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Roberts

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[54] **HIGH SPEED ARTICLE CODING MACHINE**

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[52] **U.S. Cl.** **101/35,** 101/350, 101/364

[51] **Int. Cl.** **B41f 17/16,** B41f 31/06

[58] **Field of Search** 101/35, 348, 350, 36, 349, 101/363, 364

[56] **References Cited**

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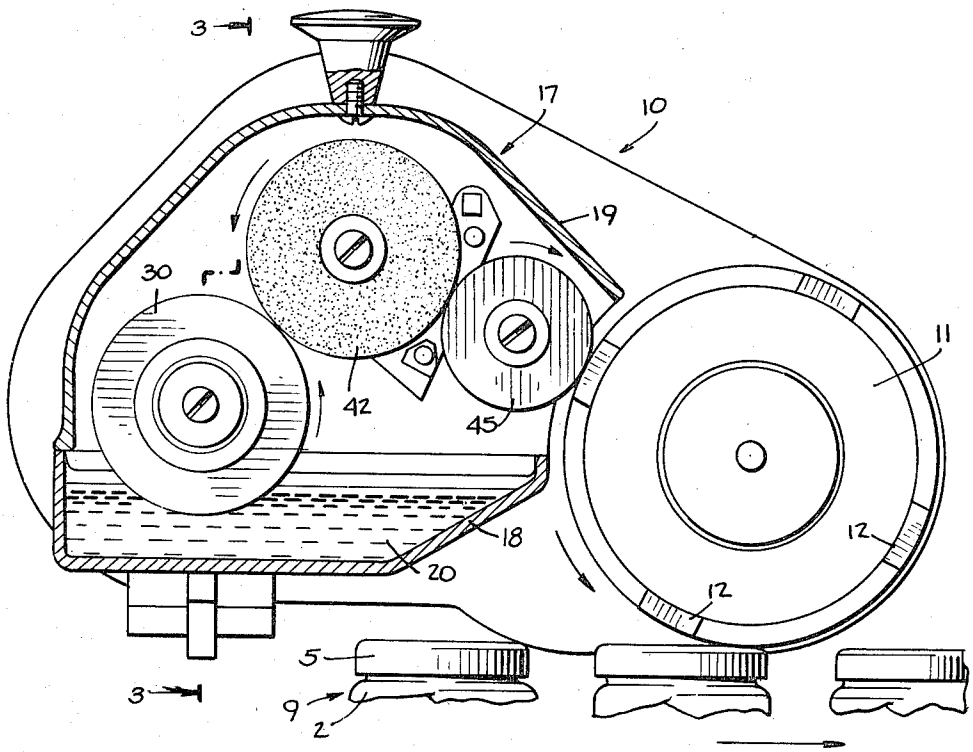
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[57] **ABSTRACT**

An improved coder is described for applying a legend or a code to an article such as a sealed package. As the articles move past the coder on a conveyor, the code symbols are applied to the moving articles by spaced coding heads on a rotating coding wheel. Improved means are provided to feed the required amount of ink from a reservoir to each of the coding heads. This means includes a thin rotating disc whose edge passes through the ink reservoir and which carries a bead of ink first to a transfer wheel. An improved ink transfer is obtained by spacing the disc from the transfer wheel so that the only direct contact is between a bead of ink on the disc and the transfer wheel. Adjustment of the disc rotational speed independently of the transfer wheel speed and the preset disc and transfer wheel spacing precisely control the amount of ink transferred. The transfer wheel engages a spreader wheel which in turn transfers the coding ink to the heads of the coding wheel.

