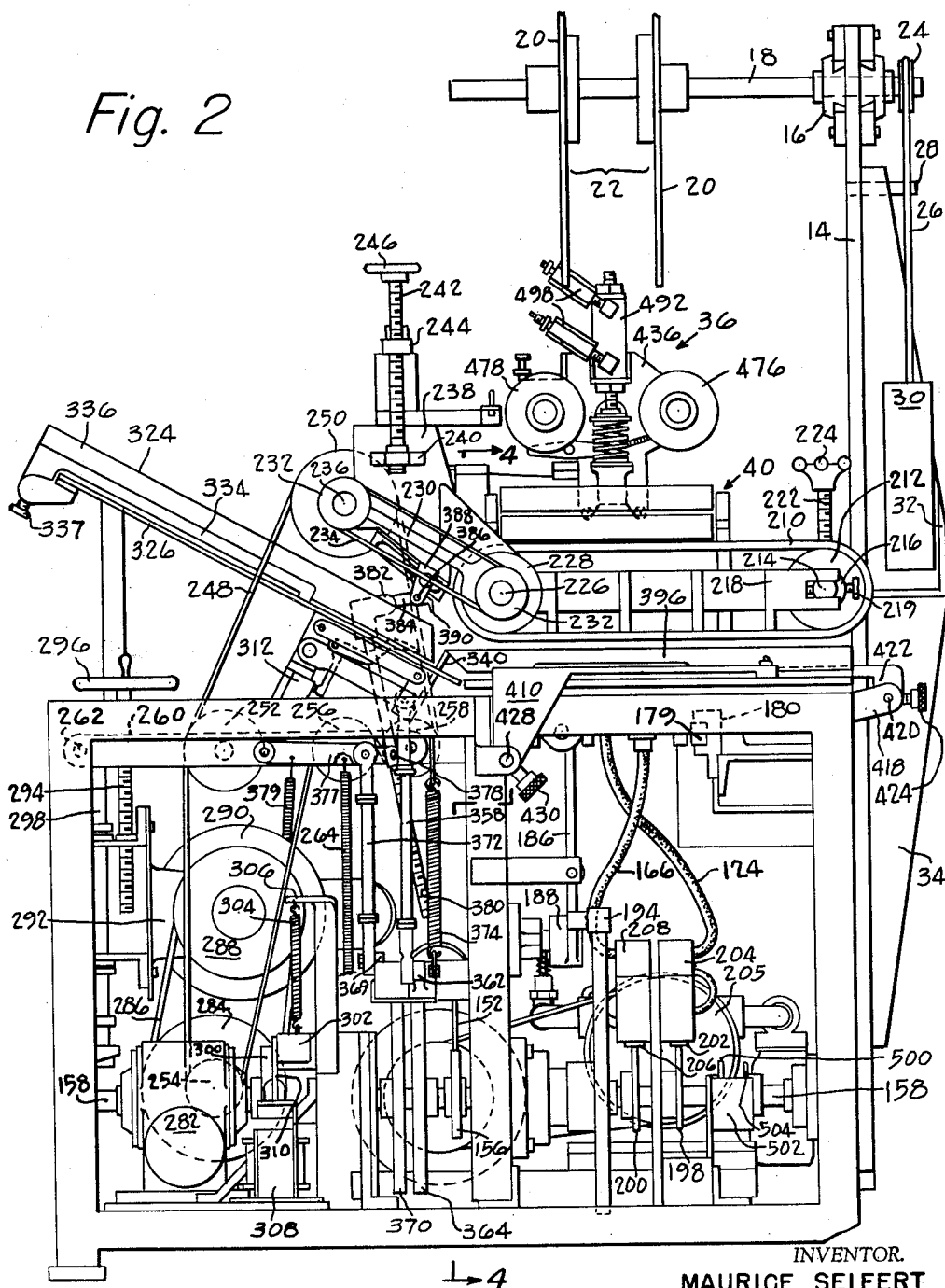
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Fig. 2



INVENTOR.
MAURICE SEIFERT
BY *Arthur Jacobs*
ATTORNEY

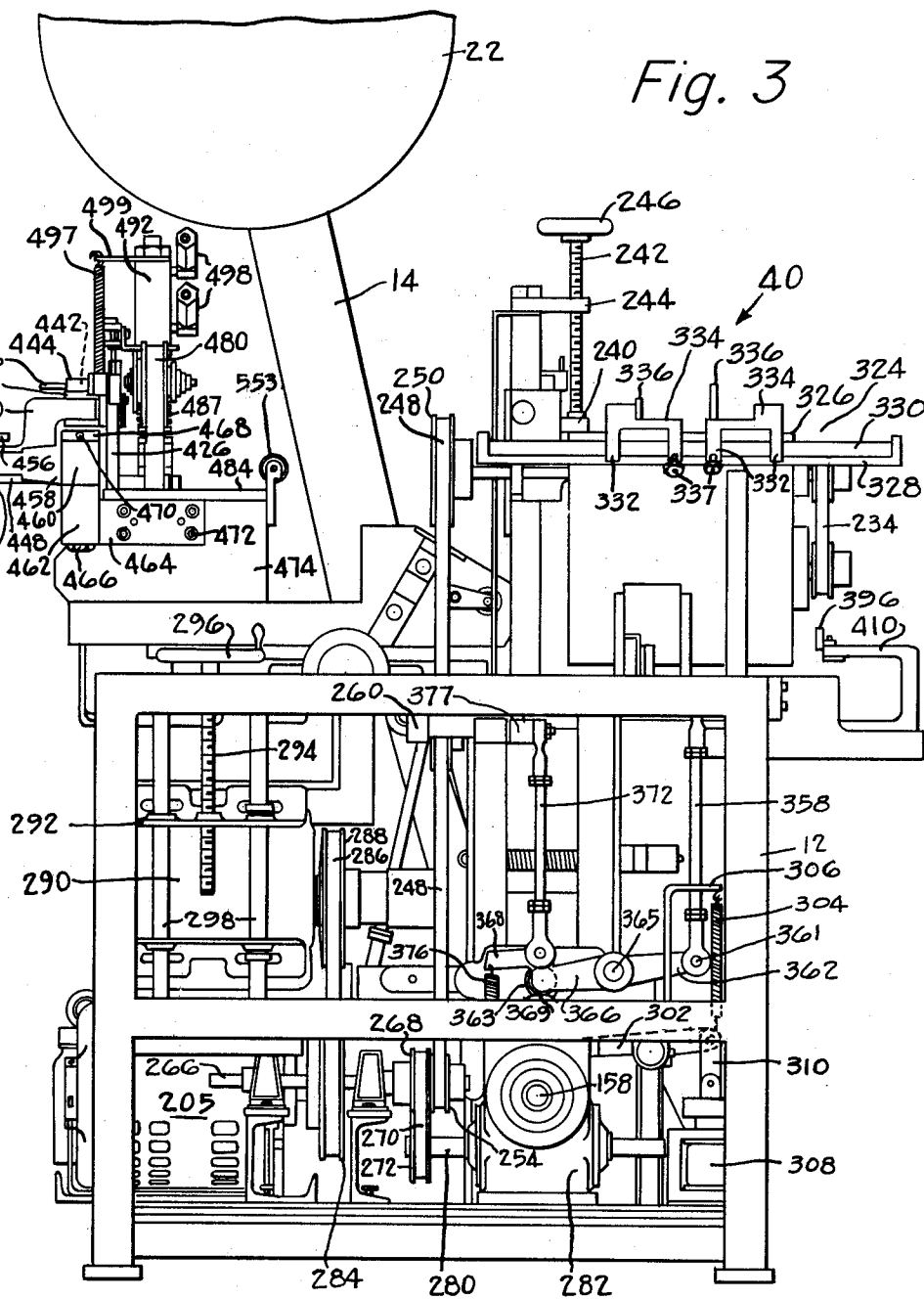
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M. SEIFERT
LABELING MACHINE

