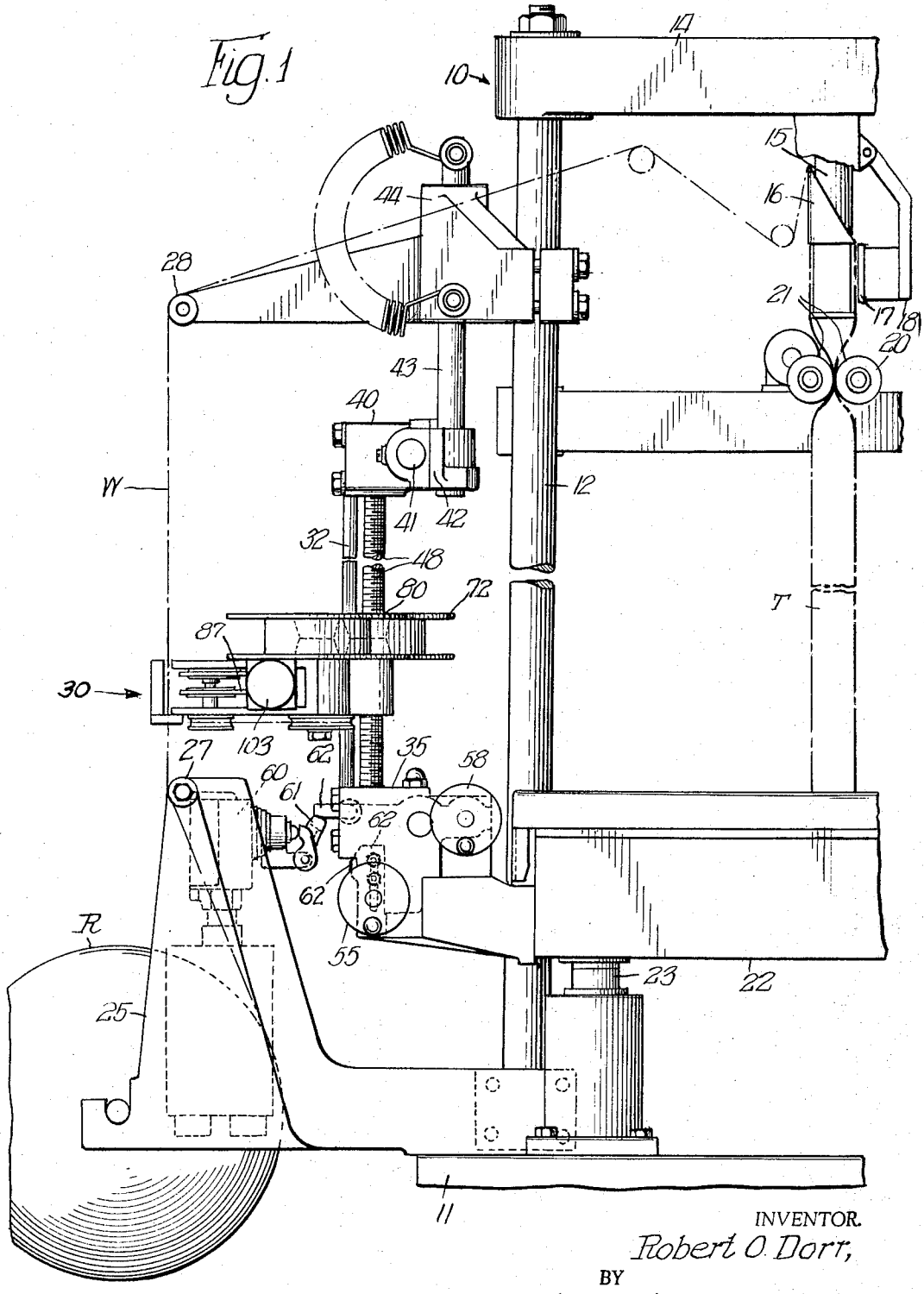
Dec. 27, 1966 R. O. DORR 3,293,824

PRINTING APPARATUS FOR PACKAGING MACHINES

Filed March 13, 1964 5 Sheets-Sheet 1

Fig. 1



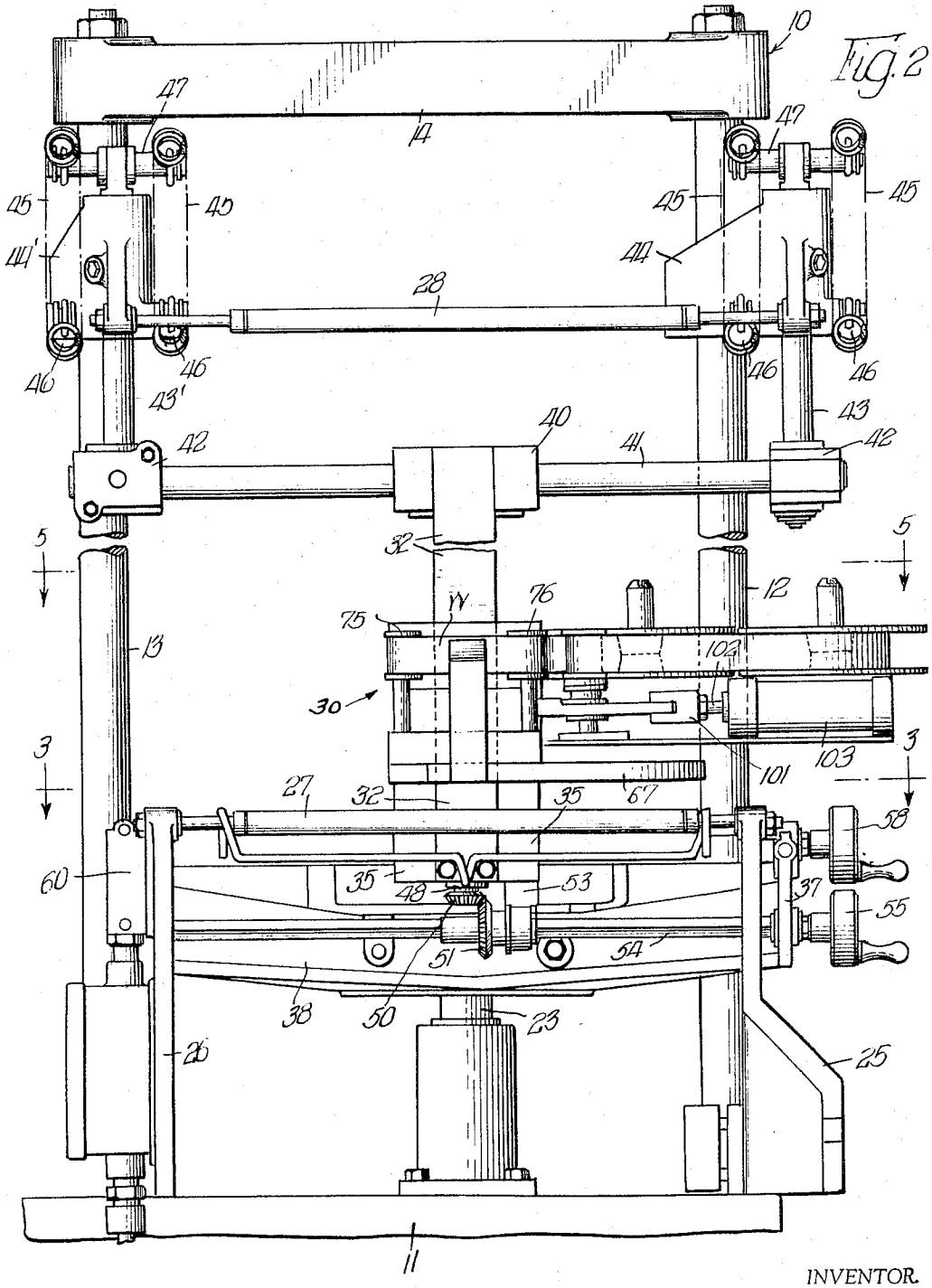

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PRINTING APPARATUS FOR PACKAGING MACHINES

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Fig. 2