3 Claims, 7 Drawing Figures



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SHEET 1 OF 4

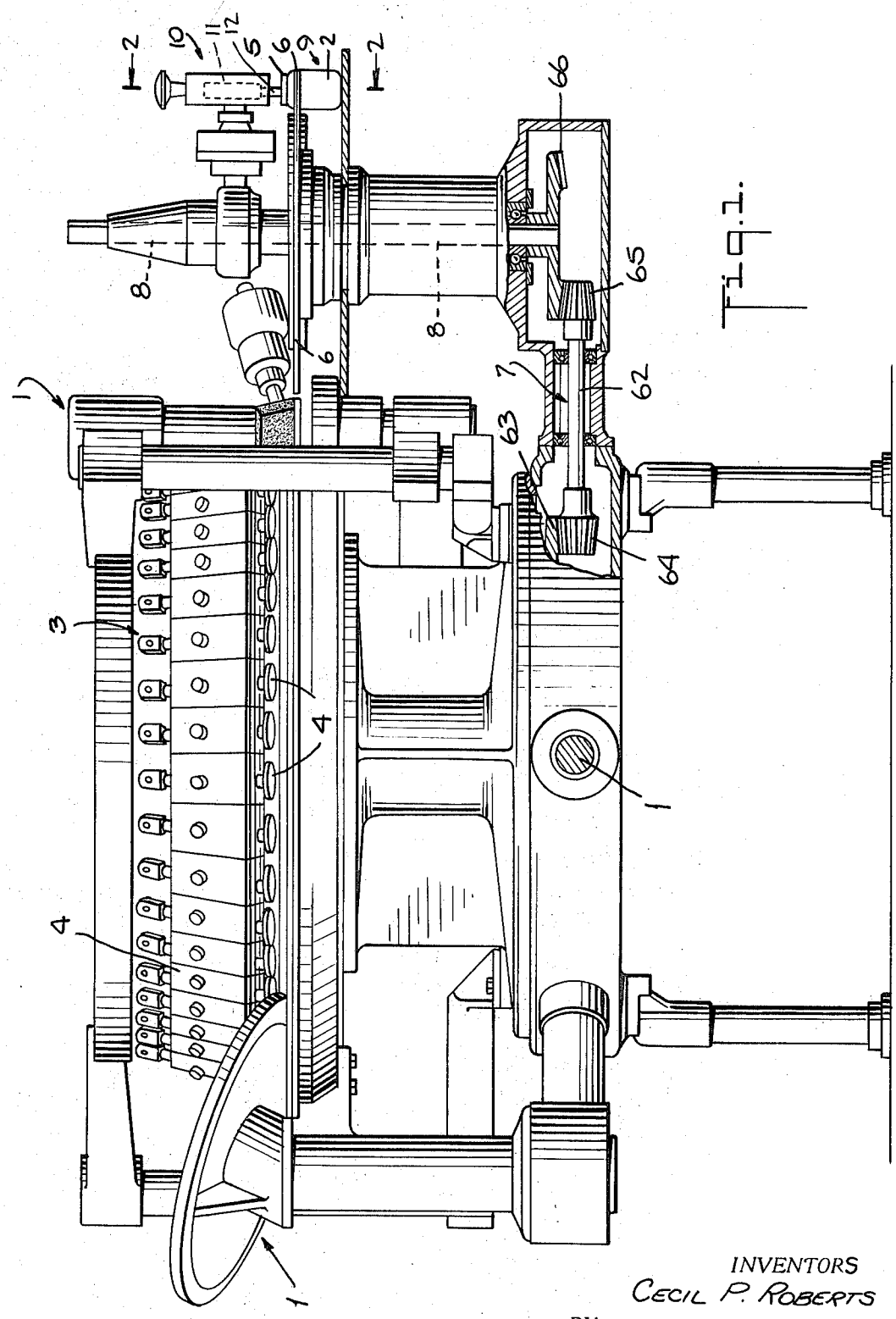


Fig. 1.

