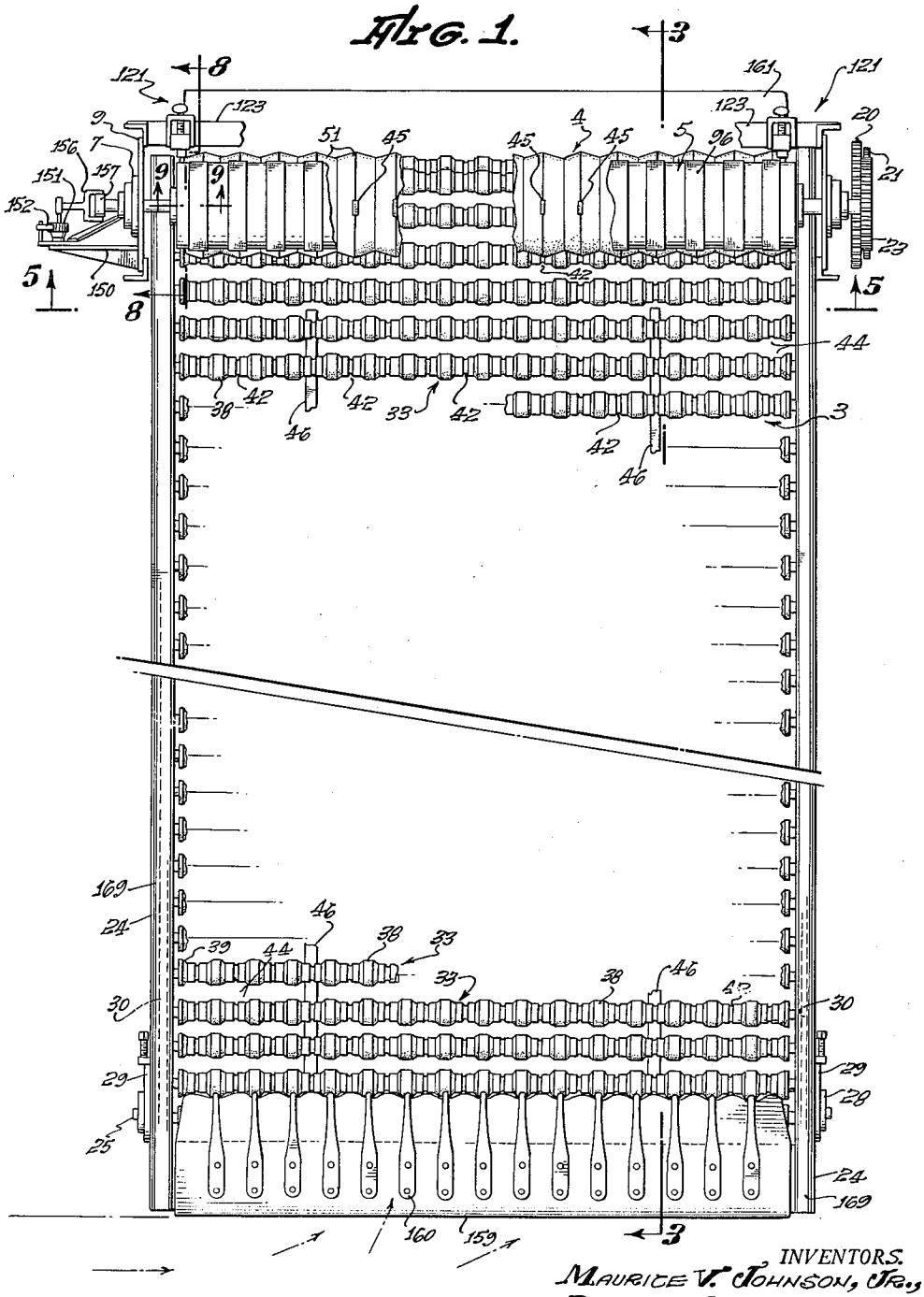
June 13, 1961 M. V. JOHNSON, JR., ET AL 2,987,991

PRINTING MACHINE

Filed Feb. 2, 1956 7 Sheets-Sheet 1

FIG. 1.



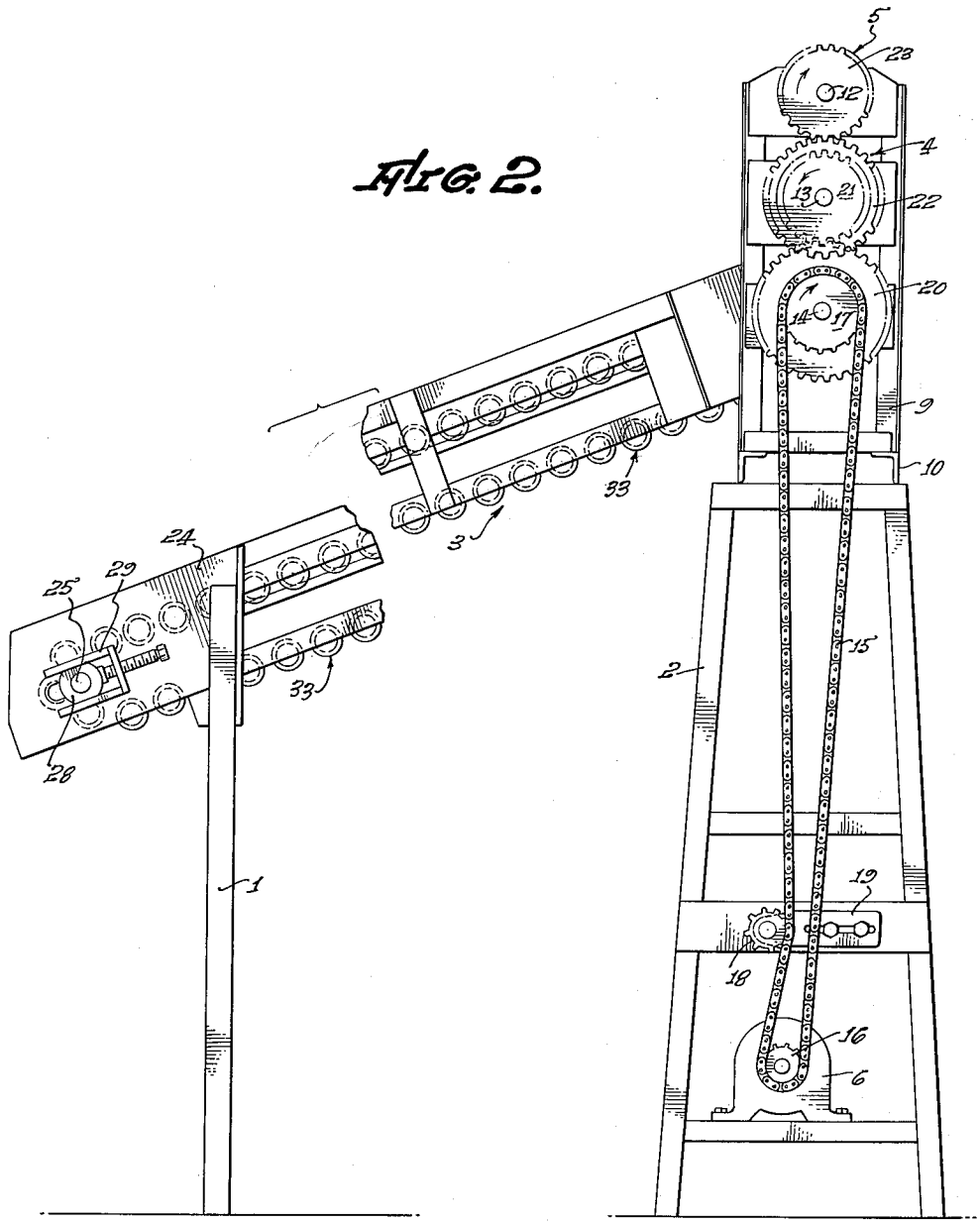
INVENTORS.
MAURICE V. JOHNSON, JR.,
DONALD C. SAVAGE,
By Mulvaney, Jones & Donald
AGENT.

June 13, 1961 M. V. JOHNSON, JR., ET AL 2,987,991

PRINTING MACHINE

Filed Feb. 2, 1956 7 Sheets-Sheet 2

FIG. 2.



MAURICE V. JOHNSON, JR.,
DONALD C. SAVAGE,
INVENTORS.

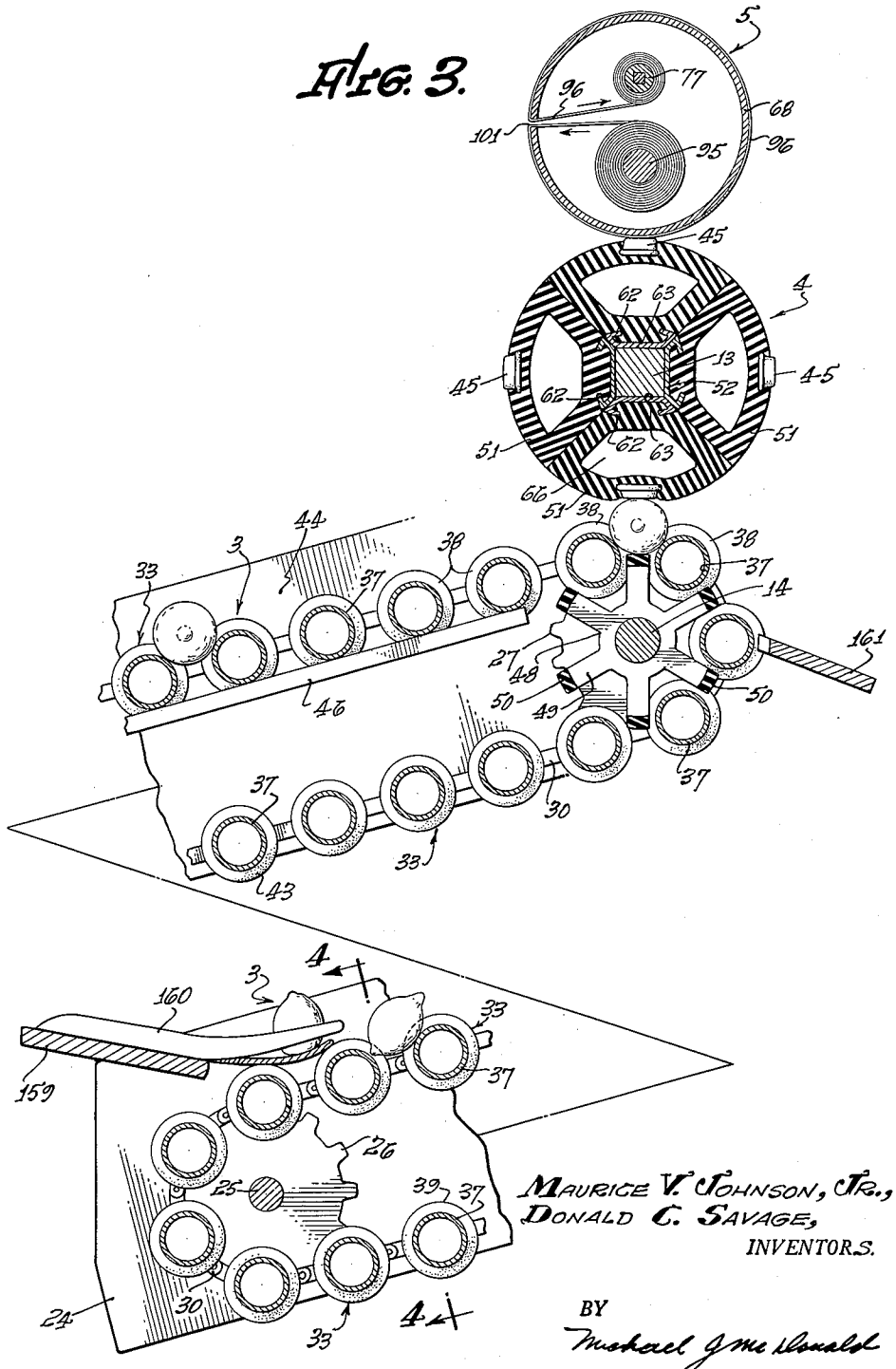
BY
Michael Jane McDonald
AGENT.

June 13, 1961 M. V. JOHNSON, JR., ET AL 2,987,991

PRINTING MACHINE

Filed Feb. 2, 1956 7 Sheets-Sheet 3

FIG. 3.



MAURICE V. JOHNSON, JR.,
DONALD C. SAVAGE,
INVENTORS.

BY
Michael J. McDonald
AGENT.