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PRINTING APPARATUS FOR PACKAGING MACHINES

Filed March 13, 1964 5 Sheets-Sheet 3

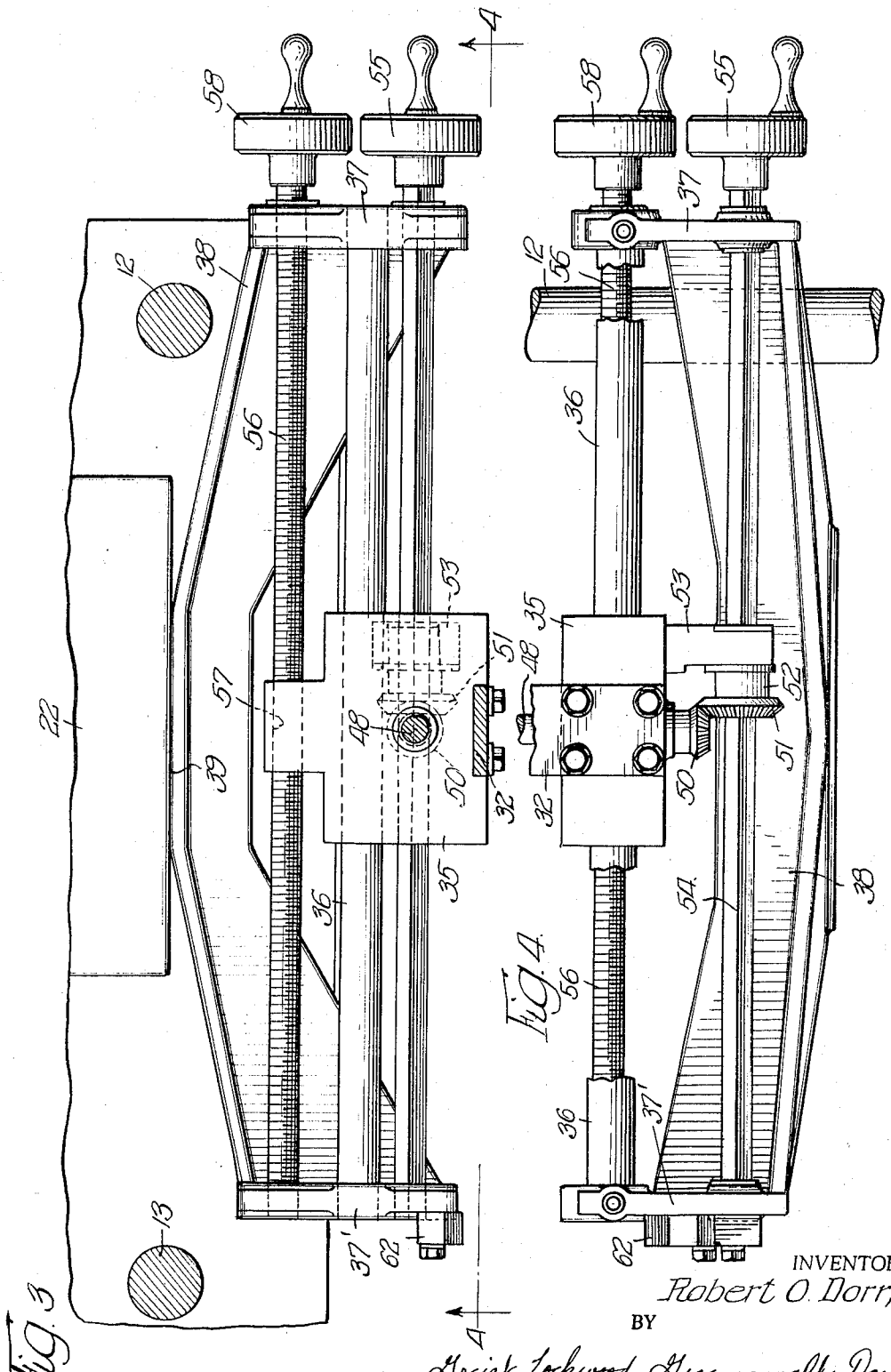



Fig. 3

Fig. 4

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PRINTING APPARATUS FOR PACKAGING MACHINES

Filed March 13, 1964 5 Sheets-Sheet 4

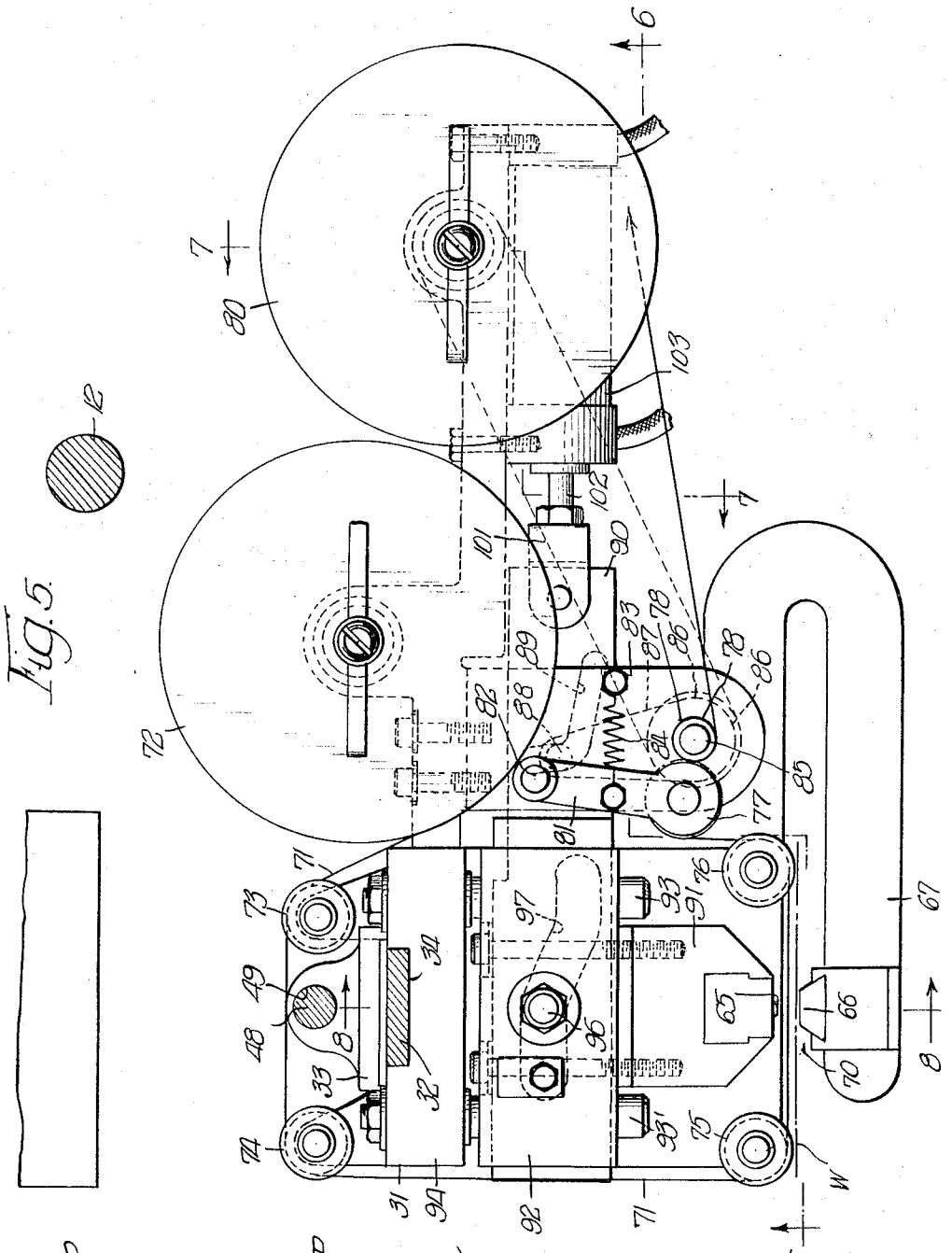


Fig. 5.

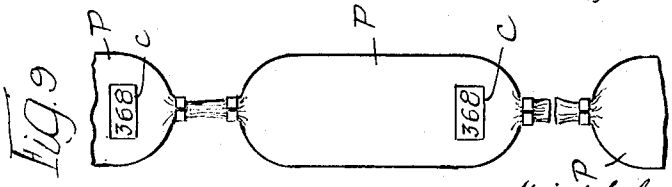


Fig. 9