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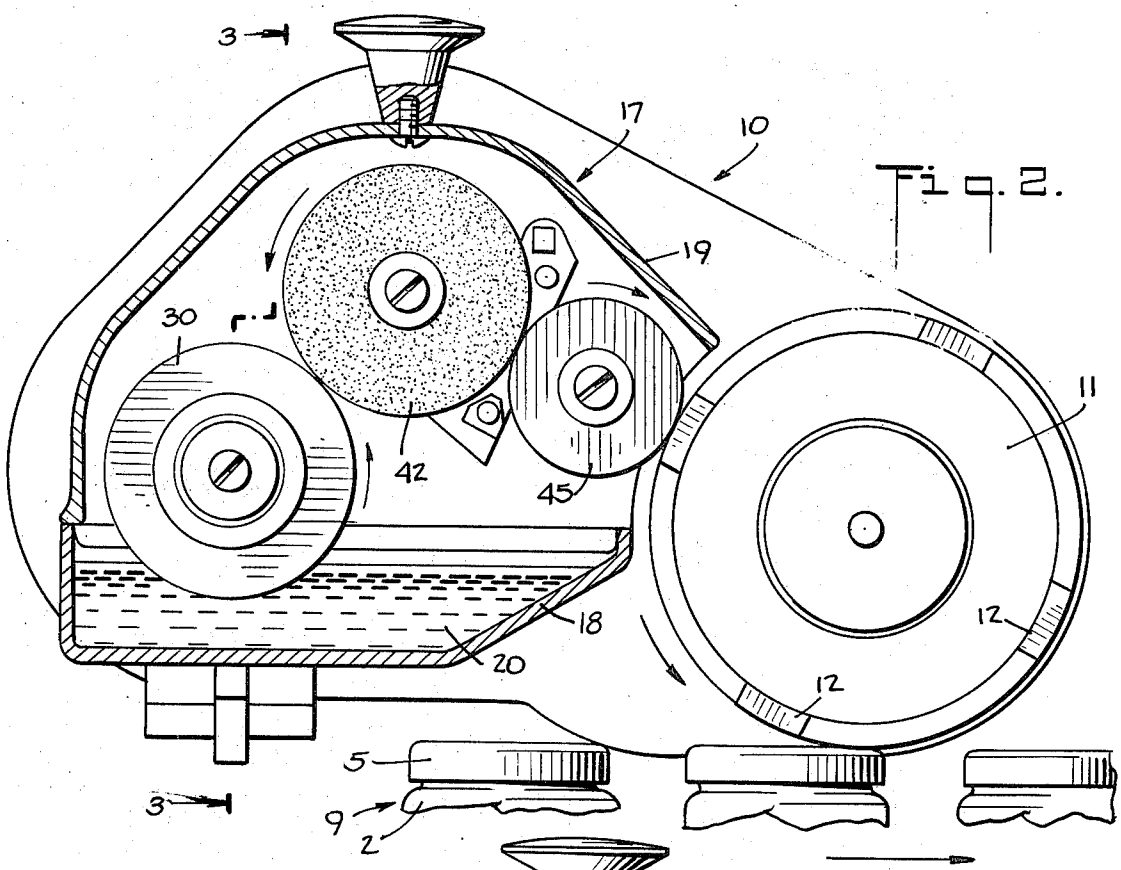


Fig. 2.

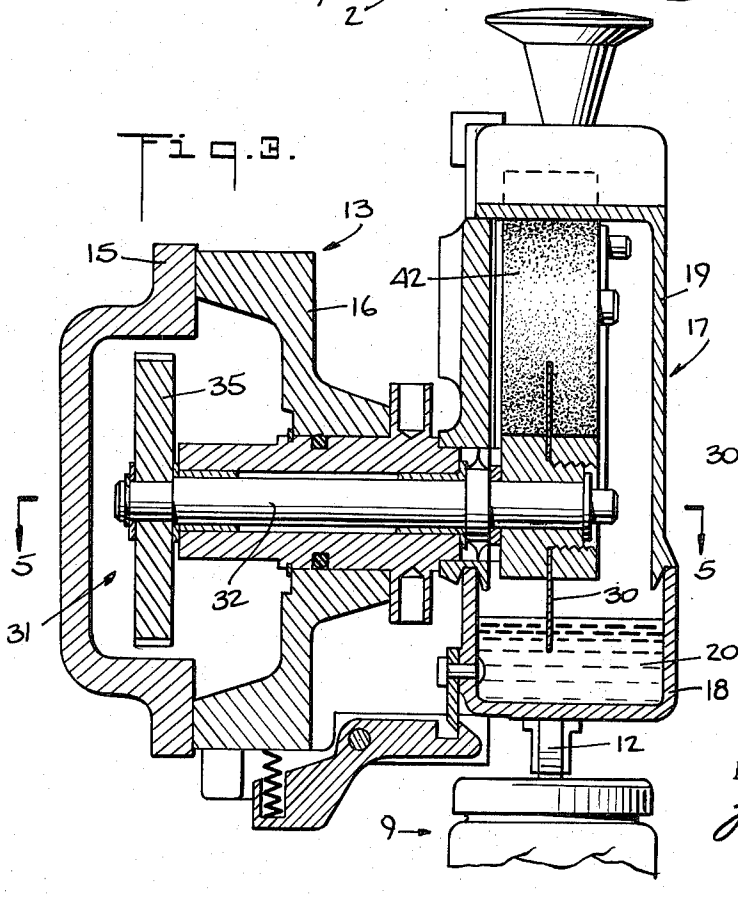


Fig. 3.