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INVENTOR.
MAURICE SEIFERT
BY *Arthur A. Jacobs*
ATTORNEY

July 6, 1965

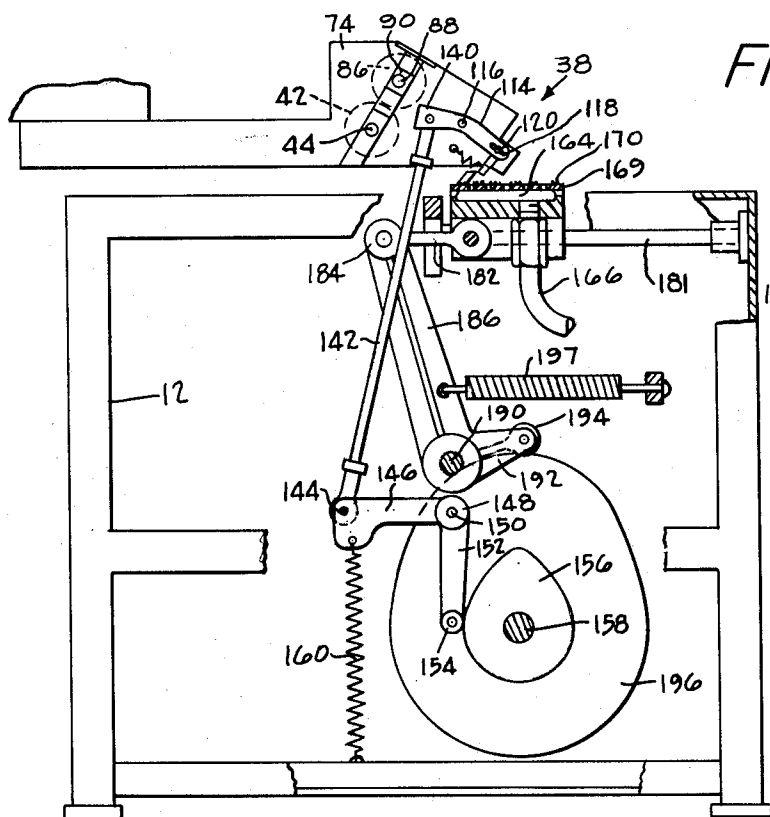
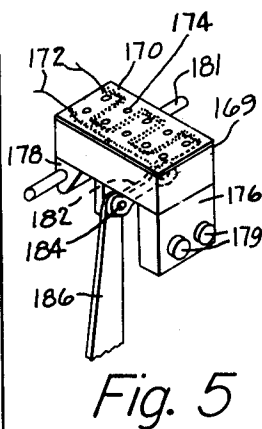
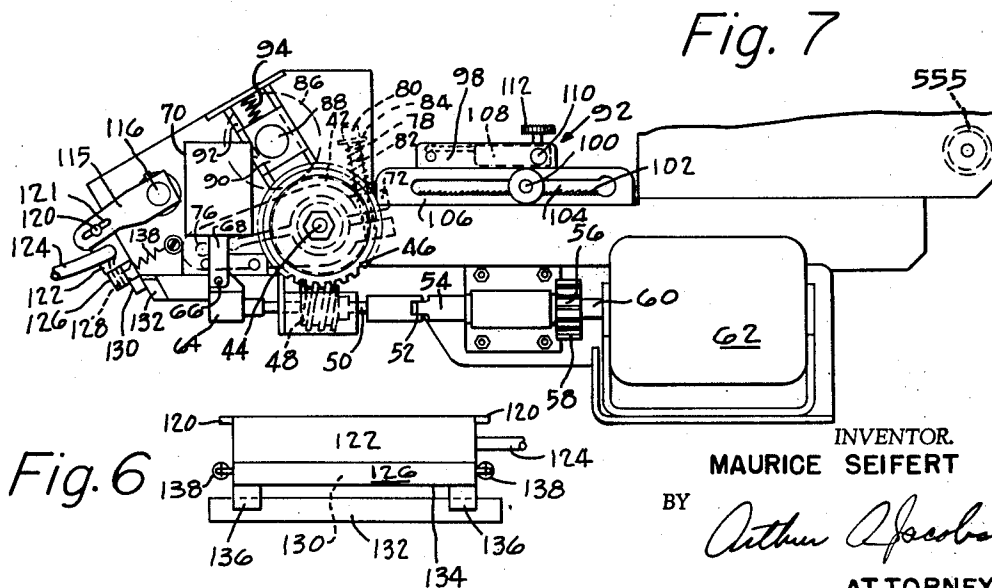
M. SEIFERT