June 13, 1961 M. V. JOHNSON, JR., ET AL 2,987,991

PRINTING MACHINE

Filed Feb. 2, 1956 7 Sheets-Sheet 4

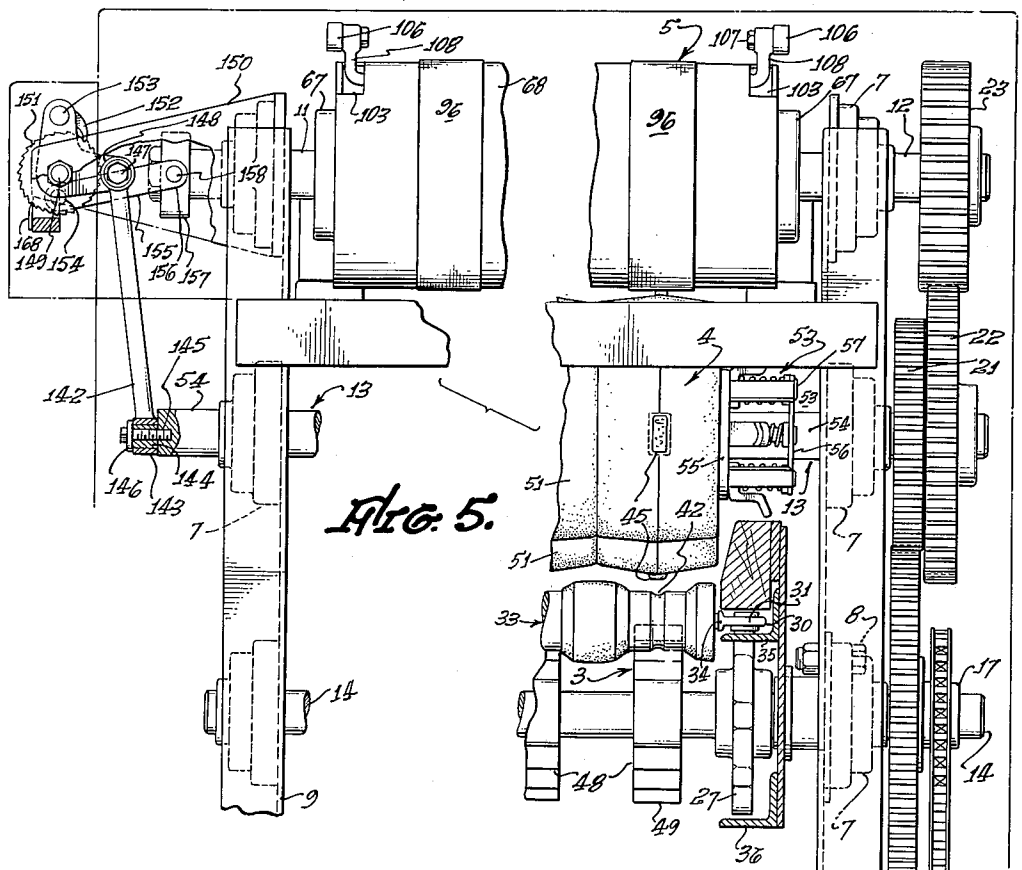


FIG. 5.

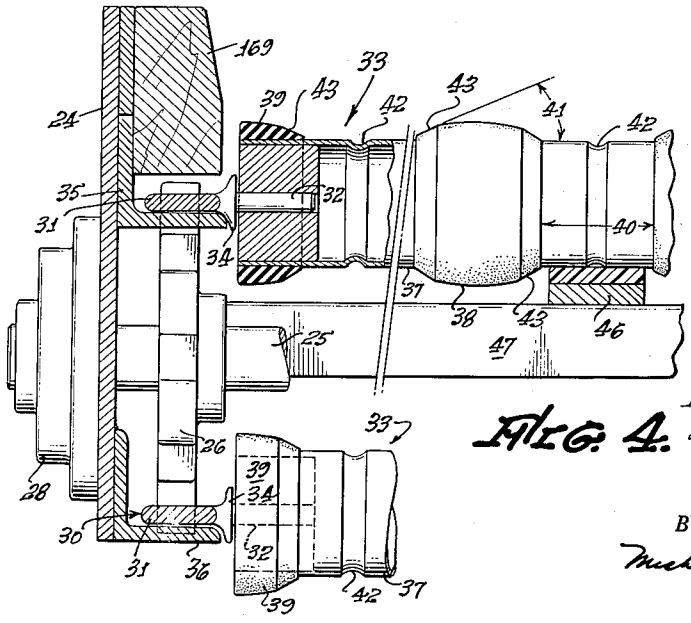


FIG. 4.

MAURICE V. JOHNSON, JR.,
DONALD C. SAVAGE,
INVENTORS.

BY

Michael John McDonald

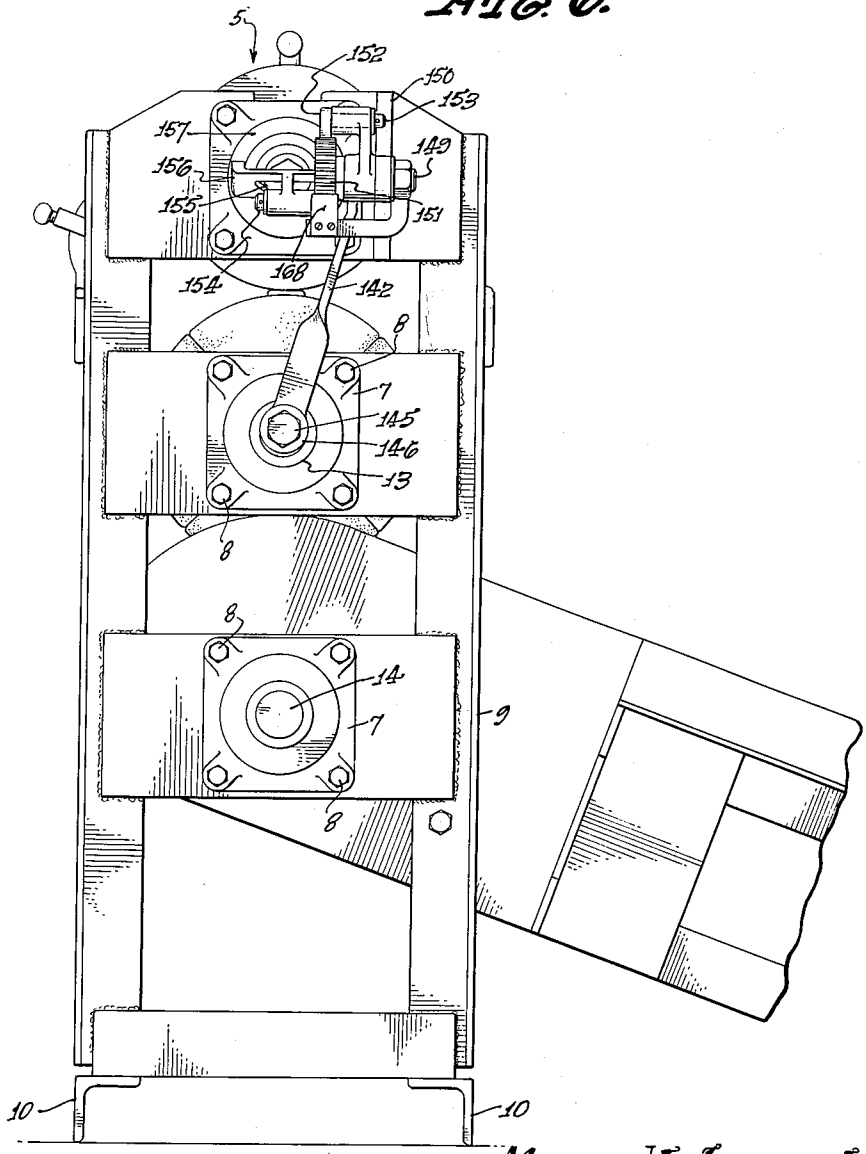
AGENT.

June 13, 1961 M. V. JOHNSON, JR., ET AL 2,987,991

PRINTING MACHINE

Filed Feb. 2, 1956 7 Sheets-Sheet 5

Fig. 6.



MAURICE V. JOHNSON, JR.,
DONALD C. SAVAGE,
INVENTORS.

BY
Michael Jones McDonald
AGENT.

June 13, 1961 M. V. JOHNSON, JR., ET AL 2,987,991

PRINTING MACHINE

Filed Feb. 2, 1956 7 Sheets-Sheet 6

Fig. 8.

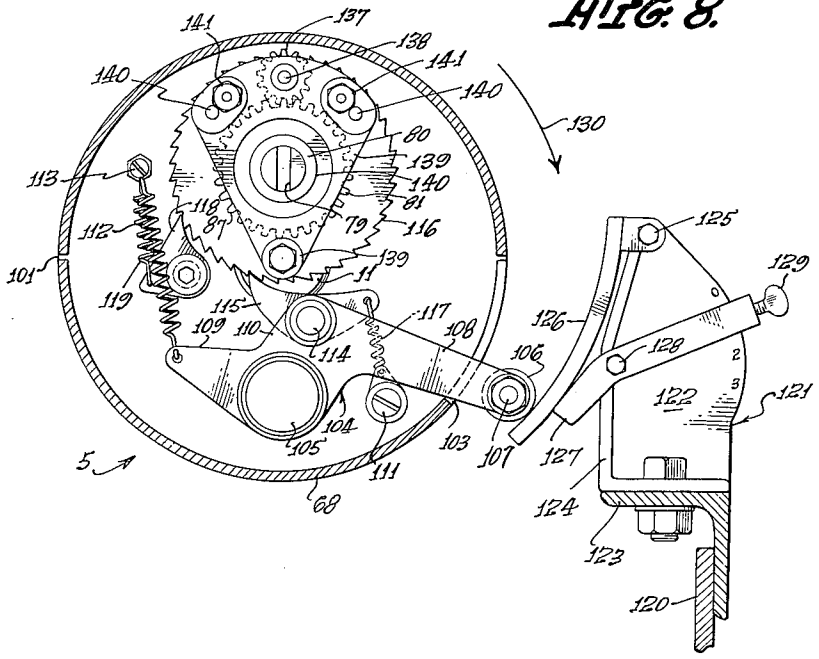
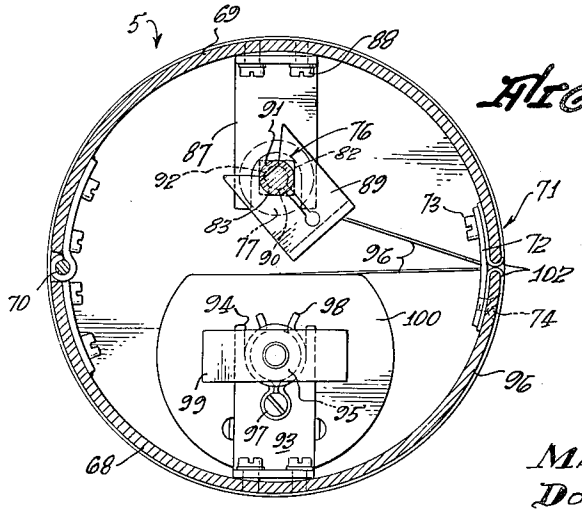


Fig. 7.



MAURICE V. JOHNSON, JR.,
DONALD C. SAVAGE,
INVENTORS.

BY
Michael J. McDonald
AGENT.

June 13, 1961 M. V. JOHNSON, JR., ET AL 2,987,991

PRINTING MACHINE

Filed Feb. 2, 1956 7 Sheets-Sheet 7

Fig. 9.

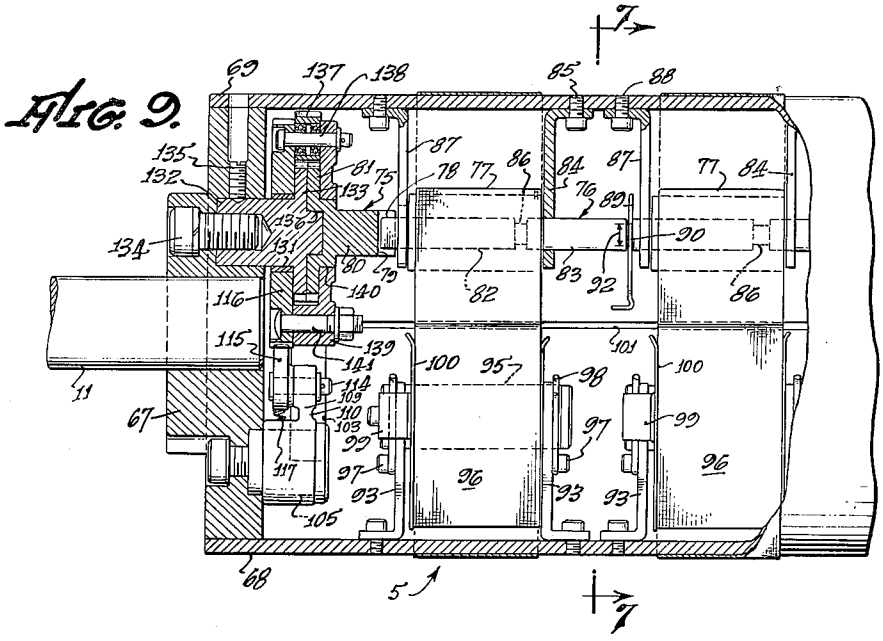


Fig. 10.