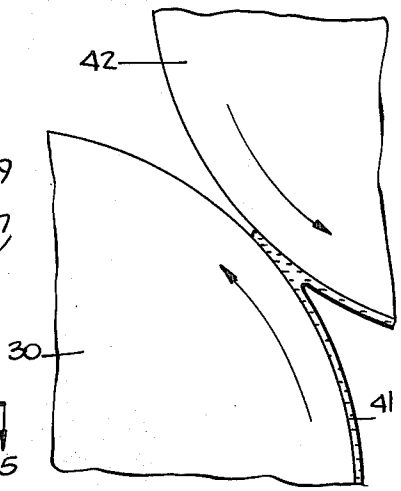


Fig. 4.

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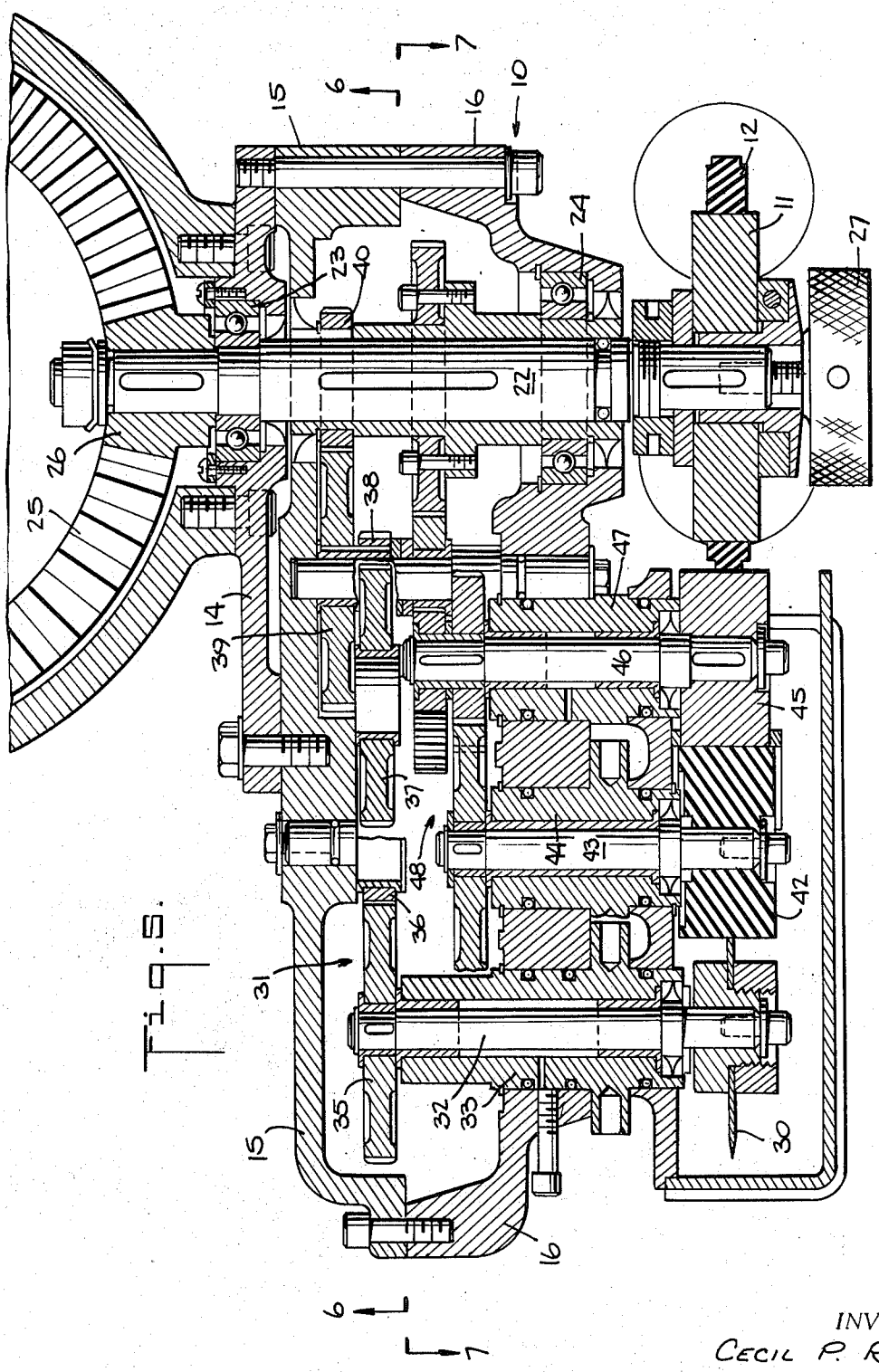


Fig. 5.