3,193,431

LABELING MACHINE

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INVENTOR.
MAURICE SEIFERT

BY

Arthur Jacobs

ATTORNEY

July 6, 1965

M. SEIFERT

3,193,431

LABELING MACHINE

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Fig. 8

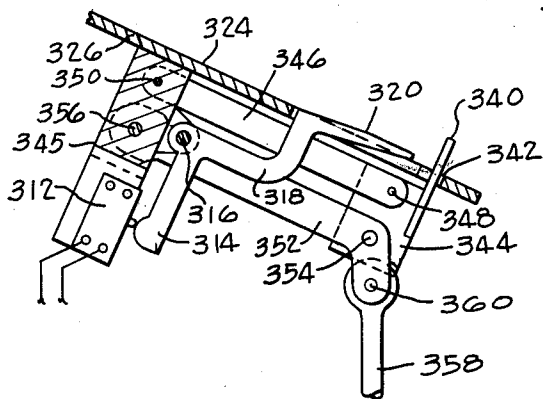
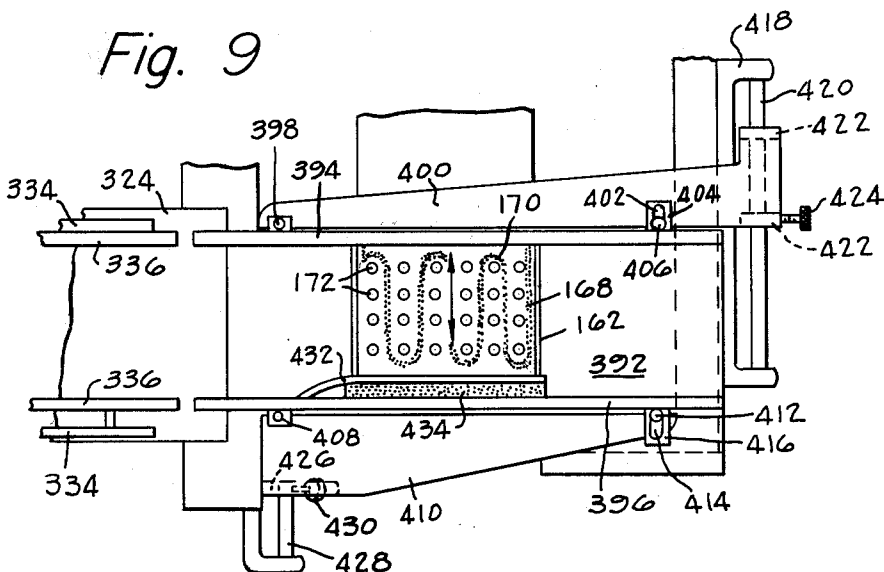


Fig. 9



INVENTOR.
MAURICE SEIFERT
BY *Arthur Jacobs*
ATTORNEY

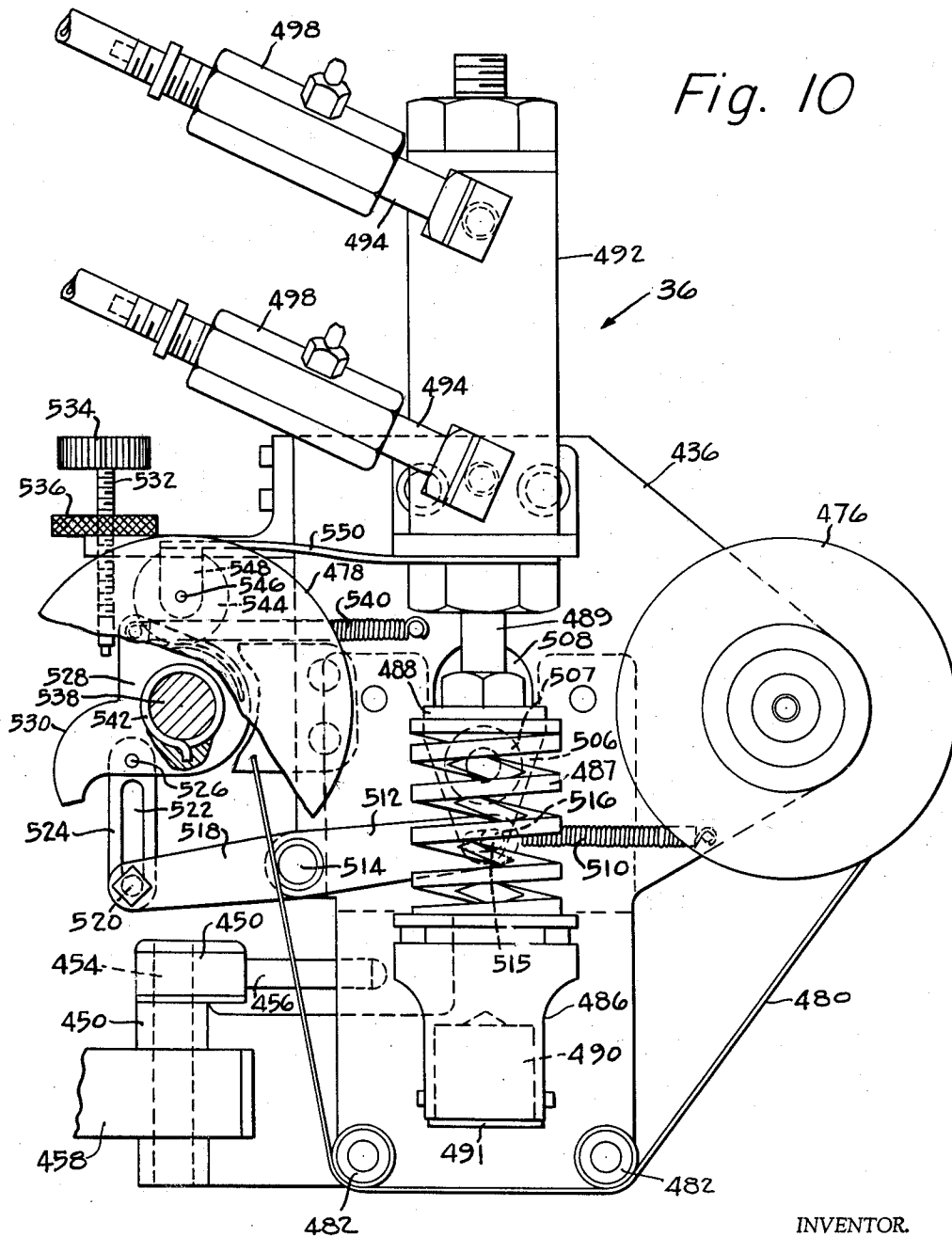
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LABELING MACHINE

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INVENTOR.
MAURICE SEIFERT
BY *Arthur A. Jacobs*
ATTORNEY