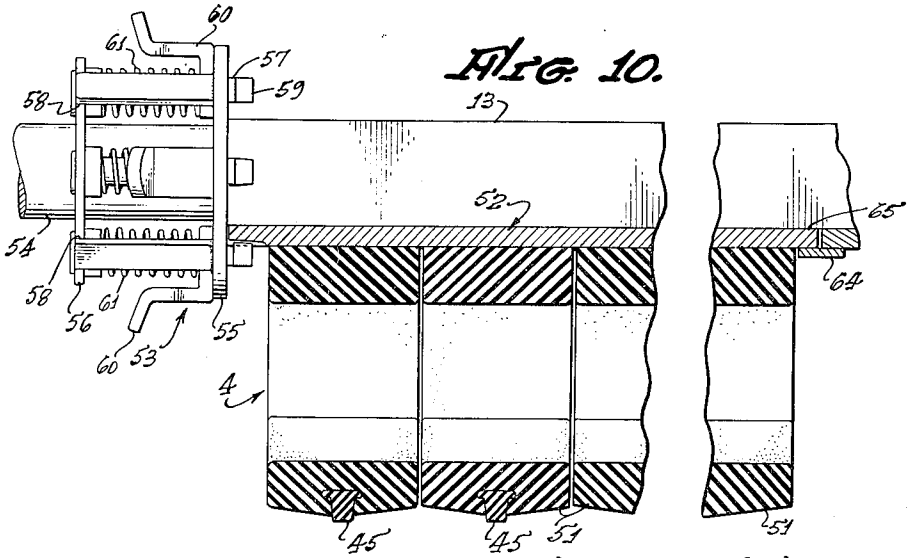
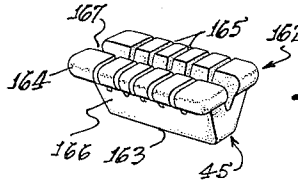


Fig. 11.



MAURICE V. JOHNSON, JR.,
DONALD C. SAVAGE,
INVENTORS.

BY

Michael J. McDonald

AGENT.

United States Patent Office 2,987,991 Patented June 13, 1961

2,987,991

PRINTING MACHINE

Maurice V. Johnson, Jr., Upland, and Donald C. Savage, Ontario, Calif., assignors to Sunkist Growers, Inc., Los Angeles, Calif., a corporation of California

Filed Feb. 2, 1956, Ser. No. 563,045
26 Claims. (Cl. 101—37)

This invention relates to printing machines and more particularly to a machine especially capable of printing citrus fruit, eggs, apples, cantaloupes, nuts, potatoes, avocados, tomatoes and other substantially cross sectionally circular objects.

Our invention will be disclosed with specific reference to the printing of trademarks or other indicia upon lemons, since that fruit, due to its ellipsoidal shape, variance in diameter from fruit to fruit and irregular and easily bruised surface, is difficult to effectively print. It will be apparent, however, that our machine is eminently adapted to print other fruits, nuts, vegetables or articles of manufacture which have a substantially circular cross section.

While many fruit and vegetable stampers or markers have been proposed, the printing of lemons with trademarks has not yet been accomplished commercially and there is not yet known a machine which will satisfactorily serve this function. The obovate to ellipsoidal form of the lemon renders it necessary to orient the fruit so that in passing through the printing assembly the smoothest, most gently rounded surface of the fruit is presented to the printing die. If the fruit is contacted by the die at either its stem or blossom end, it is evident that a true impression of the indicia will not be obtained. In addition to the problems resulting from the shape of the lemon, further problems are created by their large variation in size. The diameter of an average lemon is about 2⅛ inches but this varies from as little or less than 1½ inches to as much as 3⅛ inches or more, consequently a printing machine will not successfully print lemons which have not been previously classified as to size unless it is capable of properly functioning over at least this size range. The problem is further compounded by the fact that lemons grown in the Pacific coastal areas and in other areas having cooler climates, which account for a large percentage of the lemon production of the United States, lack resiliency and have an irregular relatively stiff inflexible peel easily subject to damage by bruising. These characteristics make it impossible to rely upon compression of the fruit itself to compensate for variation in size from fruit to fruit, which would be required if the support to die distance were fixed and unyielding. Irrespective of the size of fruit passing through the printing assembly, it is essential that there be a firm but not severe contact between every part of the die and the lemon at the time of printing. If the contact is not firm enough the indicia will not be clearly printed upon the lemon, while if it is too firm, the die may rupture the peel and possibly inoculate it with mold spores or bacteria or in any event render the fruit subject to future inoculation.

A further difficulty involves the requirement that there be substantially no relative velocity between the die and the lemon surface being printed. If there is such relative velocity, i.e., if the lemon surface is moving past the die at a velocity less than or greater than that of the die, the die will not impress its designation clearly but will produce a smeared, unreadable mark.

It will be evident that any printing machine suitable for utilization in the printing of random sizes of lemons must be capable of orienting and aligning the fruit; it must be capable of printing constantly changing sizes of lemons; it must provide a firm but not severe contact between the die and the fruit; and it must function in such

manner that there is substantially no relative velocity between the die and the fruit. Of course, it must, in addition, be capable of handling large volumes of fruit at a minimum cost.

It is therefore one of the objects of our invention to provide a printing machine fulfilling all of the requirements set forth in the preceding paragraph.

Among the further and important objects of our invention are to provide a printing machine having: an improved conveyor capable of orienting and aligning fruits, vegetables or other ellipsoidally shaped articles so that their long axes are parallel to the axes of the rollers; a rotating and reciprocating tube about which a renewable inking ribbon is continuously fed; a rotary printing drum on which dies are flexibly mounted to permit firm but yielding contact with the articles to be printed; and a rotary platen having spokes to assist the conveyor rollers in supporting fruit as it is printed.

These and further objects of our invention will become apparent from a consideration of the drawings in which:

FIGURE 1 is a plan view of our printing machine with parts broken away for clarity;

FIGURE 2 is an elevation showing the right hand side of our machine;

FIGURE 3 is a sectional view taken on line 3—3 of FIGURE 1;

FIGURE 4 is a view, partly in section, taken on line 4—4 of FIGURE 3;

FIGURE 5 is a view taken on line 5—5 of FIGURE 1 with parts shown in section;

FIGURE 6 is an elevation showing the left hand side of our machine, part of the conveyor being omitted;

FIGURE 7 is a full cross sectional view of our ribbon tube taken on line 7—7 of FIGURE 9;

FIGURE 8 is a section showing our inking roller and cam face assembly taken on line 8—8 of FIGURE 1;

FIGURE 9 is a partial longitudinal section of our inking ribbon tube taken substantially on line 9—9 of FIGURE 1;

FIGURE 10 is a detail view, partly in section, of a portion of the printing drum of our machine; and

FIGURE 11 is a perspective view of an improved form of a printing die.

With more specific reference to the drawings, our machine, which is mounted upon suitable supporting frames 1 and 2, is composed of an orienting conveyor 3, a rotary printing drum 4 and an inking ribbon tube 5 all driven by a motor 6 or other suitable driving means.

As shown in FIGURE 5, the ribbon tube, printing drum and conveyor drive shafts are rotatably mounted in bearings 7 secured by bolts 8 to side frames 9 which are in turn secured to supporting cross members 10 attached to supporting frame 2. The ribbon tube is fixed to stub shafts 11 and 12 while the printing drum 4 is mounted on shaft 13. Conveyor drive shaft 14 is provided for supporting conveyor sprockets and platens hereinafter described. Shafts 13 and 14 are parallel to each other and to ribbon tube shafts 11 and 12. The conveyor drive shaft is driven (FIGURE 2) by chain 15 which is trained over sprocket 16 on the motor shaft and sprocket 17 on conveyor shaft 14. If desired, a suitable chain tension adjusting mechanism, such as sprocket 18 rotatably mounted on adjustable bracket 19, may be provided. Gear 20 secured to shaft 14 meshes with gear 21 keyed to shaft 13. Another gear 22 attached to the shaft 13 exteriorly of gear 21 engages and drives gear 23 secured to shaft 12. Through this drive arrangement the conveyor drive shaft, printing drum and ribbon tube are rotated in the directions indicated by the arrows in FIGURE 2.

The orienting conveyor is supported at its delivery end upon drive shaft 14. The receiving end of the conveyor

is supported on shaft 25 mounted in bearings 28 in side plates 24 fixed to support frame 1. A pair of sprockets 26 are mounted at opposite ends of the shaft 25 in alignment with a pair of sprockets 27 secured to drive shaft 14. Bearings 28 (FIGURE 2) are longitudinally adjustable by a conventional take-up device 29 secured to the side plates of the conveyor unit. Conveyor chains 30 are trained over the corresponding sprockets on shafts 14 and 25. Alternate individual links 31 of the chain are provided with journals 32 upon which rollers 33 are rotatably mounted. Each of the links 31 is provided with an annular shoulder 34 which retains the rollers 33 in lateral position and guides the chains 30 by cooperating with top and bottom angle guide members 35 and 36 suitably secured to the side plates 24.

The conveyor 3 is capable of angular adjustment as a unit about the axis of shaft 14 as viewed in FIGURES 2 and 3. The relative heights of supporting frames 1 and 2 determine the angular slope of the conveyor. As shown in the drawings the fruit is conveyed upwardly by the rotating adjacent rollers and to obtain optimum orientation and alignment it is preferred that the angle of the conveyor to the horizontal be not greater than the angle of repose on the conveyor of the objects to be printed. As a practical matter this angle of repose is approximately 25° for a lemon printing conveyor assembly. Our machine will effectively print a plurality of cross sectionally circular objects whether the conveyor is horizontal or sloped upwardly or downwardly. However, to obtain maximum printing capacity as well as to avoid possible overload at peak periods or alternatively, the necessity for an ancillary controlled feed mechanism, it is preferred that the angle of the conveyor to the horizontal be between 5° and 20° upwardly. Such an angle assures the complete singularization of the fruit prior to its contact with the individual dies.

Referring again to FIGURE 4, the individual rotating rollers 33 of the conveyor unit 3 consist of cylinders 37 of suitable material, such as aluminum, upon which intermediate annular sleeves 38 and a pair of end sleeves 39 are secured. The sleeves are of trapezoidal longitudinal half section and are preferably made of rubber to avoid injury to the lemons. The edges of these sleeves are positioned a distance 40 of from 1½ to 2 inches apart. The angle 41 at which the sleeve 38 projects upwardly from cylinder 37 should be from 25° to 35°. Arcuate annular grooves 42 are formed in each of the cylinders 37 at points midway between the sleeves. The width of the intermediate sleeves 38 is not critical except that this dimension should be not less than that necessary to permit independent retention of lemons within the individual pockets 44 shown in FIGURE 1 formed by any two adjacent rotating rollers 33 without resulting in the contacting or abutment of properly aligned fruit in transversely adjacent pockets.

We have found that while a conveyor directed at an angle to the horizontal and having perfectly cylindrical adjacent rotating rollers will tend to orient small ellipsoidally shaped objects so that their longitudinal axes are parallel to the axes of the rollers, such rollers will not satisfactorily orient larger fruits of this general shape. On the other hand, a conveyor directed at an angle to the horizontal and having adjacent concavely shaped rolls will orient large fruit but will not satisfactorily orient the smaller sizes. We have discovered that the angled shoulders 43 form a roller structure with the cylinders 37 which functions similarly to concave rollers in orienting large fruit. Longitudinally adjacent rollers consequently form pockets 44 in which individual fruits are supported and oriented. In addition, the dimension 40 is sufficient to provide between adjacent sleeves substantially cylindrical longitudinally adjacent rollers for the proper orientation of small sized lemons.