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Fig. 6.

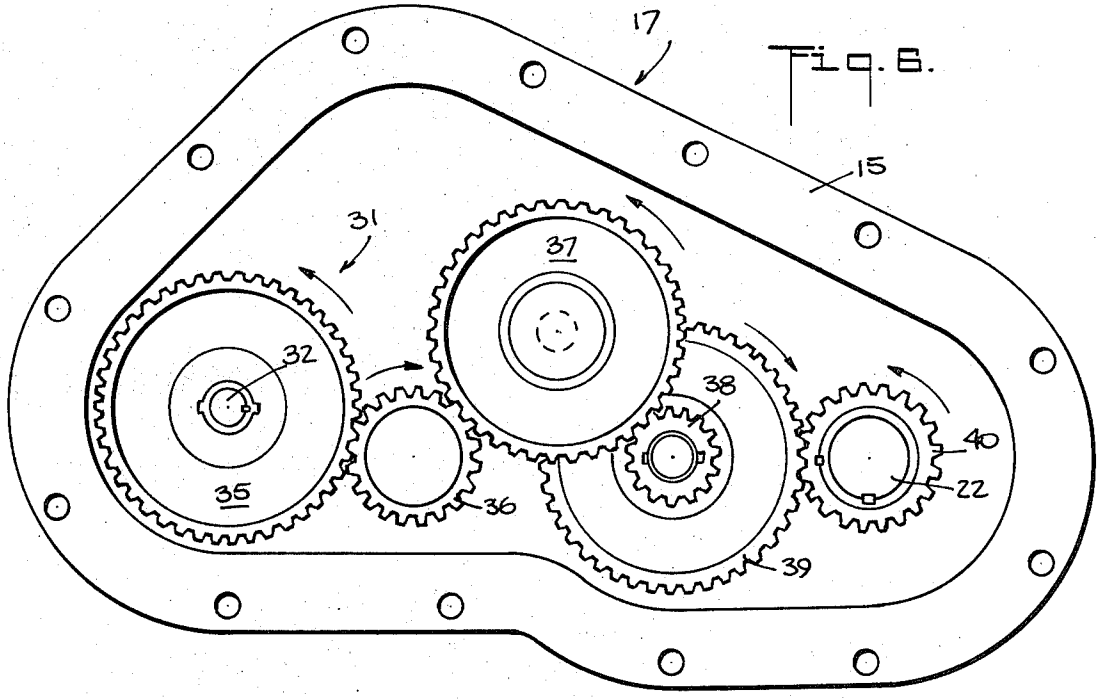
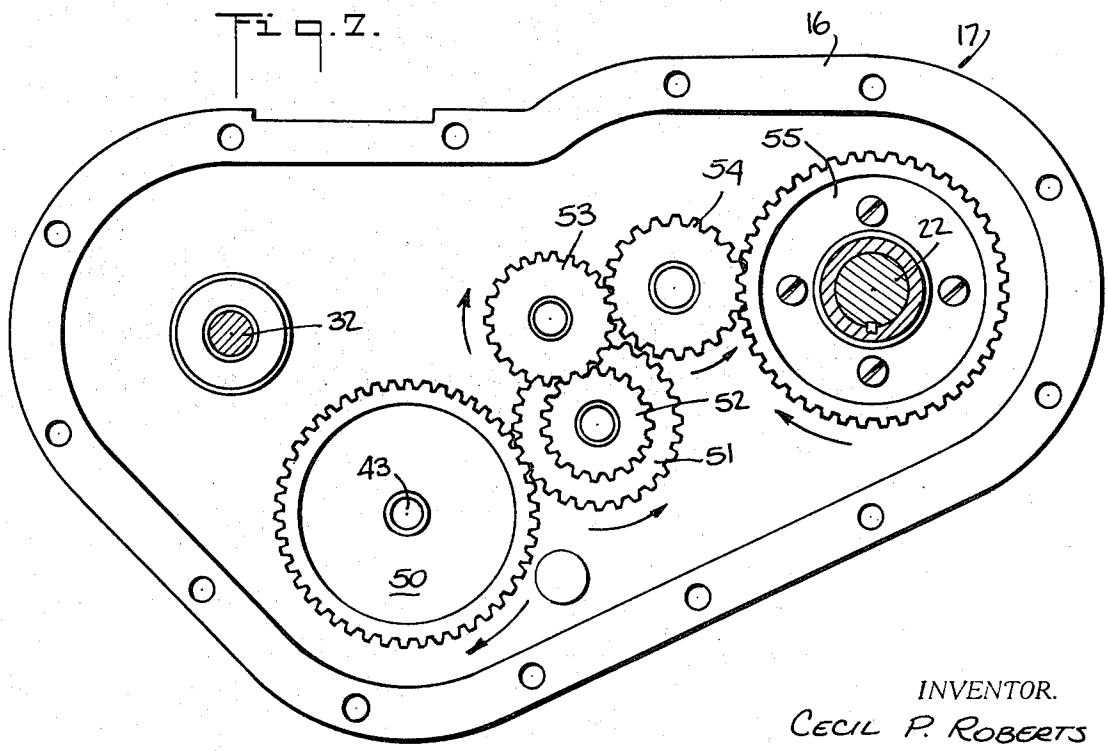