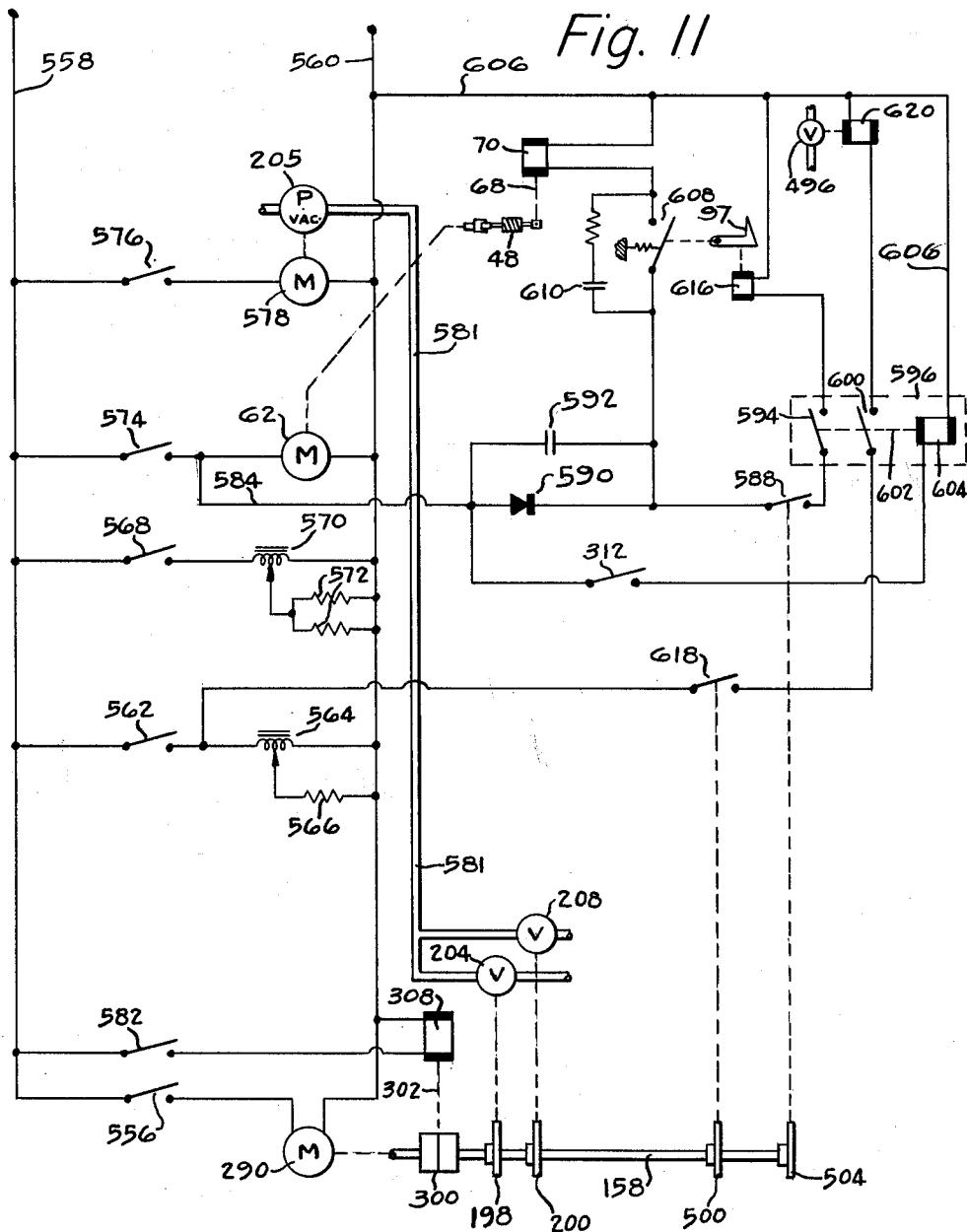
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M. SEIFERT
LABELING MACHINE

3,193,431

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7 Sheets-Sheet 7



INVENTOR
MAURICE SEIFERT
BY *Arthur Jacobs*
ATTORNEY

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3,193,431
LABELING MACHINE
Maurice Seifert, Wyndmoor, Pa.
Filed June 7, 1961, Ser. No. 115,352
7 Claims. (Cl. 156—384)

This invention relates to a label forming and applying machine, and it particularly relates to a machine of this type which is adapted to apply the labels to cylindrical objects such as bottles and the like.

Although various kinds of label forming and label applying machines have heretofore been provided, these prior machines were generally inefficient and uneconomical to use. Furthermore, they generally were not capable of easy adjustment to accommodate different sizes and shapes of objects to which the labels were to be applied. In addition, they were usually unduly complex, bulky, expensive to produce and maintain and difficult to operate with the necessary amount of effectiveness.

It is one object of the present invention to overcome the above as well as other difficulties inherent in the prior mechanisms of this general type by providing a machine which is easily adjustable to accommodate various sizes and shapes of articles and which is yet highly efficient in its operation and relatively easy to use.

Another object of the present invention is to provide a machine of the aforesaid type which is relatively simple in construction and not subject to easy breakdown.

Another object of the present invention is to provide a machine of the aforesaid type which is relatively inexpensive to produce and maintain.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view of a machine embodying the present invention;

FIG. 2 is a front elevational view of the machine of FIG. 1;

FIG. 3 is a side elevational view of the machine of FIG. 1 taken in the direction of the arrows 3—3 of FIG. 1;

FIG. 4 is a sectional view, with parts omitted for clarity, taken on line 4—4 of FIG. 2;

FIG. 5 is a fragmentary perspective view of the shuttle;

FIG. 6 is a front view of the label severing means;

FIG. 7 is a side elevational view of a portion of the machine, in the region indicated by the arrows 7—7 of FIG. 1, with parts omitted for clarity;

FIG. 8 is an enlarged, sectional view of the switch and gate assembly for individual article feed;

FIG. 9 is a top plan view of the transverse table and guide assembly;

FIG. 10 is an enlarged, detailed elevational view of the coder assembly; and

FIG. 11 is a schematic view of the electrical circuit utilized in the machine illustrated in FIGS. 1—10.

Referring now in greater detail to the various figures of the drawings wherein similar reference characters refer to similar parts, there is shown a machine, generally designated 10, comprising a framework 12. Mounted on the framework 12 is a standard 14 having a bearing 16 at its upper end. Journaled in bearing 16 is a shaft 18 on which are mounted a pair of spaced discs 20 forming a supply reel 22 for supporting a rolled up strip of labels 23. A pulley 24 is mounted on the outer end of the shaft 18 and running over this pulley is a cable 26 having one end fixed to a bracket 28, extending laterally from the upper portion of standard 14, and its other end connected to a weight 30 movable within a bracket 32 on a lateral flange 34 of the standard 14. This latter as-

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sembly acts to brake the feed roll 22 against rotation unless a linear force is exerted on the strip.

The strip 23 travels from the reel 22 through a coder mechanism, generally designated 36, then through an indexing station, and then through a label feeding and severing mechanism, generally designated 38; after which, the severed labels are transferred to a label applying mechanism, generally designated 40.

The strip 23 is linearly moved by means of a feed roll 42 (see FIG. 4 and 7) mounted on a shaft 44 on which is also mounted a worm wheel 46 (see FIG. 7). The worm wheel 46 is adapted to be drivingly engaged by a worm gear 48 mounted on a shaft 50 which is connected through a universal coupling 52 to a shaft 54 having a gear 56 at its end. The gear 56 is in mesh with a pinion 58 mounted on the drive shaft 60 of an electric motor 62. The opposite end of the shaft 50 is provided with a bearing 64 which is pivotally secured at 66 to the plunger 68 of a solenoid 70.

In order to stop the feed roll 42 without overrunning, a friction brake is provided in the form of a fork 72, secured to one side wall 74 at 76, and encompassing the shaft 44. A pin 78 having a head 80 extends through the upper tine of the fork 72 and threadedly engages the lower tine of the fork 72. A coil spring 82 surrounds the pin 78 and bears against a washer 84. The spring 82 acts to force the two tines of the fork 72 toward each other. The head 80 bearing against washer 84 is used to adjust the pressure of spring 82.

Cooperating with feed roll 42 is a pressure roll 86 mounted on a shaft 88 journaled in movable slide blocks 90. The blocks 90 are slidable on guide rails 92 and are biased by springs 94 to move roll 86 toward roll 42.