It will be noted from a consideration of FIGURES 1 and 5, that the grooves 42 are in alignment with printing dies 45. These grooves are of arcuate form but not of sufficient width or depth to receive or contact the major surface of the lemons. This groove is, however, of utmost importance since smaller sized lemons will center themselves over the groove in proper transverse alignment for stamping as the rollers rotate and progress along the conveyor. While transverse alignment of large sized lemons is assisted by the presence of the groove 42, such alignment is mainly the result of the magnitude of the angle 41 as well as the distance 40 between adjacent sleeves. The individual rollers 33 are spaced sufficiently close to one another to provide for retention of the smallest size lemons which it is desired to print. Referring further to FIGURE 4, longitudinal roller actuating members 46 retained upon suitable transverse brackets 47 extend beneath and contact cylindrical portions of rollers 33, thus rotating the rolls about journals 32 as the top flight of the conveyor is driven toward the printing end of our machine. Actuating members 46 terminate at a point spaced from the platens so that the rolls are not rotated by these members immediately prior to or during printing. The conveyor structure of our machine thus makes it possible to orient, align and singularize ellipsoidally shaped objects to be printed to a degree not heretofore obtainable by devices of the prior art irrespective of whether our conveyor is positioned horizontally or at an angle upwardly or downwardly from the horizontal.

Securely mounted upon conveyor drive shaft 14 are a plurality of rotary platens 48 (FIGURE 3) having spokes 49 which extend between adjacent rollers and assist in supporting the fruit during the printing thereof. In order to properly perform their supporting function, the spokes are so arranged and of such length as to extend into pockets 44 between the rollers to the circle of revolution defined by the rotation of the axis of each of the rollers about the shaft 14. The width of the spokes is less than the distance between adjacent cylinders 37 but greater than the distance between the sleeves 38. In addition, the spokes are no greater in thickness than the dimension 40. If desired, each spoke may be tipped with rubber 50 or other flexible, resilient material in order to provide a somewhat yielding, supporting surface that will not injure the fruit. The utilization of spoked platens permits adjacent rollers to be spaced no closer together than is necessary to retain the smallest size lemon which it is desired to print. As adjacent rollers progress in their path of revolution about the shaft 14, the lowest position of the largest fruit branded will ordinarily not extend below the circle of revolution defined by the axis of the rollers. In the absence of our platen the smallest size fruit to be printed would extend well below this circle, thus necessitating positioning of the stamping drum closer to the conveyor and resulting in excessive deflection of the die holders when large fruit was in the process of being printed. Our platen thus makes it possible to print lemons with the minimum degree of deflection required of the die holders. In addition, the platen assists greatly in assuring the lemons of a certain, firm but resilient support during printing, and prevents the wedging of smaller fruit between adjacent rollers during printing.

As best seen in FIGURES 3 and 10, the printing drum assembly 4 is composed of shaft 13 and segmental die holders 51 secured on the shaft by retaining bars 52, which are detachably secured to shaft 13 by spring lock assembly 53. The shaft 13 is square in cross section throughout its length except for journal portions 54 at each end, which are journaled in the bearings 7. Secured on shaft 13 at each journal portion are annular pin guide plate 55 and a spring pressure plate 56. These are parallel and have aligned holes 57 and 58 formed therein through which bar retainer pins 59 are longitudinally moveable. These pins each have operating tabs 60 secured thereto which abut pin guide plate 55. Coil springs 61 are compressed between the tabs 60 and spring

pressure plate 56, thus retaining the pins 59 in extended position over the edge of the die holder retaining bars 52. The operating tabs form a convenient finger grip for retracting the pins against the tension of their respective springs. The retaining bars 52 are long strips and, as shown in FIGURE 3, are flanged along their longitudinal edges at an angle from the flat portion of said retaining bars. These edges are in addition bent toward one another to provide inwardly extending flanges 62. The base portion 63 of the retaining bars 52 is flat and abuts against a flat surface portion of the shaft 13. This shaft is provided at an intermediate portion or at its opposite end with a retaining flange 64 on each of the flat portions of the shaft. One end 65 of the bar 52 is retained between the surface of the shaft 13 and the flange 64. It will be apparent that each bar 52 is detachably secured to the flat surfaces of shaft 13 by inserting the tongue 65 beneath the flange 64, pulling, the pin 59 against the force of spring 61 so that its end is almost flush with the pin guide plate 55, abutting the bar 52 against the flat surface of the shaft and releasing the pin 59.

Referring to FIGURE 3, the segmental die holders 51 are constructed of rubber, sponge rubber or other flexible resilient material and are provided with slots into which the flanges 62 fit to removably secure the holders to the retaining bars. The printing dies 45 are wedged or keyed into openings provided in the circumferential portion of the die holder segments. The segments may be provided with cavities 66 of any desired size or shape to provide the requisite flexibility of the segments depending on the nature of the material used in their fabrication.

The stub shafts 11 and 12 rotatably mounted in the bearings 7 are secured to the ribbon tube by circular end plates 67 (FIGURE 9). The ribbon tube assembly consists of a semicylindrical member 68 attached at either end to the end plates 67 and the semi-cylindrical member 69 attached to the member 68 through hinge 70 and the lock mechanism 71 (FIGURE 7) which consists of a lock plate 72 attached to the tube 69 with suitable cap screws 73. The lock plate is securable to semicylindrical member 68 by flat head screws 74.

At each end of the inking ribbon tube is a ribbon drive gear assembly 75 (FIGURE 9) which drives shaft 76 on which ribbon take-up spools 77 are detachably mounted for rotation therewith. This shaft extends from the drive gear assembly to the mid-point of the ribbon tube assembly where it is supported for rotational and longitudinal motion upon a bracket, not shown. This shaft is provided in its end with a slot 78 which receives a mating tongue 79 extending axially from shaft 80 of gear 81, thereby connecting the shaft to gear assembly 75. Shaft 76 is alternately square and round in cross section to permit quick insertion of ribbon take-up spools 77 upon the square shaft portions 82 and quick retraction of them to a freely rotatable position upon the round portions 83 thereof. This shaft is detachably supported in alignment with the gear assembly by the bearing brackets 84 secured to the semicylindrical member 69 by screws 85. Each of these brackets has a slot at one end, the width of which is equal to the diameter of annular shaft grooves 86. The slot extends inwardly to a circular bearing portion. Retaining brackets 87 are secured to the tube by screws 88 and are each provided with a U-shaped opening of sufficient width to receive the shaft. These brackets do not support the shaft but simply retain the take-up spools in a fixed longitudinal position with respect to the inking tube. It will be evident that the shaft is readily detachable by simply moving it longitudinally until annular grooves 86 are in alignment with the slots in bearing brackets 84 and then lifting it out of contact with the brackets. This could accidentally result from vibration during operation of the machine and, therefore, lock plates 89, having semicircular openings in one end, are provided to engage and be retained in annular grooves 90 formed in the shaft. The semicircular lock plate opening 91 is narrower than the diameter 92 of the annular groove, thus insuring retention of the lock plate upon the shaft. This lock plate which is readily detachable is spaced adjacent to one of the brackets 87 to prevent shaft 76 from being accidentally withdrawn from engagement with the shaft 80.

Feed spool brackets 93, having U-shaped openings 94 coinciding in size with the diameter of feed spools 95, are secured to the inner surface of the inking tube so that the axis of spools resting in said brackets are diametrically opposed and parallel to the axis of shaft 76 and take-up spools 77.

These brackets have retaining clips 98, secured thereto by means of cap screws 97, arranged to engage grooves in the feed spools to retain the latter in position. A leaf spring 99 is secured to the end of each feed spool and presses against one of a pair of ribbon aligning plates 100 mounted internally of said brackets upon each feed spool, thus providing frictional resistance to the unwinding of the spool.

As illustrated in FIGURES 3 and 7, inking ribbon 96 is withdrawn from the feed spool 95, inserted through ribbon feed slot 101 (FIGURE 3) bounded by curved flat clips 102 secured to semicylindrical member 68 and 69 on either side of said slot to provide a smooth guide surface for the ribbon edges, wound about the ribbon tube in a clockwise direction, inserted back through slot 101 and attached to take-up spool 77. As shaft 76 rotates in a clockwise direction as shown in FIGURE 7, the inking ribbon 96 is drawn over the outer surface of the ribbon tube and wound upon spool 77, thus constantly renewing the inking ribbon which contacts the dies 45. When the ribbon is completely used, the spools are removed from the ribbon tube assembly and new ribbon is installed.

As shown in FIGURE 8, the ribbon tube is slotted at 103 adjacent to and interiorly of each of the end plates 67. A pawl actuating member 104 extends through the slot and is mounted upon a stub shaft 105 secured to the end plate and is provided with a cam roller 106 rotatably mounted upon a pin 107 at its outermost end. The pawl actuating member 104 has a cam roller arm 108, a spring arm 109 and an intermediate section 110. The cam roller arm is urged against a stop pin 111, secured to the end plate 67 by means of a tension spring 112, which is attached to a pin 113 on the end plate 67 and to spring arm 109. A pawl 115 is pivotally mounted on the intermediate section 110 by means of pivot 114. One end of pawl 115 is maintained in contact with a ratchet wheel 116 by means of a spring 117 secured to the stop pin 111 and to the other end of the pawl. A stop pawl 118, one end of which is maintained in contact with the ratchet 116 by tension spring 119 secured to the other end of the pawl and to pin 113, restrains the ratchet wheel against reverse rotation.

Member 120 is attached to side frames 9 and supports a transverse angle iron 123 to which a cam assembly 121 is bolted. The cam assembly 121 includes an arcuately shaped body member 122 having a flange 124 which supports cam 126 on pivot 125. This cam is extendable or retractable with respect to the path of movement of cam roller 106 by swinging it about pivot 125 by means of a lever 127, mounted upon pivot 128 and having a thumb screw 129 adapted to secure the lever to arcuate body member 122 at varying positions to hold the cam in the selected position.

In the representation of FIGURE 8, the inking ribbon tube rotates in the direction of the arrow 130. The cam assembly 121 is mounted at a distance from the inking ribbon tube that will permit movement of the cam 126 to positions varying from that at which the cam roller will not contact it to positions where the cam roller will be so contacted as to result in the maximum travel of cam roller arm 108. Inasmuch as the extent of movement of ratchet

wheel 116 depends upon the extent of movement of arm 108, it will be seen that by adjusting cam 126 any desired rate of ribbon feed may be selected. As illustrated, the lever 127 is secured to arcuate body portion 122 by the thumb screw 129 at the position which will result in rotation of the ratchet 116 a total distance of one tooth by the pawl 115 and the pawl actuator arm 104.

As shown in FIGURE 9, the ratchet wheel 116 is mounted for rotation upon a journal portion 131 of the shaft 132 of gear 133 secured to the end plate 67 by cap screw 134 and set screw 135. Gear 133 is adjacent to gear 81 and the former is journaled at 136 to permit free rotation of gear 81. A planetary gear 137, engaging both gears 81 and 133, is retained in mesh with each of these gears by being rotatably secured to ratchet 116 and an annular alignment plate 139 by a pin 138. This plate is free to rotate upon hub 140 of gear 81. The ratchet 116 and the alignment plate 139 are further maintained in alignment and secured together by dowel pins and by bolts 141.

When the inking tube assembly is rotated in the direction of the arrow 130 of FIGURE 8 upon the shafts 11 and 12, the cam roller arm will contact the cam once each revolution and will be impelled tangentially in a counterclockwise direction about stub shaft 105, thus causing the pawl 115 to move the ratchet 116 in a clockwise direction. The planetary gear 137, being secured to the ratchet, rotates about and in mesh with the fixed gear 133 and the moveable gear 81. Each of these gears is provided with a different number of gear teeth in order to cause relative motion of one with regard to the other. For example, fixed gear 133 may be provided with forty teeth while the rotatable gear 81 is provided with thirty-nine teeth. The diametral pitch of these gears as well as that of the planetary gear is the same so that the latter gear will be in proper mesh with both the fixed and the moveable gears. It will be apparent that for every complete revolution of planetary gear 137 about the fixed gear 133, the planetary gear will have engaged forty teeth. In order to engage forty teeth of gear 81, this gear must rotate in a counterclockwise direction, opposite to the direction of revolution of the planetary gear. Thus for each revolution of the planetary gear, gear 81 will rotate a distance equal to one tooth. Shaft 76, as well as ribbon take-up spool 77, will rotate in the same direction as gear 81 since the shaft is driven by this gear.

As the take-up spools 77 rotate, they wind the spent inking ribbon upon them and cause the ribbon to be unwound from the spools 95 drawing it over the outer surface of the ribbon tube. The rotation of the take-up spools 77 results in the continuing renewal of inking ribbon 96 thus providing a constant ink supply for the printing dies 45.