Fig. 7.



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HIGH SPEED ARTICLE CODING MACHINE

BACKGROUND OF THE INVENTION

The present invention relates to devices for automatically applying an identifying code to food packages or other articles in a packaging or other article conveyor system. More particularly, the present invention relates to such a coder which is adapted for reliable continuous operation at extremely high speeds.

The continually increasing demand for packaged articles and particularly for food packages as well as increasingly strict standards of package and package lot identification have created a need for article coding apparatus which is capable of reliable operation at extremely high speeds. The most effective coding means for articles such as food packages has been found to be means for the application of a code symbol printed in an ink or similar formulation directly on a cover or other panel of the sealed package. As the speeds of the package handling systems have increased and as the codes applied to the packages have become more complex, the present coders have been found to be unreliable and in particular to be deficient in their ability to feed an ink coating of proper and uniform thickness to the coding stamps or heads of the coding machines.

The improved coding machine of the present invention is useful at extremely high speeds and has an improved ink feed system which is capable of being adjusted for both differing speeds, differing inks and different coding techniques.

Accordingly, an object of the present invention is to provide an improved high speed article coding machine.

Another object of the present invention is to provide a high speed article coding machine which is readily adjusted for differing speeds and coding inks.

Another object of the present invention is to provide a more reliable high speed article coding machine.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

BRIEF DESCRIPTION OF THE DRAWING

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings, forming a part of the specification, wherein:

FIG. 1 is a side elevational view illustrating a coding machine in accordance with the present invention positioned on the outlet of a high speed package sealing machine.

FIG. 2 is a vertical sectional view of the coding machine taken along line 2—2 of FIG. 1.

FIG. 3 is a vertical sectional view taken along line 3—3 on FIG. 2.

FIG. 4 is an enlarged detailed elevational view illustrating the ink transfer between the inking disc and the transfer wheel.

FIG. 5 is a horizontal sectional view of the coding machine illustrating the driving gear trains taken along line 5—5 on FIG. 3.

FIGS. 6 and 7 are vertical sectional views taken along lines 6—6 and 7—7 on FIG. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The coder of the present invention is useful for a variety of article coding or printing operations where articles are being moved at relatively high speeds in spaced relation to each other on a conveyor. The coder will now be described in a typical high speed packaging operation where identifying code legends are being printed onto the tops of sealed containers such as glass containers sealed with closure caps. The improved coder is obviously useful in other packaging or article handling systems.

FIG. 1 shows a high speed rotary sealing machine 1 where filled glass containers 2 are fed beneath a rotating turret 3 having a number of sealing heads 4 mounted at its periphery. A metal or plastic closure cap 5 is applied to each of the moving containers 2 by a head 4. An output star wheel 6 coupled to the turret drive, as indicated by a drive train 7 including a vertical drive shaft 8, rotates in synchronism with the turret 3 and carries the sealed packages 9 out of the machine 1 for being passed onto a package inspection or other conveyor. Each of the packages 9 is seen to be carried by the rotating exit star wheel 6 beneath a coder 10 in accordance with the present invention which has a rotating code wheel 11 for carrying code heads 12 against the caps 5 of the sealed packages 9.