At the indexing station, generally designated 37, there is provided an indexing mechanism which is not described in detail here but which generally comprises a movable hook or finger 97 underneath the path of linear movement of the strip. This finger is operatively connected to a normally closed electrical switch (hereinafter more fully described) which is in circuit with the solenoid 70 and which is opened by forward movement of the finger 97. The finger 97 is normally held in retracted position but is moved by being engaged by one of a series of slits 95 in the strip and being carried along with the strip until it opens a switch to stop the action of the feed roll. At this time the finger 97 is retracted out of the slit by a solenoid (hereinafter described) to its normally closed position. The index mechanism also includes lateral guides 98 slidably adjustable on a transverse pinion shaft 100 (note FIG. 7). The entire index mechanism may be adjusted linearly of the machine by rotating the pinion shaft 100 in mesh with rack teeth 102 in slot 104 provided in a wall 106 on the frame. A weight 108 overlies the strip 23 and holds it down between the guides 98, this weight being mounted for both pivotal and laterally slidable adjustment on a shaft 110 extending between the guides. The weight acts to open up the slits 95 to permit penetration by the hook 97. Individual set screws 112 hold the guides 98 and weight 108 in pivotal and slidable adjusted position.

Adjacent the feed roll assembly is the severing mechanism comprising a crank 114 (see FIG. 4) and an arm 115 (see FIG. 7), both secured on a rotatable shaft 116 between the walls 74. At one end, the crank 114 has an elongated slot 118 supporting one end of a shaft 120. Shaft 120 is supported at its opposite end in an elongated slot 121 in the arm 115. Mounted on shaft 120 is a vacuum housing 122 into which extends a hose 124 connected to a source of suction (hereinafter to be described). Connected to the housing 122 is a knife or blade holder 126 with ports 128 extending from the housing 122 through the blade holder 126. By means of this struc-

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ture, intermittent suction through the ports 128 acts to hold the severed label on the blade until it is deposited in registered position on the shuttle (to be hereinafter described), thereby assuring exact positioning of consecutive labels on the shuttle.

The holder 126 supports an upper blade 130 which coacts with a stationary lower blade 132. As best seen in FIG. 6, the upper blade 130 has a cutting edge at 134 between a pair of oppositely-disposed downwardly extending end flanges 136. The knife holder 126 is inwardly biased by springs 138 to hold the blade 130 against blade 132 during the shearing motion. However, when the blade 130 is in the raised, inoperative position, the springs 138 would ordinarily tend to move it inward above the blade 132 and thereby make it inoperative by preventing its downward motion. The flanges 136, however, prevent inward movement of the blade 130 since they, at all times during raised position of the cutting edge 134, abut the blade 132.

The opposite end of the crank 114 is connected at 140 to the upper end of a rod 142 (see FIG. 4), the lower end of which is connected at 144 to a lever 146 having a hub 148 pivotally mounted on a shaft 150 extending between the sides of the frame. Also connected to the hub 148 is an arm 152 having a follower roller 154 at its lower end. The follower 154 coacts with a cam 156 mounted on a shaft 158. A spring 160 is connected between the lever 146 and the bottom of the frame 12 to resiliently bias the follower 154 against the cam 156.

Coacting with the severing mechanism, described above, is a cut-label feeding device in the form of a shuttle 162. This shuttle is illustrated as comprising a head having a vacuum chamber 164 from which leads a suction hose 166, the other end of the hose being connected to a source of suction hereinafter described. The top plate 168 of the shuttle may be heated in any manner desired, as, for example, by an electric heating element, circulating hot air or water, etc. In the form illustrated, the top plate is coated with porcelain 169 and on top of this porcelain coating are provided strips of commercially available, electrically conductive, high resistance paint 170 to which wires 172 are connected, these wires being connected at their other ends to a source of electrical energy. The plate 168 is provided with ports 174 leading from the vacuum chamber 164. The paint strips 170 are joined in the form of a single sinuous strip, the ports 174 mating with holes in the porcelain coating between the convolutions of the sinuous paint strip and serve to provide a suction holding means for the labels while they are being transported by the shuttle to the applying station. At the same time the conductive paint serves to heat the thermoplastic backing on the labels.

The shuttle 162 is provided with a pair of oppositely disposed, downwardly extending flanges 176 and 178, preferably of thermally non-conductive material. The flange 176 is provided with rollers 179 which ride on a longitudinal track 180 (FIG. 2) on frame 12. The flange 178 is provided with a bore which receives a guide rod 181 also attached to the frame 12. The shuttle (as best shown in FIGS. 4 and 5) is moved by means of an arm 182 which is connected at one end to the shuttle and at its other end is pivotally connected at 184 with a lever 186. The lever 186 is provided with a hub 188 pivotally mounted on a shaft 190 and integral with an arm 192 on which is rotatably positioned a follower 194. The follower 194 coacts with a cam 196 on the shaft 158 and is biased thereagainst by a spring 197 connected at one end to the lever 186 and at its other end to the frame 12.

Also mounted on the shaft 158 are a pair of cams 198 and 200. The cam 198 coacts with a slide valve 202 in a valve housing 204. The housing 204 is connected to the hose 124 leading to the severing mechanism and is also connected to a source of suction such as the pump 205. The cam 200 similarly coacts with a slide valve 206 in a valve housing 208. The housing 208 is connected to the

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hose 166 leading to the shuttle mechanism and is also connected to the pump 205.

The severing mechanism acts to cut individual labels from the strip and the shuttle acts to deliver the cut labels to the applying mechanism 40. This applying mechanism comprises an endless belt 210 movable over a pair of rollers 212. The outer roller 212 is mounted on a shaft 214 supported by a movable bearing block 216 slidable in a forked portion of a bracket 218 by means of a screw 219. The bracket 218 has an extension 220 (see FIG. 1). This extension 220 is provided with a vertical threaded bore through which extends a threaded adjusting rod 222 having a wheel or handle 224. The bottom end of rod 222 is adapted to bear against the frame when the belt assembly is in the operative horizontal position, whereby, by turning the handle 224 in one direction or the other, the rod 222 acts as a jack to lift or lower the belt assembly in accordance with the size of the articles to which the labels are to be applied.

The belt assembly is pivotable about a shaft 226 which also serves to support the inner belt roller 212 for rotation. Also mounted on this shaft 226 is the inner hub 228 of a support arm 230. Mounted at each end of the arm 230 is a pulley 232 over which extends an endless drive belt 234, one of the pulleys 232 being coaxial with the hub 228 and the inner roller 212 on the shaft 226.

The inner roller 212 as well as support arm 30 and its associated belt drive members are mounted on a bracket 238 having a boss 240 in which is positioned one end of a threaded rod or jack 242. The rod 242 extends through a threaded nut 244 connected to the frame and is provided with a wheel or handle 246 to rotate the rod. By this means, the bracket 238 and its associated parts are adjustable up and down.

Consequently, when it is desired to adjust the height of the label-applying belt assembly in accordance with the size of the articles to be labeled, the outer end of the belt assembly is adjusted by means of the wheel 224 and the inner end is separately adjusted by means of the wheel 246.