It will be noted that the inking ribbon, which is continually fed about the inking tube, is wider than the dies 45. It is possible to greatly extend the period between required changes of ribbon by employing a wide ribbon and reciprocating the inking tube a distance substantially equal to its width. The structure of the ribbon tube reciprocating assembly will be evident from a consideration of FIGURES 1, 5 and 6. This assembly is driven by a pitman 142 having a bearing 143, within which an eccentric 144 is journaled. The eccentric is secured to the die holder shaft 13 by a bolt 145 and a retaining washer 146. As the eccentric 144 rotates with the shaft 13, pitman 142 reciprocates. The pitman is pivotally secured by means of a pin 147 to a V-shaped pawl actuator 148 which is mounted on pivot 149 secured to bracket 150 mounted on side frame 9. A ratchet wheel 151 is also mounted upon pin 149 for rotation by means of pawl 152 pivoted at 153 to the pawl actuator 148 for engagement with the teeth of ratchet 151. One end of a driving rod 155 is eccentrically journaled to the ratchet on pivot 154; the other end is in the form of a yoke 156 pivoted to a ribbon tube shaft thrust bushing 157 by means of pins 158. It will be apparent that upon rotation of the shaft 13 pitman 142 will reciprocate, thus translating motion to the pawl actuating arm. When the pitman moves upwardly, the pawl 152 rides over the top of the teeth of ratchet 151 and when it moves downwardly the pawl engages ratchet teeth rotating ratchet 151 in a clockwise direction as viewed in FIGURE 5, thus causing the ribbon tube to be reciprocated in its bearings 7. A suitable stop-pawl 168 is secured to the frame member and engages the teeth of ratchet 151 to prevent reverse rotation.

As shown in FIGURES 1 and 3, we provide a delivery board 159 for our conveyor. This is secured to the side plates 24 and is provided with a plurality of fingers or guides 160 mounted at positions corresponding with the locations of the sleeves 38 of each individual roller. While these guides assist in assuring that individual aligned pockets such as those indicated by the reference numeral 44 receive only a single fruit, they are not essential to the proper functioning of our conveyor unit. A suitable board 161 is provided to receive printed fruit delivered from the machine. Side rails 169 preferably of wood are secured to side plates 24.

Although die 45 may be constructed of any suitable material such as rubber or other flexible resilient material and may be sold in longitudinal as well as transverse cross section, we have discovered that the desired impression of the mark upon the fruit may be obtained by utilizing the inventive details shown in FIGURE 11 while substantially increasing the operative life of the die and completely avoiding any possibility of rupturing the skin of the lemon.

The die of FIGURE 11, which is generally identified by the reference numeral 162, takes the form of an isosceles trapezoid in transverse section. The face 163 contains the letters or symbols which it is desired to print on the fruit, while the back has a peripheral flange 164 protruding therefrom. This flange permits easy insertion into and retention of the die by the die holders 51 as illustrated for the die 45 in FIGURE 10. A plurality of transverse parallel slits 165 extend through the flange 164 and a centrally located longitudinal slit 167 similarly extends through the flange 164. Slits 165 and slit 167 extend partly into the body portion 166 of the die. The longitudinal and transverse slits combined with the novel shape of our die greatly increase its overall flexibility and compressibility without decreasing the rigidity of the numerals or symbols on its face.

We have also discovered that the flexibility of die 162 can be further increased without decreasing the rigidity of the numerals or symbols by constructing the die in such manner that the indicia and body portion closest to the indicia are made of a harder rubber than the remaining portion of the die. This can be accomplished during the molding process by first inserting a rubber having a Shore hardness of about 70 and filling the remainder of the mold with a rubber having a Shore hardness of about 40 before exerting heat and pressure upon the mold. The resulting die has a soft resilient back and a relatively rigid face, and has a body portion of progressively diminishing rigidity, as the back is reached.

In operation, our printing machine is installed so that a conveyor belt, not shown, will feed lemons to the delivery board and so that dropboard 161 secured adjacent the delivery end of the conveyor directs the printed fruit to a receiving conveyor, a sizer or to other lemon treating apparatus. Upon operation of the motor 6, drive chain 15 rotates the sprocket 17 on the shaft 14, thus rotating sprockets 27 which drive the pair of chains 30 and move the upper run of conveyor rollers toward the printing drum. As these rollers progress they are contacted by a roll actuating member 46, which causes each roller to rotate in a clockwise direction as viewed in FIGURE 3. This rotation permits the retention of but a single fruit within the individual pockets 44 defined by adjacent roll-

ers 33. As previously noted, the rotation and the particular shape of these rollers are responsible for the orientation of the longitudinal axis of each fruit to a position parallel to the axis of the rollers. In addition, the annular channel 42 and the angled shoulders 43 result in the transverse alignment of individual lemons with the dies 45, thus presenting the most gently rounded surface of the lemon to the die for printing. The die holder drum 4 is rotated in a counterclockwise direction in the illustrations of FIGURES 2 and 3 by gear 21 which is driven by gear 20 secured to the shaft 14. Each individual die 45 contacts the inking ribbon at a point diametrically opposed from the point of printing. The inking ribbon tube is rotated in a clockwise direction, as seen in FIGURES 2 and 3, by gear 23 driven by gear 22 secured to the die holder shaft 13.

With each revolution of the inking ribbon tube 5, the cam roller 106 contacts cam 126 to cause rotation of inking ribbon take-up spools 77 as previously described. This ribbon is rotated about the inking ribbon tube 71 in the manner shown in FIGURE 9. As the ribbon is wound upon spools 77, it is drawn over the surface and unwound from the ribbon supply spool 95.

As the ribbon tube 71 rotates about its own axis and as the inking ribbon moves relative to the surface of said tube, the tube reciprocates along its longitudinal axis in the manner set forth hereinabove and as illustrated best in FIGURE 5.

In considering the actual fruit stamping operation, it is most important to consider the relationship of the various drive gears 20, 21, 22 and 23 to each other, to the diameters of the die holder drum and the inking tube, and the vertical distance between the axis of the shaft 14 and the die 45. In order to properly stamp fruit of varying size the stamping drum is positioned from the circle of revolution of the axis of the rollers about the shaft 14, a distance equivalent to the diameter of the smallest size lemon which it is desired to print. The result is that in the printing of the smaller size lemon, the die, though firmly contacting the lemon, is not deflected inwardly toward the shaft 13 against the flexible resistance of the individual die holders 51. To obtain freedom from relative motion of the die with respect to the fruit, we have found that the elevator head gear 20 shown in FIGURE 5 must have a radius equal to the radius of revolution of the axis of the rollers plus the diameter of the average size fruit which it is desired to stamp. This gear engages gear 21 whose radius is equivalent to the radius of the stamping drum less the distance which an average sized fruit deflects the die holder inwardly. Thus during the actual printing of an average sized lemon the die is deflected to a position on a circle of rotation whose radius coincides with the radius of the gear wheel 21. Since the periphery of the gear 20 has the same velocity as the outermost point of the average sized fruit and since the peripheral velocity of gear wheels 20 and 21 are identical, the die 45, during its contact with the fruit, will have the same velocity as the fruit. It will be apparent that for a fruit smaller than the average size, the die will have a velocity slightly greater than that of the fruit, and that for fruit of a size larger than the average, the die will have a velocity slightly less than that of the fruit. This minute variation in the velocity of the fruit and the stamping die is, however, compensated for by the freedom of the individual fruit to roll upon the platen and upon the rollers.

It will thus be evident that the particular construction of our stamping drum permits diametrical adjustment of the individual die holders to firmly contact and print varying sizes of fruit. It will be equally evident that by virtue of the relationship of the radii of the gears 20 and 21 and the spacing between the peripheral surface of the stamping drum and the circle of rotation of the individual rollers about the shaft 14, we have been able to obtain substantially no relative velocity between the printing dies and the fruit to be branded.

A factor of further importance to be considered is the relationship between the radii of gears 22 and 23. It will be seen that the radius of gear wheel 22 is the same as the radius of the circle of rotation of the dies 45, while the radius of gear 23 is the same as the radius of the inking ribbon tube 5. Since the peripheral velocities of gears 22 and 23 and the peripheral velocity of the inking ribbon tube are the same, there will be no relative velocity between the inking ribbon and the dies 45. There will, as a result, be a lessened frictional contact between the dies 45 and the inking ribbon, thus preventing, as much as possible, the wearing down of the inking ribbon and the dies. We have found that relative velocity of the ribbon with respect to the dies can be completely avoided by adjusting the position of engagement of gears 22 and 23 so that one of the dies has just passed its position of contact with the ribbon when cam roller 106 strikes cam face 126. Thus, ribbon 96 will travel over the circumferential surface of the ribbon tube when no die is in contact with it.

While we have exemplified the novel inventive aspects of our printing machine with reference to the problem of printing lemons, it will be apparent that our machine is equally adapted for the impression of brands upon other cross sectionally circular articles and specifically oranges, grapefruit, apples, potatoes, tomatoes, nuts, avocadoes and other fruits and vegetables.

What is claimed is:

1. A printing machine comprising a frame; a conveyor having spaced rotary rollers for orienting objects, a drive shaft and an idler shaft, a plurality of spoked platens secured to said drive shaft, said spokes extending to the circle of revolution of said rollers about said drive shaft; a resilient printing drum rotatably mounted on said frame having a plurality of axially spaced rows of circumferentially spaced printing dies and being spaced from said conveyor a distance equivalent to the diameter of the smallest of a plurality of cross sectionally circular objects of various sizes which it is desired to print; an inking ribbon tube rotatably mounted on said frame in peripheral contact with said printing dies, a plurality of inking ribbons extending over the outer surface of said ribbon tube and spaced upon said tube in positions to contact said axially spaced rows of dies, and drive means for rotating said printing drum and said inking ribbon tube and to actuate said conveyor in unison to deliver said objects to be printed to a position of contact with the inked printing dies, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

2. A printing machine comprising a frame; a flexible resilient printing drum fixed to a shaft rotatably mounted on said frame; a plurality of axially spaced rows of circumferentially spaced printing dies detachably secured to said printing drum; an inking ribbon tube rotatably mounted on said frame in peripheral contact with said printing drum, a plurality of inking ribbons extending circumferentially over the outer surface of said ribbon tube at positions coinciding axially with said axially spaced rows of printing dies; a conveyor assembly mounted on said frame and having a plurality of individual rollers, each roller being substantially circular in cross section, having its axis parallel to the axes of said printing drum and said inking ribbon tube and having a plurality of circumferential arcuate grooves spaced axially therein to coincide with said axially spaced rows of printing dies, each of said rollers further having a plurality of annular sleeves of trapezoidal longitudinal half section spaced intermediately of said plurality of grooves, said rollers being secured at each end to a pair of chains trained over two pairs of longitudinally aligned sprockets secured to a drive shaft and an idler shaft rotatably mounted in said frame, said rollers being spaced apart a distance no greater than the diameter of the smallest object of a plurality of cross sectionally circular objects

of various sizes which are conveyed by said conveyor, a plurality of spoked platens secured to said drive shaft, said spokes extending to the circle defined by the revolution of the axes of said rollers about said drive shaft, said conveyor being spaced from said printing drum a distance no greater than the diameter of the smallest object of a plurality of objects of various sizes which it is desired to print, said conveyor making an angle with the horizontal no greater than the angle of repose of said objects to be printed upon said conveyor, and a drive means for actuating said drive shaft, printing drum and inking ribbon tube in synchronism, said platens being positioned to project intermediate said rollers for supporting objects during contact with said dies.