The coder 10, in accordance with the present invention, must operate in synchronism with its cooperating article conveyor which in the case illustrated is the rotating exit star wheel 6. The coder 10 is, therefore, conveniently driven by a coupling to the article conveyor such as by the direct coupling 7 to the vertical drive shaft 8 for the exit star wheel 9. This adjustable speed coupling and the other details of the improved coder 10 will now be described.

The coder 10 comprises a molded rigid metal casing 13 for mounting its several parts in a rigid manner while permitting disassembly for inspection and adjustment. The principal portions of the casing 13 comprise an inner support flange 14 to which is bolted a drive housing comprising inner and outer sections 15 and 16 respectively, including suitable bearings for the various drive shafts. The hollow ink reservoir 17 is mounted on the outer surface of the outer casing portion 16 and comprises the ink reservoir 18 and an upper removable top 19.

The improved ink transfer means for carrying coding ink 20 from the reservoir 17 to the coding wheel will now be described with particular reference to FIGS. 2, 3, 4 and 5.

The article coding wheel 11 is seen to be mounted on a horizontal drive shaft 22 supported in spaced bearings 23 and 24 in the flange 14 and in the outer housing 16. This drive shaft 22 is rotated by a coupling to the vertical exit star wheel drive shaft 8 through the intermediation of gears 25 and 26. This causes the coding wheel 11 to rotate in exact synchronism with the exit star wheel 6. The coding wheel 11 is detachably mounted on the outer end of the shaft 22 by a knurled coupling knob 27. Several coding heads 12 are mounted on the outer surface of the coding wheel 11 in spaced arrangement for engaging the top surfaces of the articles being coded. The improved means for transferring the coding ink 20 from the reservoir 17 to the rotating coding wheel 11 will now be described.

The first member of the transfer system comprises a thin rotating inking disc **30** having its outer edge immersed in the ink **20** within the reservoir **17.** This inking disc **30** is rotated at a selected speed through the intermediation of an adjustable gear drive system **31** best seen in FIGS. **5** and **6.** The drive system **31** includes a horizontal support shaft **32** for the inking disc **30** mounted in a bearing **33** on the outer housing **16** and having a drive gear **35** attached at its inner end. The drive gear **35** is coupled to the code wheel drive shaft **22** through a gear train including gears **35** through **40.** This gear train is seen to consist of the six gears **35–40** providing a means for rotating the disc at a different speed from the coding wheel **11.** The inking disc **30** rotational speed is made adjustably different from the coding wheel **11** speed by providing a number of interchangable gears or gear sets permitting a wide range of speed adjustments for the inking disc **30,** all of which provide an exact and constant speed ratio between the speed of the inking disc **30** and the rotational speed of the coding wheel **11.** The thin inking disc **30,** during rotation, picks up a bead **41** of coding ink **20** at its outer rim. This bead **41** is transferred to a rotating ink transfer wheel **42** which, as illustrated in FIG. **4,** has its periphery spaced from the surface of the rotating inking disc **30.** This spacing, which is relatively slight, provides for a transfer of a constant volume of ink depending upon the relative rotational speeds of the inking disc **30** and the transfer wheel **42.** The transfer wheel **42** is seen to be mounted upon its own independent support shaft **43** in a bearing **44** mounted in the outer casing **16.** The ink transfer wheel **42** is preferably of a relatively soft material such as rubber and it has its outer surface in engagement with the surface of a third wheel which is the ink spreader wheel **45.** The operation of the spreader wheel **45** as it rotates in engagement with the transfer wheel **42** forms a uniform and wide ink coating on its surface for the final transfer to the coding heads **12** on the rotating coding wheel **11.** The spreader wheel **45** is also mounted on its own independent support shaft **46** mounted in a bearing **47** in the outer casing **16.**

The transfer wheel **42** and the spreader wheel **45** are preferably driven so that their outer inking surfaces move at the same speed as the inking surfaces on the several inking heads **12** on the coding wheel **11.** This result is obtained through a chain of drive gears **48** (FIGs. **5** and **7**) which couples the transfer wheel **42** and the spreader wheel **45** directly to the coding wheel shaft **22.** This drive chain is seen to include removable gears **50–55** which permit the speed of the transfer wheel **42** and the spreader wheel **45** to be adjusted as necessary.