The belt 210, which is resilient, rotates the bottles or other articles over the labels as they lie on the shuttle with the shuttle suction turned off, so that each label is wrapped around an individual bottle. Since the labels are provided with a thermoplastic backing, the heated shuttle melts this backing sufficiently to cause adherence of the labels to the bottles around which they are wrapped.

The belt 234, which drives the label applying belt assembly, is itself driven by a belt 248 passing over a pulley 250 coaxial with the outer pulley 232 on the shaft 236. The belt 248 also passes over an idler pulley 252, then over a pulley 254, and then over an idler pulley 256, after which it passes over a self adjusting pulley 258 and back over the pulley 250. The pulley 258 is mounted on one end of an arm 260 which, at its other end, is pivoted to the frame at 262. A spring 264 is connected at one end to the arm 260 and at its other end to the frame and serves to bias the pulley 258 downwardly. In this manner, the pulley 258 acts as a self adjusting pulley to compensate for variations in the effective length of the drive belt 248 when the bracket 238 is raised or lowered. The pulley 256 is provided in order to obtain a desirably long belt length to permit variation for the full vertical distance of adjustment of the bracket 238.

The pulley 254 is mounted on a jack shaft 266 (see FIG. 3) coaxial with a pulley 268. An endless belt 270 passes around the pulley 268 and a pulley 272 on a shaft 280. The shaft 280 extends through a gear box 282 where gearing is provided for driving the shaft 158 through a clutch mechanism.

Also mounted on the shaft 266 is a pulley 284 which is drivingly connected by an endless belt 286 to a variable speed pulley (such as a Reeves drive pulley) shown at 288. The pulley 288 is mounted on the drive shaft of an electric motor 290 supported on a bracket 292. The bracket 292 is provided with a threaded aperture into

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which extends a threaded jack screw or rod 294 rotatably supported by the frame 12. The rod 294 has a wheel 296 for rotating it. The bracket is also apertured to receive guide rods 298 mounted on the frame. By turning the rod 294, the bracket 292 and motor 290 are moved vertically up or down to vary the vertical position of the pulley 288, thereby varying the speed of the belt drive.

The aforementioned clutch mechanism between the shaft 158 and the gear box 282 comprises a one-revolution clutch 300 (see FIG. 2) which is engaged and disengaged by a finger on an arm 302. The arm 302 is urged into engagement with the clutch by a spring 304 connected between the arm 302 and one end of a bracket 306 mounted on the frame. The arm 302 is moved out of clutch engagement, against the force of the spring, by a solenoid 308 having a plunger 310 connected to the arm (as best seen in FIG. 3). The clutch 300 is of standard type.

The solenoid 308 is actuated by a switch 312 (note especially FIGS. 2 and 8) which is closed by means of a contact finger 314 hinged at 316 and integral with a curved arm 318. The arm 318 is integral with a finger 320 which projects through a slot 322 in a slide or chute 324. The chute 324 comprises an angularly arranged table 326 having a support bracket 328 (see FIGS. 1 and 3). The bracket 328 supports thereon a slide bar 330 adjacent the upper end of the chute, and slidably positioned on the slide bar are a pair of apertured ears 332 depending from each of two laterally movable guide supports 334. Each guide support is connected to a guide bar 336. A set screw 337 is provided in one of each pair of ears 332 to releasably hold the guide supports in laterally adjusted positions. The guides 336, by being laterally adjustable, are adapted to guide the downward passage of various lengths of cylindrical articles to be labeled, such as the bottles 338 (shown in FIG. 1).

As the bottles 338, or similar articles, slide down the chute, they individually depress the finger 320 which rocks the contact finger 314 to close the switch 312, thereby actuating the solenoid 308 and causing the one-revolution clutch to become engaged.

Acting in conjunction with the switch finger 320 is a vertically movable gate 340 (see FIGS. 2 and 8). This gate extends up through a slot 342 in the chute 324 and serves to restrict the passage from the chute of one bottle 338 at a time. The gate 340 is mounted on a plate 344 which is connected to an oppositely-disposed plate 345 by a pair of oppositely-disposed links 346 (only one of which is shown). The links 346 are pivoted to the plates 344 and 345 at 348 and 350 respectively. A second pair of links 352 are pivoted at 354 and 356 to the plates 344 and 345 respectively. The links 346 and 352 form parallel linkage which causes the gate 340 to move in a straight-line path. This movement is effected by a rod 358 pivotally connected at 360 to an offset portion of the link 352. The rod 358 is pivotally connected at its lower end, as at 361, to a lever 362 having a cam follower 363 coating with a cam 364.

The lever 362 is pivoted to the frame by a pivot rod 365. Also mounted on the rod 365 is a lever 366 having an offset portion 368. A cam follower 369 is provided on the lever 366 to coact with a cam 370. The lower end of a rod 372 is pivotally connected to the lever 366.

The lever 362 is biased upwardly (as viewed in FIG. 2) by a spring 374 (shown in FIG. 2) and the lever 366 is biased downwardly (as viewed in FIG. 3) by a spring 376, this latter spring being connected to the offset portion 368 of the lever 366.

The rod 372 is pivotally connected to the intermediate portion of pivoted arm 377. The arm 377 is biased downwardly around its pivot by a spring 379. The arm 377 is provided with a threaded socket 378 (see FIG. 2) and through this socket extends a threaded rod 380, whereby the rod 380 can be vertically adjusted through the socket.

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At its upper end, the rod 380 is provided with a bracket 382 having an arm 384 operatively connected to a rotatable shaft 386 mounted in ears 388 connected to a bracket 238. A hook 390 is connected to the shaft 386.

The cam 370 acts through the follower 369 and lever 366 to first raise and lower the hook 390 to clear one bottle on the chute and hold the rest back. The cam 364 acts through follower 363 and lever 362 to lower and raise the gate 340 to permit the cleared bottle to roll down the chute and onto the label applying station beneath the belt 210.

The shuttle 162, carrying an individual label severed from the strip and held on the shuttle by suction, is movable onto a transverse table 392 which is cut away to receive the shuttle with the shuttle top plate 168 in substantially the same plane as the transverse table. The transverse table 392 is provided with a pair of laterally adjustable guide bars 394 and 396 which are adapted to be adjustably aligned with the adjustable guide bars 336 on the chute (note FIG. 9). The guide bar 394 is pivotally connected at 398 to the rear end of a support bar 400 and is connected at the front end of the support bar by an elongated slot 402 in a laterally-extending boss 404 on the bar 394 whereby a set screw 406 on the support bar 400 is laterally adjustable. The guide bar 396 is similarly pivotally connected at 408 to the rear end of the support bar 410 and is connected at the front end by a set screw 412 on the support bar 410 extending adjustably through a laterally elongated slot 414 in a lateral boss 416 on the guide bar 396.