3. A printing machine comprising a frame; a conveyor having rotary rollers for orienting objects mounted on said frame by a drive shaft and an idler shaft; a resilient printing drum rotatably mounted on said frame having a plurality of axially spaced rows of circumferentially spaced printing dies and being spaced from said conveyor a distance equivalent to the diameter of the smallest of a plurality of cross sectionally circular objects of various sizes which it is desired to print; an inking ribbon tube rotatably mounted on said frame and having a plurality of inking ribbons extending over the outer surface of said ribbon tube in positions to contact said rows of circumferentially spaced dies, a plurality of platens secured to said drive shaft in transverse alignment with said plurality of axially spaced rows of printing dies, each of said platens having a plurality of spokes terminating in object supporting faces, said spokes extending between adjacent rollers of said roller conveyor to points on a circle of revolution of the axes of said rollers about said drive shaft, said printing drum being spaced a distance from the terminal faces of said spokes equal to the diameter of the smallest of said objects it is desired to print, and drive means for rotating said printing drum and said inking ribbon tube and to actuate said conveyor to deliver said objects to be printed to a position of contact with said printing dies, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

4. A printing machine comprising a frame; a rotary roller ellipsoidal object sligning and orienting conveyor having a drive shaft, rollers in said conveyor for orienting objects and an idler shaft, a plurality of spoked platens secured to said drive shaft, said spokes extending to the circle of revolution of said rollers about said drive shaft; a resilient printing drum comprised of a shaft journaled at opposite ends and mounted for rotation on said frame, a pair of parallel spaced annular plates secured to said shaft at each of its ends normal to the axis thereof, each of said pairs of plates having aligned openings, a plurality of retainer pins extending through said openings, said retainer pins having operating tabs secured thereto, said tabs normally abutting the exterior side of the interior plate of said pair of plates, a plurality of coil springs compressed between the interior surface of the external plate and said operating tabs, said printing drum having a plurality of retaining bars, said bars being flanged along their longitudinal edges, a plurality of retaining flanges centrally affixed to said shaft, said bars being detachably secured to said shaft by said retaining pins and by said retaining flanges, a plurality of flexible resilient segmental die holders, said holders having mating grooves receiving the flanged edges of said retaining bar and being detachably secured thereto, a plurality of dies frictionally secured in openings in said holders to provide a plurality of axially spaced rows of circumferentially spaced dies, said printing drum being spaced from said conveyor a distance equal to the diameter of the smallest of a plurality of cross sectionally circular objects of various sizes which it is desired to print; an inking ribbon tube rotatably secured to said frame in contact with said dies, a plurality of inking ribbons extending over the outer surface of said ribbon tube in positions to contact said axially spaced rows of dies, and drive means for rotating said printing drum and said inking ribbon tube and for actuating said conveyor to deliver said objects to be printed to a position of contact with said dies, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

5. A printing machine comprising a frame; a rotary roller orienting and aligning conveyor mounted for relative motion thereto by a drive shaft and idler shaft, rollers in said conveyor for orienting objects, a plurality of spoked platens secured to said drive shaft, said spokes extending to the circle of revolution of said rollers about said shaft; a flexible resilient printing drum rotatably mounted on said frame having a plurality of axially spaced rows of circumferentially spaced printing dies detachably secured thereto and being spaced from said conveyor a distance equal to the diameter of the smallest of a plurality of cross sectionally circular objects of various sizes which it is desired to print; a cylindrical inking ribbon tube rotatably mounted on said frame by means of external stub shafts fixed to circular end plates of said tube, said tube having a slotted section along a portion of its circumference adjacent to and interiorly of each of said end plates, each of said end plates having internally secured thereto a stub shaft, a pawl actuating member mounted thereupon, said actuating member having an arm extending through said slotted section, said arm being provided at its terminal end with a cam roller, said pawl actuating member having secured thereto a pawl, a gear fixedly secured to said end plate and having a first and second journal portion, a ratchet rotatably mounted upon said first journal portion, a freely rotatable gear having a number of teeth differing from the number of teeth in said fixed gear rotatably mounted upon said second journal portion, a planetary gear rotatably secured to said ratchet, said planetary gear being in mesh with said fixed and said rotary gears, a ribbon take up shaft detachably secured to said rotary gear and extending axially therefrom and supported for rotation within said tube upon brackets secured to said tube; a plurality of ribbon take up spools detachably secured to said take up shaft at positions axially of said shaft in transverse alignment with said rows of circumferentially spaced dies, a plurality of ribbon supply spools mounted for rotation upon brackets secured to said ribbon tube, said ribbon supply spools having their axes parallel to and spaced equidistantly from the axis of said take up shaft and being in transverse alignment with said ribbon take up spools, a plurality of rolls of ribbon secured upon each of said supply spools, said ribbons extending through axial slots provided in the circumference of said ribbon tube over the external surface of said tube and back through said slots and secured to said ribbon take up spools, said ribbons being in contacting relationship with said rows of circumferentially spaced dies; a pair of cams secured to said frame at positions adjacent to but spaced radially from said end plates in a position to contact said cam rollers and deflect said pawl actuating arms, and drive means for rotating said ribbon tube and said printing drum and to actuate said conveyor to deliver said objects to be printed to a position of contact with said dies, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

6. A printing machine comprising a frame; a rotary roller ellipsoidal object aligning and orienting conveyor mounted thereon; rollers in said conveyor for orienting objects, a flexible resilient printing drum fixed to a shaft rotatably mounted on said frame, said printing drum having a plurality of axially spaced rows of circumferentially spaced printing dies detachably secured thereto and being spaced from said conveyor a distance equivalent to the diameter of the smallest of a plurality of cross

sectionally circular objects of various sizes which it is desired to print; an inking ribbon tube rotatably mounted on said frame by means of a pair of stub shafts, a plurality of inking ribbons extending over the outer surface of said ribbon tube in positions to contact said axially spaced rows of dies, a thrust bushing journaled to one of said stub shafts, a ratchet rotatably mounted on said frame, a driving rod secured at one of its ends to said bushing and eccentrically mounted at the other of its ends to said ratchet, a pawl actuating member pivotally mounted on said frame, a pawl supported in engagement with said ratchet by one arm of said actuating member, a pitman pivoted at one end to the other arm of said actuating member and eccentrically pivoted at its other end to the end of said printing drum shaft, and means for rotating said printing drum and said inking ribbon tube and actuating said conveyor to deliver said objects to be printed to a position of contact with said printing dies.

7. A printing machine comprising a frame; a flexible resilient printing drum fixed to a shaft rotatably mounted on said frame, said printing drum having a plurality of axially spaced rows of circumferentially spaced printing dies detachably secured thereto; an inking ribbon tube rotatably mounted on said frame in contact with said printing dies, a plurality of inking ribbons extending circumferentially over the outer surface of said tube at positions coinciding axially with said rows of printing dies; a conveyor having rotary rollers for orienting objects mounted on said frame including a drive shaft and an idler shaft, a plurality of spoked platens secured to said drive shaft, the spokes of said platens extending to the circle of revolution of said rollers about said drive shaft, said printing dies being spaced from the circle of rotation of the extremities of said spoked platens a distance equivalent to the diameter of the smallest of a plurality of cross sectionally circular objects of various sizes which it is desired to print; a first gear secured to said drive shaft and having a radius equivalent to the radius of revolution about said shaft of the outermost surface of the average size of said objects; a second gear and a third gear secured to said printing drum shaft, said second gear being in mesh with said first gear, said third gear having a radius equal to the radius of said printing drum; a drive stub shaft fixed to said inking ribbon tube; a fourth gear secured to said drive stub shaft and meshed with said third gear, and means for driving said conveyor drive shaft, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

8. A printing machine comprising a frame; a flexible resilient printing drum fixed to a shaft rotatably mounted on said frame, a plurality of axially spaced rows of circumferentially spaced printing dies secured to said printing drum; an inking ribbon tube rotatably secured to said frame in contact with said printing dies, a plurality of inking ribbons extending circumferentially over the outer surface of said ribbon tube at positions coinciding axially with said axially spaced rows of printing dies; a conveyor assembly mounted on said frame and having a plurality of individual rollers, each roller being substantially circular in cross section having its axis parallel to the axes of said printing drum and said inking ribbon tube and having a plurality of circumferential arcuate grooves spaced axially therein to coincide with said axially spaced rows of printing dies, each of said rollers further having a plurality of annular sleeves of trapezoidal longitudinal half section spaced intermediately of said plurality of grooves, said rollers being secured at each end to a pair of chains trained over two pairs of longitudinally aligned sprockets secured to a drive shaft and an idler shaft rotatably mounted on said frame, said rollers being spaced apart a distance no greater than the diameter of the smallest object of a plurality of cross sectionally circular objects of various sizes which are conveyed by said conveyor; a plurality of platens secured to said drive shaft in transverse alignment with said plurality of axially spaced rows of printing dies, each of said platens having a plurality of spokes terminating in object supporting faces, said spokes extending between adjacent pairs of said rollers to points on a circle of revolution of the axes of said individual rollers about said drive shaft, said printing drum being spaced a distance from the terminal end of said spokes equal to the diameter of the smallest of said objects it is desired to print, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

9. A printing machine comprising a frame; a resilient printing drum comprised of a shaft journaled at opposite ends and mounted for rotation on said frame, a pair of parallel spaced annular plates secured to said shaft at each of its ends normal to the axis thereof, each of said pairs of plates having aligned openings, a plurality of retainer pins extending through said openings, said retainer pins having operating tabs secured thereto, said tabs normally abutting the exterior side of the interior plate of said pair of plates, a plurality of coil springs compressed between the interior surface of the external plate and said operating tabs, said printing drum having a plurality of retaining bars, said bars being flanged along their longitudinal edges, a plurality of retaining flanges centrally affixed to said shaft, said bars being detachably secured to said shaft by said retaining pins and by said retaining flanges, a plurality of flexible resilient segmental die holders, said holders having mating grooves detachably receiving said longitudinally flanged edges of said retaining bars, a plurality of dies frictionally secured in said holders to provide a plurality of axially spaced rows of circumferentially spaced dies; an inking ribbon tube rotatably mounted on said frame, a plurality of inking ribbons extending circumferentially over the outer surface of said ribbon tube in contact with said axially spaced rows of dies; a conveyor assembly mounted on said frame and having a plurality of individual rollers, each roller being substantially circular in cross section, having its axis parallel to the axes of said printing drum and said inking ribbon tube and having a plurality of circumferential arcuate grooves spaced axially thereon to coincide with said axially spaced rows of printing dies, each of said rollers also having a plurality of annular sleeves of trapezoidal longitudinal half section spaced intermediately of said plurality of grooves, said rollers being secured at each end to a pair of chains trained over two pairs of longitudinally aligned sprockets secured to a drive shaft and to an idler shaft rotatably mounted in said frame, said rollers being spaced apart a distance no greater than the diameter of the smallest object of a plurality of cross sectionally circular objects of various sizes which are conveyed by said conveyor, said conveyor having a plurality of spoked platens secured to said drive shaft in transverse alignment with said plurality of circumferentially spaced rows of axially spaced printing dies, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

10. A printing machine comprising a frame; a flexible resilient printing drum fixed to a shaft rotatably mounted on said frame; a plurality of axially spaced rows of circumferentially spaced printing dies secured to said printing drum; a conveyor assembly on said frame and having a plurality of individual rollers, each roller being substantially circular in cross section having its axis parallel to the axis of said printing drum and having a plurality of circumferential arcuate grooves spaced axially thereon to coincide with said axially spaced rows of printing dies, each of said rollers further having a plurality of annular sleeves of trapezoidal longtudinal half section spaced intermediately of said plurality of grooves, said rollers being secured at their ends to chains trained over two pairs of

longitudinally aligned sprockets secured to a drive shaft and an idler shaft rotatably mounted on said frame, said rollers being spaced apart a distance no greater than the diameter of the smallest object of a plurality of cross sectionally circular objects of various sizes which are conveyed by said conveyor; a plurality of spoked platens secured to said drive shaft in transverse alignment with said printing dies, said conveyor being spaced from said printing dies a distance no greater than the diameter of the smallest object of said plurality of objects it is desired to print; a cylindrical inking ribbon tube rotatably mounted on said frame by means of external stub shafts fixed to circular end plates of said tube, said tube having a slotted section along a portion of its circumference adjacent to each of said end plates, each of said end plates having internally secured thereto a stub shaft, a pawl actuating member mounted thereupon, said actuating member having an arm extending through said slotted section and having a cam roller at its terminal end, a pawl pivoted on said pawl actuating member, a gear fixed to each of said end plates and having a first and second journal portion, a ratchet rotatably mounted upon said first journal portion, a freely rotatable gear having a number of teeth differing from the number of teeth in said fixed gear rotatably mounted upon said second journal portion, a planetary gear rotatably mounted on said ratchet, said planetary gear being in mesh with said fixed and said rotary gears, a ribbon take up shaft detachably engaging said rotary gear and extending axially therefrom and supported for rotation within said tube upon brackets secured to said tube, a plurality of ribbon take up spools detachably mounted on said take up shaft at positions axially of said shaft in transverse alignment with said rows of circumferentially spaced dies, a plurality of ribbon supply spools mounted for rotation upon brackets secured to said ribbon tube, said ribbon supply spools having their axes parallel to and spaced equidistantly from the axis of said take up shaft and being in transverse alignment with said ribbon take up spools, a plurality of rolls of ribbon wound upon each of said supply spools, said ribbons extending through axial slots in the circumference of said ribbon tube over the external surface of said ribbon tube and back through said slots and secured to said ribbon take up spools, said ribbons being in contacting relationship with said rows of circumferentially spaced dies; a pair of cams secured to said frame at positions adjacent to but spaced radially from said end plates in positions to contact said cam rollers and deflect said pawl actuating arms, and drive means to rotate said ribbon tube and said printing drum and to actuate said conveyor to deliver said objects to be printed to a position of contact with said dies, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