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PRINTING APPARATUS FOR PACKAGING MACHINES

Filed March 13, 1964 5 Sheets-Sheet 5

Fig. 6

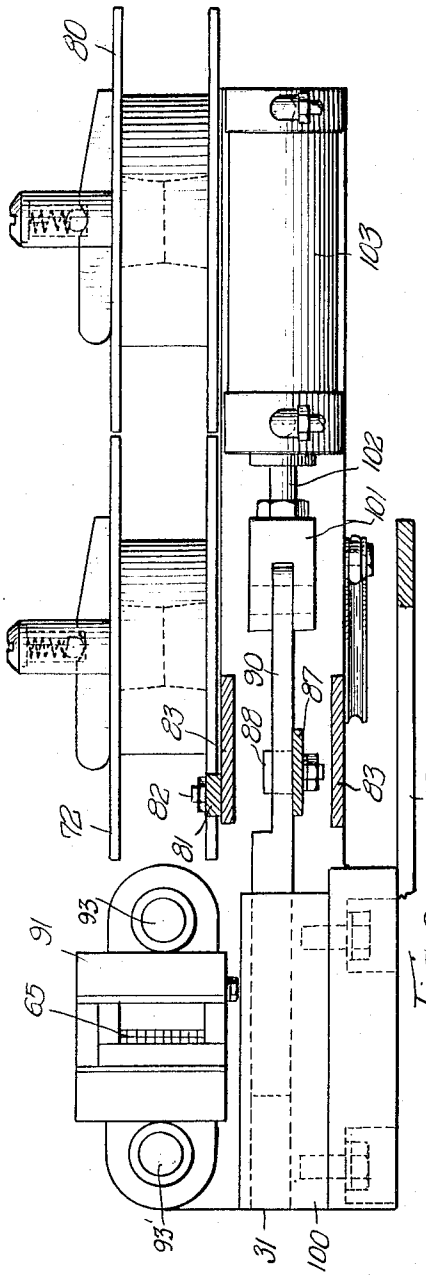



Fig. 7

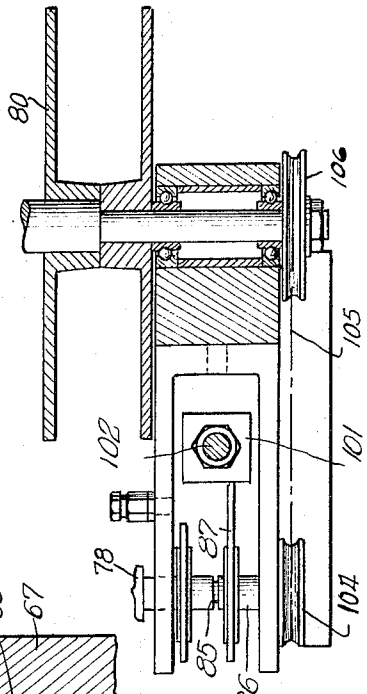
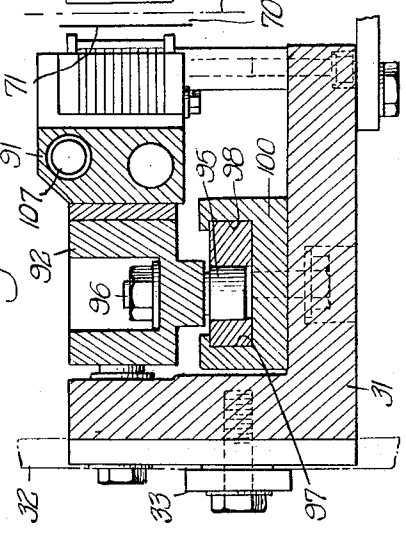



Fig. 8




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United States Patent Office 3,293,824 Patented Dec. 27, 1966



3,293,824

# PRINTING APPARATUS FOR PACKAGING MACHINES

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10 Claims. (Cl. 53—131)

This invention relates to packaging and is more particularly concerned with apparatus for imprinting a code number, date or other information or design on a film or web as it is fed into a packaging machine and subsequently formed into a series of packages.