A bracket 418 is provided at the front of the table 392 and supports a slide bar 420 on which is slidable a pair of ears 422 depending from the front end of the support bar 400. A set screw 424 is provided in one of the ears 422 to releasably retain the support bar in laterally adjustable position. The support bar 410 is provided with dependent ears 426 on its rear end, and these ears are slidable on a slide bar 428. A set screw 430 on one of the ears 426 releasably retains the support bar 410 laterally adjusted position.

In order to provide for variations in size between the opposite ends of the articles being labeled, as, for example, in the case of a bottle having a relatively large bottom and relatively small neck, the guide bar 396 is provided with a metal strip 432 on its inner face. This strip 432 is backed by a resilient cushion 434, of foam rubber or the like. By the use of this structure, the strip 432 will resiliently support the small end of the article and prevent its being twisted during passage between the guides.

It is often necessary to provide a marking, code number or other indicia on the labels. This is accomplished in the present machine by the coder mechanism 36. This mechanism comprises a support plate 436 (as best shown in FIG. 10) provided with an apertured clevis 438 (see FIG. 3) which receives an apertured end of an arm 440. A pivot pin 442 extends through the clevis and arm and is held in position by a clamp nut 444 having a handle 446.

The arm 440 is provided with a downwardly offset portion having a horizontal extension 448 ending in a clevis 450. The clevis 450 is apertured to receive a pivot pin 452 held in place by a clamp nut 454 having a handle 456, the pivot pin serving to pivotally secure an arm 458 having an apertured boss 460 mating with an apertured boss 462 on a bracket 464. A pivot pin 466 extends through the apertured bosses 460 and 462 and is held by a clamp nut 468 having a handle 470 to adjustably secure the arm 458 and its associated parts to the bracket 464. The bracket 464 is secured by rivets 472 or the like to a support 474 on the frame. The plate 436 supports a supply reel 476 and a take up reel 478 for a strip of colored thermoplastic tape 480. The tape 480 passes beneath a pair of laterally spaced guide rollers

482 mounted at the bottom of plate 436 as it travels between the reels. The tape is held taut between the rollers 482 and overlies a bed 484 on the support 474.

The strip of labels from the supply reel 22 is adapted to pass over the bed 484 and beneath the tape 480 between the rollers 482. At this point the tape 480 is intermittently forced down against the strip of labels and heated pressure is applied to the tape to melt it and imprint a code number or the like onto the strip. This heated pressure is applied by a printer head 486 having a heating element therein. The head 486 is connected through a heat-insulating spring 487 to a spring follower 488 connected to a plunger 489.

The head 486 is also provided with a magnet 490 on its bottom end. This magnet 490 is adapted to securely but releasably hold a plate 491 with the desired indicia already impressed therein. This obviates the tedious printer's "preparation" which would otherwise be necessary.

The plunger 489 extends into a fluid-pressure (pneumatic) cylinder, 492 mounted on the plate 436. A piston head (not shown) is provided on the plunger 490 within the cylinder and inlet and outlet conduits 494 lead into the cylinder on opposite sides of the piston head. The conduits are connected to a source of fluid-pressure through a valve 496 (see FIG. 11). Interposed between each conduit 494 and the valve 496 is a manual valve 498. The valves 498 can be adjusted to vary the fluid flow into and out of the cylinder 492 and thereby act to vary the speed of the plunger. A return spring 497 is connected to a bracket 499 attached to the plunger 490.

The valve 496 is operated by a cam 500 on the shaft 158 which operatively engages a micro-switch (hereinafter described) in a housing 502 (see FIG. 2). Also in housing 502 is a second micro-switch (hereinafter described) operatively engaged by a cam 504 for operating the solenoid 70.

The follower 488 is connected to a V-shaped bracket 506 (see FIG. 10) having a guide roller 507 movable in an elongated vertical slot 508. A spring 510 biases the bracket 506 to hold the roller 507 against one side of the slot. A rocker arm 512 is pivoted on a shaft 514 and has a lost-motion connection between a pin 515 on arm 512 and a slot 516 in bracket 506. An extension 518 of the rocker arm 512 is provided with a pin 520 movable in an elongated vertical slot 522 in a link 524 which is pivoted at 526 to a rotatable abutment plate 528. This plate 528 is provided with an arcuate nose or abutment portion 530 which is adapted to engage against a vertically adjustable, threaded stop pin 532. The pin 532 has a knob 534 and extends through a threaded nut 536.

The abutment plate 528 is rotatably mounted on a shaft 538 which also supports the take-up reel 478. A spring 540 resiliently biases the abutment plate around the shaft 538 into abutment against the stop pin 532 while the rocker arm 512, acting through extension 518 and link 524, normally holds the abutment plate away from the stop pin.

A one-direction spring clutch 542 is connected to the abutment plate 528 and permits the reel to rotate with the abutment plate in only one direction (counterclockwise as viewed in FIG. 10). When the plunger 489 moves down, the pin 520 moves up in the slot 522 of link 524 until the pin abuts the top of the slot, at which time the spring 542 rotates the abutment plate clockwise until the nose 530 strikes the stop 532. This unwinds the spring 542. When unwinding, the spring 542 does not grip the shaft 538. When the plunger 489 moves up, the pin 520 moves to the bottom of slot 522 and moves the abutment plate counterclockwise, thereby causing the spring 542 to twist and grip the shaft 538. This causes rotation of the shaft with the abutment plate. The lost motion connection between pin 520 and slot 522 and the provision of the adjustable stop 532 permits the plunger

to operate with a full stroke while only a predetermined rotation of the reel is effected.

In a desirable embodiment of the invention, the tape 480 is not wound up on the take-up reel because this would require constant removal and replacement of the take-up reel. To prevent this, a pressure roll 544 is provided. This pressure roll is mounted for rotation on a shaft 546 held between ears 548 on a spring arm 550 which is attached to the bracket 552 which also supports the cylinder 492. The used tape passes between the take-up reel and the pressure roll 544 and is then collected in a receptacle or the like on the floor adjacent the machine.

The strip 23 passes from the coder mechanism, which, as is obvious from the above description, is actually an imprinting mechanism, to the feeding and severing mechanism by first passing under a guide roller 553 positioned adjacent the front edge of the bed 484 and then over a pair of vertically spaced guide rollers 555 at the rear and under the bed 484 (note FIGS. 1 and 7), the bed being vertically spaced above the frame of the machine by side plates. The strip then moves in its longitudinal path over the various treating stations described above.

As shown in FIG. 1, there is a control panel 554 which (as shown in FIG. 11) has a motor circuit including a switch 556 in circuit through line 558 with a source of electrical energy. The switch 556 is electrically connected to the main drive motor 290 connected through line 560 to the opposite side of the power source. In parallel with the motor circuit is a switch 562 in circuit with a rheostat 564 and a heating element 566 located in the head 486 of the coder mechanism. Also in parallel circuit is a switch 568 connected through rheostat 570 with the heating means 572 in the shuttle, this heating means preferably comprising the high resistance, electrically conductive paint 170 heretofore described. A third switch 574 controls the motor 62 which drives feed roll 42, while a fourth switch 576 controls a motor 578 which operates the vacuum pump 205. The vacuum pump is connected through line 581 to the valves 204 and 203 operated by cams 198 and 200 respectively on shaft 158.