11. A printing machine comprising a frame; a flexible resilient printing drum fixed to a shaft rotatably mounted on said frame, a plurality of axially spaced rows of circumferentially spaced printing dies secured to said printing drum; a conveyor assembly on said frame and having a plurality of individual rollers, each roller being substantially circular in cross section having its axis parallel to the axis of said printing drum and having a plurality of circumferential arcuate grooves spaced axially therein to coincide with said axially spaced rows of printing dies and having a plurality of annular sleeves of trapezoidal longitudinal half section positioned intermediately of said grooves, said rollers being secured at their ends to chains trained over two pairs of longitudinally aligned sprockets secured to a drive shaft and an idler shaft rotatably mounted in said frame, said rollers being spaced apart a distance no greater than the diameter of the smallest object of a plurality of cross sectionally circular objects of varying sizes which are conveyed by said conveyor, a plurality of spoked platens secured to said drive shaft in transverse alignment with said printing dies, said conveyor being spaced from said printing drum a distance no greater than the diameter of the smallest object of said plurality of objects it is desired to print; an inking ribbon tube rotatably mounted on said frame by a pair of stub shafts, a plurality of inking ribbons extending over the outer surface of said ribbon tube in positions to contact said axially spaced rows of dies, a thrust bushing journaled on one of said stub shafts, a ratchet pivoted on said frame, a driving rod pivoted at one end to said bushing and eccentrically pivoted at its other end to said ratchet, a pawl actuating member pivoted on said frame, a pawl supported in engagement with said ratchet by one arm of said actuating member; a pitman pivoted at one end to the other arm of said actuating member and eccentrically pivoted at its other end to one end of said printing drum shaft and driving means for rotating said printing drum and said inking ribbon tube and actuating said conveyor to deliver said objects to be printed to a position of contact with said printing dies, said platens being positioned to project intermediate said rollers for supporting said objects during tact with said dies.

12. A printing machine comprising a frame; a flexible resilient printing drum fixed to a shaft rotatably mounted on said frame, a plurality of axially spaced rows of circumferentially spaced printing dies detachably secured to said printing drum; an inking ribbon tube rotatably mounted on said frame in contact with said printing dies, a plurality of inking ribbons extending circumferentially over the outer surface of said ribbon tube at positions coinciding axially with said axially spaced rows of printing dies; a conveyor assembly on said frame and having a plurality of individual rollers, each roller being substantially circular in cross section having its axis parallel to the axes of said printing drum and said inking ribbon tube and having a plurality of circumferential arcuate grooves spaced axially thereon to coincide with said axially spaced rows of printing dies, a plurality of annular sleeves of trapezoidal longitudinal half section positioned intermediately of said plurality of grooves, said rollers being secured at their ends to a pair of chains trained over two pairs of longitudinally aligned sprockets secured to a drive shaft and an idler shaft rotatably mounted in said frame, said rollers being spaced apart a distance no greater than the diameter of the smallest object of a plurality of cross sectionally circular objects of various sizes which are conveyed by said conveyor, and a plurality of spoked platens secured to said drive shaft in transverse alignment with said plurality of axially spaced rows of printing dies, the spokes of said platens extending to the circle of revolution of said rollers about said drive shaft, said printing dies being spaced from the circle of rotation of the extremities of said spoked platens a distance equivalent to the diameter of the smallest of a plurality of cross sectionally circular objects of various sizes which it is desired to print; a first gear secured to said drive shaft and having a radius equivalent to the radius of revolution about said shaft of the outermost surface of the average size of said objects to be printed, a second gear and a third gear secured to said printing drum shaft, said second gear being in mesh with said first gear, said third gear having a radius equal to the radius of said printing drum, a drive stub shaft fixed to said inking ribbon tube, a fourth gear secured to said drive stub shaft and being in mesh with said third gear, and drive means for rotating the conveyor drive shaft, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

13. A printing machine comprising a frame; a rotary roller ellipsoidal object aligning and orienting conveyor mounted on said frame by a drive shaft and an idler shaft; rollers in said conveyor for orienting objects, a resilient printing drum comprised of a shaft journaled at opposite ends and mounted for rotation on said frame, a pair of parallel spaced annular plates secured to said shaft at each of its ends normal to the axis thereof, each of said

pairs of plates having aligned openings, a pluarlity of retainer pins extending through said openings, said retainer pins having operating tabs secured thereto, said tabs normally abutting the exterior side of the interior plate of said pair of plates, a plurality of coil springs compressed between the interior surface of the external plate and said operating tabs, said printing drum having a plurality of retaining bars flanged along their longitudinal edges, a plurality of retaining flanges centrally affixed to said shaft, said bars being detachably secured to said shaft by said retaining pins and by said retaining flanges, a plurality of flexible resilient segmental die holders, said holders having grooves detachably receiving said longitudinally flanged edges of said retaining bars, a plurality of dies frictionally secured within openings in said holders to provide a plurality of axially spaced rows of circumferentially spaced dies, said printing drum being spaced from said conveyor a distance equal to the diameter of the smallest of a plurality of cross sectionally circular objects of various sizes which it is desired to print, a plurality of platens secured to said drive shaft in transverse alignment with said plurality of axially spaced rows of dies, each of said platens having a plurality of spokes terminating in object supporting faces, said spokes extending between adjacent rollers to points on the circle of revolution of the axes of said rollers about said drive shaft, said printing drum being spaced a distance from the terminal end of said spokes equal to the diameter of the smallest of said objects it is desired to print; an inking ribbon tube rotatably mounted on said frame in contact with said dies, a plurality of inking ribbons extending over the outer surface of said ribbon tube in positions of contact with said series of circumferentially spaced dies, and means for rotating said printing drum and said inking ribbon tube and for actuating said conveyor to deliver said objects to be printed to a position of contact with said dies, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

14. A printing machine comprising a frame; a flexible resilient printing drum rotatably mounted on said frame, a plurality of axially spaced rows of circumferentially spaced printing dies secured to said drum; an inking ribbon tube rotatably mounted on said frame, a plurality of inking ribbons extending circumferentially over the outer surface of said ribbon tube in contact with said rows of axially spaced printing dies; a rotatary roller conveyor mounted on said frame by a drive shaft and an idler shaft, rollers in said conveyor for orienting objects, and a plurality of platens secured to said drive shaft in transverse alignment with said rows of printing dies, each of said platens having a plurality of spokes terminating in object supporting faces, said spokes extending between adjacent rollers of said roller conveyor to points on the circle of revolution of the axes of said rollers about said drive shaft, said printing drum being spaced from the circle of rotation of the extremities of said spoked platens a distance equivalent to the diameter of the smallest of a plurality of cross sectionally circular objects of various sizes which it is desired to print; a first gear secured to said drive shaft and having a radius equivalent to the radius of revolution about said shaft of the outermost surface of the average size of said objects, a second gear and a third gear secured to said printing drum shaft, said second gear being in mesh with said first gear, said third gear having a radius equal to the radius of said printing drum, a drive shaft fixed to said inking ribbon tube, a fourth gear secured to said drive shaft and being in mesh with said third gear, and means to drive said conveyor shaft, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

15. A printing machine comprising a frame; a rotary roller ellipsoidal object aligning and orienting conveyor mounted on said frame by a drive shaft and an idler shaft; rollers in said conveyor for orienting objects, a resilient printing drum comprised of a shaft journaled at opposite ends and mounted for rotation on said frame, a pair of parallel spaced annular plates secured to said shaft at each of its ends normal to the axis thereof, each of said pairs of plates having aligned openings, a plurality of retainer pins extending through said openings, said retainer pins having operating tabs secured thereto, said tabs normally abutting the exterior side of the interior plate of said pair of plates, a plurality of coil springs compressed between the interior surface of the external plate and said operating tabs, said printing drum having a plurality of retaining bars having longitudinal flanges, a plurality of retaining flanges centrally affixed to said shaft, said bars being detachably secured to said shaft by said retaining pins and by said retaining flanges, a plurality of flexible resilient segmental die holders, said holders having grooves detachably receiving said retaining bar flanges, a plurality of dies frictionally secured in openings in said holders to provide a plurality of axially spaced rows of circumferentially spaced dies, said printing drum being spaced from said conveyor a distance equal to the diameter of the smallest of a plurality of cross sectionally circular objects of various sizes which it is desired to print, a plurality of platens secured to said drive shaft in transverse alignment with said plurality of axially spaced rows of dies, each of said platens having a plurality of spokes terminating in object supporting faces, said spokes extending between adjacent rollers to points on the circle of revolution of the axes of said rollers about said drive shaft, said printing drum being spaced a distance from the terminal end of said spokes equal to the diameter of the smallest of said objects it is desired to print; an inking ribbon tube rotatably mounted on said frame, a plurality of inking ribbons extending over the outer surface of said ribbon tube in positions of contact with said series of circumferentially spaced dies; a first gear secured to said drive shaft and having a radius equivalent to the radius of revolution about said drive shaft of the outermost surface of the average size of said objects, a second gear and a third gear secured to said printing drum shaft, said second gear being in mesh with said first gear, said third gear having a radius equal to the radius of said printing drum, a drive stub shaft fixed to said inking ribbon tube, a fourth gear secured to said drive stub shaft and being in mesh with said third gear, and drive means for rotating the drive shaft of said conveyor, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

16. A printing machine comprising a frame; a rotary roller ellipsoidal object aligning and orienting conveyor mounted thereon by a drive shaft and an idler shaft, rollers in said conveyor for orienting objects, a plurality of spoked platens secured to said drive shaft, said spokes extending to the circle of revolution of said rollers about said shaft; a resilient printing drum comprised of a shaft journaled at opposite ends of said frame, a pair of parallel spaced annular plates secured to said shaft at each of its ends normal to the axis thereof, each of said pairs of plates having aligned openings, a plurality of retainer pins extending through said openings, said retainer pins having operating tabs secured thereto, said tabs normally abutting the exterior side of the interior plate of said pair of plates, a plurality of coil springs compressed between the interior surface of the external plate and said operating tabs, said printing drum having a plurality of flanged retaining bars, a plurality of retaining flanges centrally affixed to said shaft, said bars being detachably secured to said shaft by said retaining pins and by said retaining flanges, a plurality of flexible resilient segmental die holders having grooves detachably receiving the flanges of said retaining bars, a plurality of dies frictionally secured in openings in said quadrantal segments to provide a plurality of axially spaced rows of circumferentially spaced dies, said printing drum being spaced from said

conveyor a distance equal to the diameter of the smallest of a plurality of cross sectionally circular objects of various sizes which it is desired to print; an inking ribbon tube rotatably mounted on said frame adjacent said dies, a plurality of inking ribbons extending over the outer surface of said ribbon tube in positions to contact said axially spaced rows of dies; a first gear secured to said conveyor drive shaft and having a radius equivalent to the radius of revolution about said drive shaft of the outermost surface of the average size of said objects, a second gear and a third gear secured to said printing drum shaft, said second gear being in mesh with said first gear, said third gear having a radius equal to the radius of said printing drum, a drive stub shaft fixed to said inking ribbon tube, a fourth gear secured to said drive stub shaft and being in mesh with said third gear, and means to drive said conveyor drive shaft, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