OPERATION OF THE CODER

It is, therefore, seen that the above described coder **10** is positioned on a portion of a packaging or conveying system where the packages are moved in spaced relationship under the coder **10.** FIG. **1** illustrates a typical and a particularly suitable use of the coder **10** where it is mounted directly upon the outlet star wheel **6** of the rotary sealing machine **1.** Sealed containers **9** sealed with closure caps **5** are carried out of the sealing turret **3** in the spaced pockets of the outlet star wheel **6.** These containers **9** are, therefore, moving in a precisely spaced arrangement and at a constant and predetermined speed under the coder **10** of this invention. FIG. **1** shows the coder **10** attached to the star wheel support frame so that it may be operatively coupled directly to the vertical drive wheel shaft **8** which is driven from the sealing machine **1** through drive system **62–66.** A positive geared coupling **25, 26** (FIG. **5**) between the drive shaft **8** and the code wheel **11** permits the coding heads **12** on the code wheel **11** to move at the same speed as the container tops as the containers **9** pass beneath the coder **10.**

As already indicated, the coder **10** is particularly useful for high speed coding operations where packages may pass beneath it at speeds up to **1,000** articles per minute and higher. The system for providing the ink to the coding heads **12** in a reliable manner at this high speed includes the thin rotating inking disc **30** which, as seen in FIG. **2,** carries ink **20** from the ink reservoir **17** to the rotating ink transfer wheel **42.** In particular, the disc **30,** as seen in FIG. **4,** is seen to carry a narrow bead **41** of the ink on its rim to a point adjacent to but spaced from the ink transfer wheel **42.** The ink transfer wheel **42,** which is rotating in the same direction as the disc **30,** is, therefore, fed a continuous and constant supply of ink which is determined by the adjustable speed of rotation of the inking disc **30** as well as by its preset spacing from the transfer wheel **42.** The transfer wheel **42** rotates with a surface speed similar to that of the surface speed of the inking heads **12** so that by direct contact it may pass ink onto the spreader wheel **45** and so that the spreader wheel **45** may then transfer an ink coating of the proper thickness to the moving inking heads **12.**

The above described gear train **31** coupling the inking disc **30** to the drive system and providing an adjustable disc speed is seen to be synchronized with but to permit speed adjustment of the inking disc **30** relative to the speed of the coding wheel **11** as well as of the transfer and spreader wheels **42** and **45.** The second gear train **48** which drives the transfer wheel **42** and the spreader wheel **45** is seen to permit the proper adjustment of these wheel speeds independently of the rotational speed of the inking disc **30.** The height of the coder may be adjusted by moving the housing together with the beveled ring gear **25** axially of the star wheel drive shaft **8.**

It will be seen that an improved coder has been provided for coding packages at high speeds. The improved coder, in particular, has a means for applying an exactly predetermined amount of ink for each coding head so that high speed coding may be done with a clear coding print and without excess ink being present in the system. The inking control system, including the improved inking disc, is adjustable so that adjustments of ink supply rate may be made to make the system operative for varying code symbols and package speeds and making the system widely applicable to a variety of high speed coding operations.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In a coder for applying legends to surfaces of moving articles using a driven coding wheel which is fed with ink from an ink reservoir an improved ink transfer means for transferring ink from the reservoir to the coding wheel comprising the combination of:

an inking disc having a relatively thin outer edge positioned within said reservoir for picking up a bead only of the ink:

means for rotatably mounting said inking disc;

drive means for rotating said inking disc;

a rotatably mounted ink transfer wheel for receiving said bead of ink from said inking disc;

said ink transfer wheel being relatively thick at its ink receiving surface compared to said edge of said inking disc;

said inking disc being positioned with its outer edge spaced slightly from the outer surface of said transfer wheel whereby the bead of ink on the inking disc is engaged by and transferred to the surface of said transfer wheel;

drive means for rotating said transfer wheel in the same direction as the direction of rotation as said inking disc whereby their said spaced outer disc edge and wheel surface pass each other in opposite directions; and

said first and second drive means including speed control means for driving said disc and said transfer wheel at adjustably differing speeds.

2. The coder as claimed in claim **1** in which said speed control means for said disc and said transfer wheel comprises gear trains with replaceable gears.

3. The coder as claimed in claim **1** which further comprises a drive shaft for the coding wheel, a first gear train coupling said disc to said drive shaft and a second gear train coupling said transfer wheel to said drive shaft.

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