Also in circuit between the lines 558 and 560 is a switch 582. This switch 582 is in circuit with solenoid 303 which controls the main clutch 300 on shaft 158 by means of an arm 302, the shaft 158 being connected to the motor 290 by means of the clutch 300.

The switch 574 is in circuit through line 584 with the normally open switch 588 situated in housing 502 and actuated by cam 504 on shaft 158, a rectifier 590 and condenser 592 being interposed in this circuit.

The switch 588 is in circuit with a contact 594 forming part of a relay 596. The relay also includes a contact 600. Both contacts are provided on the armature 602 of a coil 604. The coil 604 is connected at one side to line 584 through switch 312 (not also FIG. 8) and at its other side it is connected through line 606 to the power source. The solenoid 70, positioned in the circuit (note also FIG. 7), acts through plunger 68 to engage and disengage the worm gear 48 from the worm wheel 46.

The solenoid 70 is in circuit with a normally closed switch 608 having a spark extinguisher condenser 610 shunted thereacross. The switch 608 is held normally closed by a spring 612 and is mechanically connected to the finger 97. The finger 97, as it is moved by the strip 23, acts to open the switch 608. However, when the finger 97 is released from the slot in the strip 23, the plunger of a solenoid 616, interposed in the circuit between switch 588 and line 606, acts to return the finger 97 to its normal position.

When the relay 596 is energized, the contact 600 closes the circuit between the switch 618, in housing 502, and a solenoid 620. This solenoid 620 operates the valve 496 in the coder mechanism.

In operation, with the various switches on the panel

closed, the main drive motor 290 is engaged with the shaft 158 by clutch 300 and, as the shaft rotates, the various cams thereon become operative. The cam 504 closes the switch 538 and, since the closed panel switch has already closed switch 594, the solenoid 70 is actuated to engage worm gear 48 with worm wheel 46 and thereby actuates the feed roll 42 to move the strip of labels 23 longitudinally from the reel 22.

As the strip 23 moves, the cam 500 closes switch 618 to actuate the coder mechanism to imprint a code or other indicia on the labels by pressing down the heated head 486 on to the thermoplastic tape 480 as it overlies the strip 23.

The strip 23 is indexed for predetermined distances corresponding to the distances between slots in the strip by means of the finger 97. At the end of each indexing movement, the severing mechanism, operated by cam 156, severs an individual label and holds it by suction until released onto the shuttle 162 which holds it thereon by suction, with its thermoplastic backing uppermost, until it is wrapped around a bottle. The suction for the severing mechanism and shuttle is regulated by the corresponding cams 198 and 200.

The bottles 338 are fed down the chute 324 and held thereon until the gate 340 is pulled down by rod 358 controlled by cam 364, at which time, an individual bottle is rolled onto the label positioned on the shuttle, the hook 390, which is controlled by cam 370 and rod 372, acting to restrain the other bottles against movement down the chute. After the gate 340 is again in place, the cam 370 moves the hook 390 to release the next bottle and to interpose itself between it and the next bottle adjacent thereto.

As the bottle passes between the guides 394 and 396, the endless belt 210 passes thereover to rotate the bottle and the label which has now been relieved from the suction hold on the shuttle. Since the shuttle is heated and the backing of the label is thermoplastic, it is sufficiently melted to adhere to the bottle under the rolling pressure of the belt 210. The labeled bottle then passes transversely off the machine and onto a loading station or the like (not shown).

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

The invention claimed is:

1. A labeling machine comprising a framework, a supply reel on said framework for holding a rolled up strip of labels, feed means on said framework for feeding said strip from said reel in a longitudinal path, indexing means operatively connected to said feed means to intermittently halt the operation of said feed means, actuating means operatively connected to said feed means to intermittently actuate said feed means, an imprinting means on said framework to intermittently apply indicia to said strip as it moves from said reel, said imprinting means being operatively connected to said feed means and indexing means to apply said indicia at predetermined intervals along said strip as determined by said feed means and indexing means, a severing means operatively connected to said feed means and indexing means to sever a label from said strip at predetermined intervals determined by said feed means and indexing means, a label-applying means on said framework, conveying means for conveying a severed label to said label-applying means, and delivery means on said framework for delivering articles to be labeled to said label-applying means, said label-applying means being constructed and arranged to rotate said articles in surface contact with said labels whereby, when the adjacent surface of a label is adhesive, it will adhere to the surface of a corresponding article.

2. The machine of claim 1 wherein said conveying means comprises a shuttle reciprocable along said longitudinal path of the strip, said shuttle including suction

means for holding a label thereon by the releasable application of suction, said suction means comprising at least one port leading through said shuttle from a suction chamber, said suction chamber being operatively connected to a source of suction, and control means for intermittently applying and releasing the suction through said port, said control means being operatively connected to said feed means, indexing means and severing means.

3. The machine of claim 2 wherein said shuttle also includes a heating means for applying heat to a label carried thereby.

4. The machine of claim 1 wherein said delivery means comprises a chute in association with a movable gate and a movable hook, said gate and hook being operatively connected for timed operation whereby said hook is first moved to release the endmost article of a stack of articles on the chute and engage the next adjacent article thereon and the gate is then moved from a barrier position to release said endmost article to permit it to move to said label-applying means after which the gate is returned to said barrier position, said gate and hook being operatively connected to said feed means, indexing means, severing means and conveying means.

5. The machine of claim 1 wherein said label-applying means comprises a table mounted on the framework transversely of the path of movement of said conveying means, said table having a pair of laterally spaced guide bars, said guide bars being laterally adjustable relative to each other and to the table, an endless belt assembly adjustably connected to said framework above said table, said assembly including an endless belt adapted to contact an article passing between said guide bars on said table while said article overlies a label on said conveying means.

6. In a labeling machine, a framework, feed means on said framework for feeding a strip of labels along a longitudinal path, severing means operatively connected to said feed means for severing individual labels from said strip, a label-applying means on said framework, conveying means operatively connected to said severing means for conveying individual labels to said label-applying means, said label applying means comprising an endless belt assembly adjustably mounted on said framework, a table underlying said belt assembly transverse to the path of movement of said conveying means, individually laterally adjustable guide bars on said table, a chute adjacent said table, said chute being arranged to hold a stack of articles to be labeled, and means operatively connected to said conveying means for releasing individual articles from said chute to said table, at least one of said guide bars having a resilient auxiliary contact member for engaging articles of non-uniform shape and size to prevent twisting of such articles.

7. The machine of claim 6 wherein said auxiliary contact member comprises a metal strip connected to the corresponding guide bar at least at one end, and a resilient cushion between said strip and said corresponding guide bar.

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EARL M. BERGERT, *Primary Examiner*.
HAROLD ANSHER, ALEXANDER WYMAN,
Examiners.