Machines have heretofore been provided for packaging various products in a fluid or paste-like form which are characterized by a hollow cylindrical forming and filling mandrel, about which a web or film of wrapper forming material is folded and sealed to provide a tube into which the product is forced through the mandrel, and a reciprocably mounted constricting and sealing head at the end of the mandrel which constricts the filled tube at predetermined intervals and applies thereto pairs of spaced closure and sealing elements, usually of metal, so as to form successive packages which may be thereafter separated by cutting between each pair of closure elements. A package forming machine of this type is disclosed in Jensen and Eberman Patent No. 2,831,302, dated Apr. 22, 1958, and an object of the present invention is to provide for incorporating in this type of packaging machine a printing apparatus which is adapted to imprint on the wrapping material as it is advanced to the tube forming and filling mandrel so that a code number, date or other information, design, or the like may be applied to each successive package.

It is a further object of the invention to provide in a packaging machine of the type which forms a tube from a traveling web about a filling mandrel through which a product is delivered into the tube as it advances off the end of the mandrel and down through a vertically reciprocating tube constricting and closure applying head which constricts the tube at intervals and applies closure fasteners thereto, a film imprinting device mounted on the reciprocating tube constricting and closure applying head, and means for operating the imprinting device to apply a code number or other data on the web, which apparatus is actuated in accordance with the movement of the tube constricting and closure applying head.

These and other objects and advantages of the invention will be apparent from a consideration of the apparatus which is shown by way of illustration in the accompanying drawings wherein:

FIGURE 1 is a partial front elevation of a wrapping machine having incorporated therein an imprinting apparatus, which machine embodies the principal features of the invention;

FIGURE 2 is a partial side elevation of the machine shown in FIGURE 1;

FIGURE 3 is a partial cross section taken on the line 3—3 of FIGURE 2, to a larger scale;

FIGURE 4 is a view taken on the line 4—4 of FIGURE 3, with portions broken away;

FIGURE 5 is a partial cross section taken on the line 5—5 of FIGURE 2, to an enlarged scale;

FIGURE 6 is a section taken on the line 6—6 of FIGURE 5;

FIGURE 7 is a section taken on the line 7—7 of FIGURE 5;

FIGURE 8 is a cross section taken on the line 8—8 of FIGURE 5; and



FIGURE 9 is an elevation of the package produced by the machine.

Referring to FIGURES 1 and 2 of the drawings, there is illustrated a tubular package forming machine **10** which is constructed substantially in accordance with the disclosure in Jensen and Eberman Patent No. 2,831,302 to which reference may be had for details of the packaging or wrapping machine which are not hereinafter described. The packaging machine **10** is supported on a rectangular base frame **11** and an upstanding superstructure, the latter including four vertical posts, two of which are shown at **12** and **13**, which posts extend from the base frame **11** upwardly to a top cross frame **14** disposed horizontally in vertically spaced relation above the top of the base frame **11**. The top frame **14** supports in depending relation therefrom a hollow tube forming and filling mandrel **15** having associated therewith a tube forming collar **16** and a longitudinal seal forming or seaming apparatus **17** which is supported on a pivotally mounted U-shaped support bracket **18**. The forming mandrel **15** has a conduit (not shown) connecting it with a product supply line for delivering to the mandrel the product to be packaged, the product being in a fluid or semi-fluid state. A tube gripping and advancing mechanism **20** is positioned near the end of the mandrel **15** which includes spaced pairs of driven rollers **21** for engaging the filled tube T and drawing it downwardly over the end of the mandrel **15**. The rollers **21** are driven by an associated power drive mechanism (not shown). The filled tube T is advanced downwardly through a cross head **22** which is in the form of a rectangular frame extending transversely of the machine and mounted for vertical reciprocation on a pair of laterally disposed support posts, one of which is shown at **23**, and which posts **23** are reciprocated in a vertical path by a suitable drive mechanism (not shown). The drive mechanism is operated by cams or the like and reciprocates the head **22** in a vertical path so that the latter has a harmonic motion which in effect covers a predetermined speed range, for example 0 to 800 inches per minute, as it moves between the upper and lower limits of its vertical path, the extent of the path being determined by the size of the package being formed. The rate of feed of the product to the mandrel **15**, the speed of the tube feeding rollers **21** and the rate of movement of the head **22** may all be adjusted according to the product being packaged and the size of package desired.

The tube forming film or web W is supplied on a roll R which is supported on a pair of plate-like brackets **25** and **26** extending from the posts **12** and **13** at one side of the machine. The web W leaves the supply roll R and travels in a vertical path between vertically spaced guide rollers **27** and **28** and thence across the roller **28** at the top of the machine to the tube forming collar **16** which folds the web so that its margins overlap on the vertically disposed side wall of the mandrel **15** and a longitudinal seam is formed by sealing the overlapped margins. The longitudinal seam or seal is formed by the mechanism **17** and the tube T is advanced by the mechanism **20** down through the constricting and closure applying head **22**.

An apparatus **30** (FIGURES 1, 2 and 5 to 8) is mounted on the machine **10** for imprinting on the web W while the web is traveling between the guide rollers **27** and **28**. The apparatus **30** is preferably located at the one side of the machine above the roll supporting brackets **25** and **26**. It comprises a base or frame member **31** which is slidably supported for vertical adjustment on a vertically extending bracket forming bar or plate member **32** by means of a clamp plate or bracket **33**. The base member

31 is recessed at 34 to receive the vertical support or mounting bar 32.

The support bar 32 is secured at its lower end to the front wall of a carriage forming casting 35 (FIGURES 1, 3 and 4) which is slidably mounted on a horizontal supporting guide rod 36 extending between the ends 37 and 37' of a generally C-shaped bracket 38 which is in turn secured at its center to the vertical end wall 39 of the reciprocating cross head 22 of the packaging or wrapping machine 10. At its upper end the vertical support bar 32 is attached to a carriage 40 (FIGURES 1 and 2) which is mounted in sliding relation on a cross bar 41. The cross bar 41 is connected at its opposite ends to brackets 42 and 42' on the lower ends of vertically disposed slide rods 43 and 43'. The slide rods 43 and 43' are mounted in vertical sliding relation in fixed brackets 44 and 44' attached to the upper ends of vertical frame posts 12 and 13. A pair of flexitor springs 45 are connected at their lower ends at 46 to each of the brackets 43 and 43' and at their opposite upper ends to the pins 47 on the uppermost ends of the slide rods 43 and 43'. The flexitor springs 45 serve to counterbalance the weight of the head assembly 22.

The imprinting apparatus 30 is adjustable vertically on the vertical support bar 32 by means of a vertically disposed screw 48 which is journaled at its top and bottom ends in the top and bottom carriages 40 and 35 and which has threaded engagement in a bore 49 (FIGURE 5) in the clamp forming member 33. The adjusting shaft 48 has a bevel gear 50 (FIGURES 2 to 4) on its lower end which engages with a bevel gear 51 on a hollow stub shaft 52 journaled in a depending arm portion 53 of the carriage 35. The hollow shaft 52 telescopes an operating cross shaft 54 of square cross section so that the shaft 52 is slidable along its shaft 54 while rotation of the shaft 54 turns the gear 51 and rotates the adjusting shaft 48. The shaft 54 is journaled at opposite ends in the ends 37 and 37' of the bracket 38 and carries an operating knob 55 at one end for rotating the shaft to adjust the vertical position of the apparatus 30.

The imprinting apparatus 30 is also adjustable in a direction laterally of the machine by means of a threaded cross shaft 56 (FIGURES 2 to 4) which is journaled in the ends 37 and 37' of the bracket 38 and has threaded engagement in a bore 57 (FIGURE 3) in the carriage 35. The shaft 56 has an operating knob 58 at one end for rotating the same so as to move the vertical support member 32 and the apparatus 30 laterally between the posts 12 and 13 of the machine.

The imprinting apparatus or coder dater 30 is operated for printing on the web W by a limit switch 60 (FIGURE 1) mounted on the fixed bracket 26 and having an operating arm 61 with a cam roller on its free end extending into the path of a striker 62 which is mounted for vertical adjustment on the one end 37' of the bracket 38 extending from the head assembly 22. The operating arm 61 for the limit switch 60 is actuated upon upward movement of the striker 62 but it is not actuated upon downward movement thereof. The striker 62 may be adjusted vertically on the bracket end 37' so that the apparatus 30 is operated for imprinting on the film when the head assembly 22 and the apparatus 30 are moving at the same speed that the film W is traveling. The striker 62 is adjusted so that it operates the switch 60 controlling the coder dater at the instant when the head assembly 22 and the film W are traveling at approximately the same speed so as to bring the type in the imprinting apparatus 30 against the film W while there is no relative movement between the coder dater apparatus 30 and the film W.

The imprinting apparatus 30 which is illustrated in FIGURES 5 to 8 comprises a type carrying bar 65 and an oppositely disposed anvil member 66 mounted on a supporting arm 67 which is carried on the main housing or frame 31 so as to provide a slot 70 for accommodating the film or web W and an inking tape 71 which is fed between the film and the type bar 65. The inking tape 71 is supplied from a stock roll or reel 72 and travels over the guide rolls 73, 74, 75 and 76 with the guide rolls 75 and 76 being spaced on opposite sides of the type bar 65. The inking tape 71 passes from the roller 76 around a tensioning roller 77 and a drive roller 78 to the waste or collecting reel 80. The tension roll 77 is mounted on the end of a supporting arm 81 which is pivotally mounted at its other end at 82 on a bifurcated fixed portion 83 of the main housing or frame 31. The roll 77 is urged against the drive roller 78 by a tension spring 84. The drive roller 78 is secured on a vertical drive shaft 85 having a one way clutch 86 (FIGURE 7) with an operating arm 87 carrying on its free end a cam follower roller 88 which engages in a cam slot 89 in a horizontally disposed reciprocating slide plate 90.

The type bar 65 is secured on a holder 91 which is in turn mounted on a carriage 92 which is supported for reciprocation on a pair of guide pins 93 and 93' extending from a base forming member 94 which is part of the main frame or housing 31. The carriage 92 carries a cam follower roller 95 (FIGURE 8) which is mounted on the lower end of a vertically disposed pin 96 and which rides in a cam slot 97 in the reciprocating slide plate or bar 90.

The slide plate 90 is mounted in a guideway 98 (FIGURE 8) in the fixed frame member 100 and has its one end connected by a clevis 101 to the end of a piston 102 extending from a cylinder 103 mounted in fixed relation on the main frame 31 of the device. Reciprocation of the slide plate 90 is effected by operation of the cylinder 103. The cam slot 97 moves the type bar carriage 92 while the cam slot 89 operates through the clutch 86 the drive roller 78 to advance the inking tape 71 for each printing operation. The tape drive roller shaft 85 has a pulley 104 on its bottom end which is connected by drive belt 105 with a pulley 106 on the bottom end of the shaft for the waste reel 80 so as to wind up the tape 71 on the reel 80 as it is advanced by the rolls 77 and 78. The reel 72 may be provided with an override brake (not shown). The cylinder 103 is, of course, connected to a suitable fluid supply, for example, a compressed air line and controlled through a valve (not shown) and the control switch 60.

Preferably, a heat actuated ink is employed which is carried by the inking tape or ribbon 71. The type holder 91 is supplied with electric heating elements 107 (FIGURE 8) to maintain the type in the type bar 65 at the proper temperature for activating the ink employed.

The web W may have successive labels or designs printed on it which are adapted to appear in the proper position on the successive packages. The feed of the tube may be controlled by index marks on the web which actuate an electric eye device (not shown) which in turn controls the drive for the feed rolls 21 so as to synchronize the advance of the web and the operation of the constricting and closing head 22. With proper adjustment the imprint by apparatus 30 will then appear in the same location relative to the label or design on each of the packages as shown in FIGURE 9.

In operation, the web imprinting apparatus 30 reciprocates with the tube constricting and closure applying head 22 and the actuating switch 60 is operated by the striker plate 62 to control the fluid to the cylinder 103 through a suitable valve which is responsive to operation of the switch 60. The timing is adjusted so that the printing on the web W occurs when the head 22 is moving at the same speed as the web W and there is no relative movement between the printing bar 65 and the web W. Since the imprinting apparatus 30 is carried on the head 22, any adjustment of the movement of the head 22 also changes the movement of the imprinting apparatus. Consequently, when the size of package is changed the movement of the head 22 is adjusted and the imprinting apparatus 30 is merely adjusted so as to operate at the proper time by adjustment of the switch striker plate 62 in order to keep the code or date or other imprint C (FIGURE 9) at the desired location on the package.

While particular materials and specific details of construction are referred to in describing the illustrated form of the apparatus, it will be understood that other materials and equivalent structural details may be resorted to within the spirit of the invention.

I claim:

1. A package forming machine comprising an upright supporting frame, a hollow tube forming mandrel, means for forming a web of packaging material around the mandrel, means for sealing the same to provide a continuous tube, means for delivering a product to be packaged through the hollow mandrel and into the tube, means for advancing the tube, a tube constricting and sealing head mounted for vertical reciprocation at the end of the filling mandrel for constricting and sealing the tube at intervals so as to divide the same into packages, means on the supporting frame for mounting a roll of packaging material, means for guiding the packaging material in a vertical path parallel with the path of the tube constricting and sealing head, a printing apparatus mounted on said tube constricting and sealing head, said printing apparatus including a reciprocably mounted type holder and an anvil spaced on opposite sides of the vertical path of the packaging material, and means to reciprocate the type holder when the packaging material and the tube constricting and sealing head are traveling upwardly at the same speed.

2. In a package forming machine having an upright supporting frame, a hollow tube forming mandrel, means for guiding packaging material around the mandrel so as to form a tube, means for forming a longitudinal seam in the tube, means for delivering a product to be packaged through the hollow mandrel and into the tube, means for advancing the tube, a vertically reciprocating head for constricting and sealing the tube at intervals so as to divide the filled tube into packages of predetermined length, means on the supporting frame for supplying packaging material in web form and for guiding the packaging material in a vertical path, a printing apparatus mounted on said tube constricting and sealing head, said printing apparatus having a movably mounted type holder and an anvil on opposite sides of the vertical path of the packaging material, and means controlled by movement of said tube constricting and sealing head to move the type holder so as to print on the packaging material when the packaging material and the tube constricting and sealing head are traveling upwardly at the same speed.

3. In a package forming machine having an upright supporting frame, a hollow tube forming mandrel, means for forming from a web of film material a continuous tube around the mandrel, means for delivering a product to be packaged through the hollow mandrel and into the tube, means for advancing the filled tube, a tube constricting and sealing head mounted for reciprocation in a vertical path adjacent the end of the filling mandrel, means on the supporting frame for receiving a roll of film material and for guiding the film in a vertical path parallel with the path of the tube constricting and sealing head, a film printing apparatus mounted on one end of said tube constricting and sealing head, said printing apparatus including a type holder and an anvil disposed on opposite sides of the vertical path of the film material, and means for operating the type holder to print on the film material when the film material and the tube constricting and sealing head are traveling upwardly at the same speed.

4. A package forming machine comprising an upright supporting frame, a hollow tube forming mandrel, means for forming a web of packaging material around the mandrel, means for sealing the same to provide a continuous tube, means for delivering a product to be packaged through the hollow mandrel and into the tube, means for advancing the tube, a tube constricting and sealing head mounted for reciprocating movement in a vertical path at the end of the filling mandrel, means for operating the head so as to divide the filled tube into packages of uniform length, means on the supporting frame for supplying a web of packaging material, means for guiding the packaging material in a vertical path parallel with the path of the tube constricting and sealing head, a printing apparatus adjustably mounted on said head, said printing apparatus including a reciprocably mounted type holder and an anvil spaced on opposite sides of the vertical path of the web, and means operative to reciprocate the type holder in timed relation to the movement of the head and the web of packaging material.



5. In a package forming machine having an upright supporting frame, a hollow tube forming mandrel, means for forming from a web of film material a continuous tube around the mandrel, means for delivering a product to be packaged through the hollow mandrel and into the tube, means for advancing the filled tube, a tube constricting and sealing head mounted for reciprocation in a vertical path adjacent the end of the filling mandrel, means on the supporting frame for supplying film material and for guiding the film in a vertical path parallel with the path of the tube constricting and sealing head, a film printing apparatus adjustably mounted on said tube constricting and sealing head, said printing apparatus including a type holder and an anvil disposed on opposite sides of the vertical path of the film material, and means for operating the type holder to print on the film material in timed relation to the upward movement of the film material and the tube constricting and sealing head.

6. In a packaging machine as recited in claim 5, and said constricting and sealing head having a bracket mounted thereon, a carriage adjustably mounted on said bracket for movement transversely of the path of said head, a vertically disposed support bar extending upwardly of said carriage in parallel relation with the path of movement of said constricting and sealing head, and means to slidably mount said film printing apparatus on said support bar.

7. In a packaging machine as recited in claim 5, and spring means associated with said tube constricting and sealing head for counterbalancing the weight of said tube constricting and sealing head and said film printing apparatus.

8. In a package forming machine having an upright supporting frame, a hollow tube forming mandrel, means for supplying a web of packaging material, guiding the web around the mandrel and forming a longitudinal seam in the tube, means for delivering a product to be packaged through the hollow mandrel and into the tube, means for advancing the filled tube, a vertically reciprocating head for constricting and sealing the tube at intervals so as to divide the filled tube into packages of predetermined length, means for reciprocating said head with an harmonic motion, means on the supporting frame for supplying packaging material in web form and for guiding the packaging material in a vertical path parallel with the path of said head, a printing apparatus mounted on said head, said printing apparatus have a movably mounted type holder and an anvil disposed so as to travel on opposite sides of the vertical path of the packaging material, and means controlled by movement of said head for operating the type holder so as to print on the web of packing material when said head and said web are moving upwardly at substantially the same speed.

9. In combination, a package forming machine having a supporting frame, a hollow tube forming mandrel, means for forming from a web of film material a continuous tube around the mandrel, means for delivering a product to be packaged through the hollow mandrel and into the tube, means for drawing the filled tube downwardly along a vertical path with a uniform speed, a tube constricting and sealing head mounted for reciprocation in a vertical path below the end of the fill-

ing mandrel, means for reciprocating said tube constricting and sealing head with a non-uniform speed, means on the supporting frame for supplying a web of tube forming film material and for guiding the film in a vertical path which is parallel with the path of the tube constricting and sealing head, a bracket mounted on said tube constricting and sealing head, a film printing apparatus mounted on said bracket for adjustment in vertical and lateral directions, said printing apparatus including a type holder and an anvil disposed on opposite sides of the vertical path of the film material, and means responsive to movement of said tube constricting and sealing head for operating the type holder to print on the film material when the film material and the tube constricting and sealing head are traveling at substantially the same speed.

10. A package forming machine having a supporting frame, a hollow tube forming mandrel disposed vertically thereon, means for forming from a web of film material in a continuous tube around the mandrel, means for delivering a product to be packaged through the hollow mandrel and into the tube, means for feeding the filled tube downwardly with uniform speed, a tube constricting and sealing head mounted for reciprocation



in said frame in a vertical path adjacent the lower end of the filling mandrel, means for reciprocating the tube constricting and sealing head with a non-uniform speed, supporting means on the frame for a supply of film material and for guiding the film in a vertical path parallel with the path of the tube constricting and sealing head, a film printing apparatus mounted for horizontal and vertical adjustment on said tube constricting and sealing head, said printing apparatus including a type holder and an anvil disposed on opposite sides of the vertical path of the film material, and means responsive to predetermined movement of the tube constricting and sealing head for operating the type holder to print on the film material when the speed of the tube constricting and sealing head and the film are substantially the same.

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