17. A printing machine comprising a frame; a rotary roller orienting and aligning conveyor mounted thereon by a drive shaft and an idler shaft; rollers in said conveyor for orienting objects, a plurality of spoked platens secured to said drive shaft, said spokes extending to the circle of revolution of said rollers about said shaft; a flexible resilient printing drum rotatably mounted on said frame having a plurality of axially spaced rows of circumferentially spaced printing dies detachably secured thereto and being spaced from said conveyor a distance equal to the diameter of the smallest of a plurality of cross sectionally circular objects of various sizes which it is desired to print; a cylindrical inking ribbon tube rotatably mounted on said frame through external stub shafts fixed to circular end plates of said tube, said tube having a slotted section along a portion of its circumference adjacent to each of said end plates, each of said end plates having secured thereto an internal stub shaft, a pawl actuating member pivoted thereon, said actuating member having an arm extending through said slotted section and provided with a cam roller, a pawl on said pawl actuating member, a gear fixedly secured to each of said end plates and having a first and second journal portion, a ratchet rotatably mounted upon said first journal portion, a freely rotatable gear having a number of teeth differing from the number of teeth in said fixed gear rotatably mounted upon said second journal portion, a planetary gear rotatably mounted on said ratchet, said planetary gear being in mesh with said fixed and said rotary gears, a ribbon take up shaft detachably engaging said rotary gear and extending axially therefrom and supported for rotation within said tube upon brackets secured to said tube, a plurality of ribbon take up spools detachably mounted on said take up shaft at positions axially of said shaft in transverse alignment with said rows of circumferentially spaced dies, a plurality of ribbon supply spools mounted for rotation upon brackets secured to said ribbon tube, said ribbon supply spools having their axes parallel to and spaced equidistantly from the axis of said take up shaft and being in transverse alignment with said ribbon take up spools, said ribbons extending from said supply spools through axial slots provided in the circumference of said ribbon tube over the external surface of said tube and back through said slots to said ribbon take up spools, said ribbons being in contacting relationship with said rows of circumferentially spaced dies; a pair of cams adjustably secured to said frame at positions adjacent to but spaced radially from said end plates a distance sufficient to contact said cam rollers and deflect said pawl actuating arms, a thrust bushing journaled on one of said external stub shafts, a ratchet rotatably mounted on said frame, a driving rod pivoted at one end to said bushing and eccentrically pivoted at the other end to said ratchet; a pawl actuating member pivoted to said frame, a pawl supported in engagement with said ratchet by one arm of said actuating member, a pitman pivoted at one end to the other arm of said actuating member and eccentrically pivoted at its other end to the end of said printing drum shaft, and drive means for rotating said printing drum and said inking ribbon tube and for actuating said conveyor to deliver said objects to be printed to a position of contact with said printing dies, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

18. A printing machine comprising a frame; a rotary roller ellipsoidal object aligning and orienting conveyor mounted thereon by a drive shaft and an idler shaft, rollers in said conveyor for orienting objects, a plurality of spoked platens secured to said drive shaft, said spokes extending to the circle of revolution of said rollers about said shaft; a resilient printing drum comprised of a shaft journaled at opposite ends for rotation on said frame, a pair of parallel spaced annular plates secured to said shaft normal to the axis thereof, said plates having aligned openings, a plurality of retainer pins extending through said openings, said retainer pins having operating tabs secured thereto, said tabs normally abutting the interior side of one plate of said pair, a plurality of coil springs compressed between the interior surface of the other plate and said operating tabs, a plurality of flanged retaining bars, a plurality of retaining flanges affixed to said shaft, said bars being detachably secured to said shaft by said retaining pins and by said retaining flanges, a plurality of flexible resilient segmental die holders having grooves detachably receiving said flanged retaining bars, a plurality of dies frictionally secured in openings in said holders to provide a plurality of axially spaced rows of circumferentially spaced dies, said printing drum being spaced from said conveyor a distance equal to the diameter of the smallest of a plurality of cross sectionally circular objects of varying sizes which it is desired to print; a cylindrical inking ribbon tube rotatably mounted on said frame through external stub shafts fixed to circular end plates of said tube, said tube having a slotted section along a portion of its circumference adjacent to each of said end plates, each of said end plates having secured thereto an internal stub shaft, a pawl actuating member pivoted thereupon, said actuating member having an arm extending through said slotted section, said arm being provided at its terminal end with a cam follower, said pawl actuating member having a pawl, a gear fixedly secured to each of said end plates and having first and second journals, a ratchet rotatably mounted upon said first journal, a freely rotatable gear having a number of teeth differing from the number of teeth in said fixed gear rotatably mounted upon said second journal, a planetary gear rotatably secured to said ratchet, said planetary gear being in mesh with said fixed and said rotary gears, a ribbon take up shaft detachably secured to said rotary gear and extending axially therefrom and supported for rotation on brackets within said tube, a plurality of ribbon take up spools detachably secured to said take up shaft at positions axially of said shaft in transverse alignment with said rows of circumferentially spaced dies, a plurality of ribbon supply spools mounted for rotation upon brackets secured to said ribbon tube, said ribbon supply spools having their axes parallel to and spaced equidistantly from the axis of said take up shaft and being in transverse alignment with said ribbon take up spools, said ribbons extending from the supply spools through axial slots provided in the circumference of said ribbon tube over the external surface of said tube and back through said slots to said ribbon take up spools, said ribbons being in contacting relationship with said rows of circumferentially spaced dies; a pair of cams secured to said frame at positions adjacent to but spaced radially from said end plates a distance sufficient to contact said cam follower and deflect said pawl actuating arms; a thrust bushing journaled on one of said external stub shafts, a ratchet rotatably mounted on said frame, a

driving rod pivoted at one end to said bushing and eccentrically pivoted at its other end to said ratchet, a pawl actuating member pivoted to said frame, a pawl supported in engagement with said ratchet by one arm of said actuating member, a pitman pivoted at one end to the other arm of said actuating member and eccentrically pivoted at its other end to the end of said printing drum shaft, and means for rotating said printing drum and said inking ribbon tube and actuating said conveyor to deliver said objects to be printed to a position of contact with said printing dies, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

19. A printing machine comprising a frame; an orienting and aligning conveyor having rotary rollers for orienting objects mounted thereon; a plurality of spoked platens secured to the drive shaft of said conveyor, said spokes extending to the circle of revolution of said rollers about said shaft; a flexible resilient printing drum rotatably mounted on said frame having a plurality of axially spaced rows of circumferentially spaced printing dies detachably secured thereto and spaced from said conveyor a distance equal to the diameter of the smallest of a plurality of cross sectionally circular objects of various sizes which it is desired to print; an inking ribbon tube mounted for rotation on said frame through exterior stub shafts fixed to circular end plates of said tube, said ribbon tube comprising semicylindrical sections hinged to one another, said ribbon tube being slotted along a portion of its circumference adjacent to each of said end plates, each of said end plates having secured thereto an interior stub shaft upon which is pivoted a pawl actuating member, an arm of which extends through said slotted section, a pawl on said actuating member, said ribbon tube having a ratchet rotatably mounted upon a journaled portion of a gear fixedly secured to said end plate, said fixed gear supporting a rotatable gear having a number of teeth differing from the number of teeth in said fixed gear, said ratchet having a planetary gear rotatably mounted thereon and in mesh with said fixed and said rotary gears, said rotary gear having detachably secured thereto and extending axially therefrom a ribbon take up shaft supported for rotation on brackets within said ribbon tube, said ribbon take up shaft having a plurality of ribbon take up spools detachably secured thereto at positions axially of said shaft in transverse alignment with said rows of circumferentially spaced dies, said ribbon tube having a plurality of ribbon supply spools mounted for rotation upon brackets secured to said ribbon tube, ribbons extending from the supply spools through axial slots in the circumference of said ribbon tube over the external surface of said ribbon tube and back through said slots to said ribbon take up spools, said ribbons being in contacting relationship with said rows of circumferentially spaced dies; a pair of cams secured to said frame at positions adjacent to and radially spaced from said end plates a distance sufficient to contact the arm of said pawl actuating member and deflect the same, a thrust bushing journaled on one of said external stub shafts, a ratchet rotatably mounted on said frame, a driving rod pivoted at one end to said bushing and eccentrically pivoted at its other end to said ratchet, a pawl actuating member pivoted to said frame, a pawl supported in engagement with said ratchet by one arm of said actuating member, a pitman pivoted at one end to the other arm of said actuating member and eccentrically pivoted at its other end to the end of said printing drum shaft, a first gear secured to said drive shaft and having a radius equivalent to the radius of revolution about said shaft of the outermost surface of the average size of said objects, a second gear and a third gear secured to said printing drum shaft, said second gear being in mesh with said first gear, said third gear having a radius equal to the radius of said printing drum, a drive stub shaft fixed to said inking ribbon tube, a fourth gear secured to said drive stub shaft and meshed with said third gear, and means for driving said conveyor drive shaft, said platens being positioned to project intermediate said rollers for supporting said objects during contact with said dies.

20. A machine for printing indicia upon ellipsoidally shaped objects which comprises a flexible, resilient printing drum, a plurality of printing dies secured to said printing drum at positions on the surface of said drum such that said dies form axially spaced rows of circumferentially spaced dies, a reciprocable, rotatable inking tube having a plurality of inking ribbons axially spaced along said inking ribbon tube and contacting each of said plurality of axially spaced rows of dies, each of said inking ribbons being wound on a ribbon supply spool and a ribbon take up spool mounted interiorly of said inking ribbon tube, means responsive to rotation of said tube for extending said ribbons from said supply spools and winding said ribbons upon said take up spools, and conveyor means for orienting the axes of said ellipsoidal objects to be printed with the axes of said printing drum, for aligning said objects transversely with said printing dies and for delivering said objects into contacting relationship with said printing dies, said conveyor means having rollers for orienting objects.

21. A printing drum comprising a shaft provided with journals at opposite ends, a pair of parallel spaced annular plates secured to said shaft normal to the axis thereof, each of said pair of plates having aligned openings, a plurality of retainer pins extending through said openings, said retainer pins having operating tabs secured thereto, said tabs normally abutting the interior side of one plate of said pair of plates, a plurality of coil springs compressed between the interior surface of the other plate and said operating tabs, a plurality of flanged retaining bars, a plurality of retaining flanges affixed to said shaft, said bars being detachably secured to said shaft by said retaining pins and by said retaining flanges, a plurality of flexible resilient segmental die holders having grooves detachably receiving said flanged retaining bars and a plurality of dies frictionally secured within axial rows of circumferentially spaced openings in said holders.

22. A printing drum comprising a cross sectionally square shaft provided with journals at opposite ends; a pair of parallel spaced annular plates secured to said shaft at each of its ends normal to the axis thereof, each of said pairs of plates having aligned openings, a plurality of retainer pins extending through said openings, said retainer pins having operating tabs secured thereto, said tabs normally abutting the exterior side of the interior plate of said pair of plates; a plurality of coil springs compressed between the interior surface of the external plate and said operating tabs, said printing drum having four retaining bars, said bars being flanged along their longitudinal edges to be C-shaped in cross section, four retaining flanges centrally affixed to said shaft, said bars being detachably secured to said square shaft by said retaining pins and by said retaining flanges; a plurality of flexible resilient segmental die holders having grooves detachably receiving said longitudinally flanged edges of said retaining bars, and a plurality of dies frictionally secured within axially spaced rows of circumferentially spaced openings in said holders.

23. A printing machine comprising a frame, a conveyor mounted on said frame, rollers in said conveyor for orienting objects, a rotary flexible resilient printing drum having a plurality of axially spaced rows of circumferentially spaced printing dies secured to said printing drum, a rotary inking ribbon tube having a plurality of inking ribbons originating and terminating within said tube and extending over the outer circumference of said tube, each inking ribbon being in contact with each of said plurality of rows of printing dies, means responsive to rotation of said inking ribbon tube to continuously

progress said inking ribbons about the exterior circumference of said inking ribbon tube and means for rotating said printing drum and inking tube and for actuating said conveyor in synchronism to print objects delivered to said machine.

24. A printing machine comprising a flexible resilient printing drum, a plurality of printing dies secured to said drum in axially spaced rows of circumferentially spaced slots in said printing drum, means for contacting each of said axially spaced rows of printing dies with a constantly renewed inking ribbon, a rotary roller aligning and orienting conveyor disposed to deliver cross sectionally circular objects to be printed to said printing dies, rollers in said conveyor for orienting objects, means in combination with said conveyor for supporting said objects during the time of contact of said objects by said printing dies, and means for actuating said printing drum, contacting means and conveyor.

25. A printing machine comprising a flexible, resilient printing drum having a plurality of axially spaced rows of circumferentially spaced printing dies, an ellipsoidal object orienting and aligning conveyor, rollers in said conveyor for orienting objects, said conveyor being spaced from said dies a distance equal to the diameter of the smallest sized object of a plurality of ellipsoidal objects of various sizes which it is desired to print; a reciprocable, rotatable inking ribbon tube having a plurality of renewably feedable inking ribbons spaced axially therealong in contact with said axially spaced rows of circumferentially spaced printing dies and means for actuating said conveyor to deliver said objects to be printed to positions of contact with said printing dies and for rotating said dies about the axis of said printing drum at a velocity at the point of contact with the surface of the average sized of said plurality of ellipsoidally shaped objects equal to the velocity of the surface of said average sized objects.

26. A printing machine comprising a rotatable roller conveyor having a plurality of equally spaced transverse rollers; a cylindrical printing drum whose axis is fixed with respect to said conveyor, said printing drum being constructed of flexible resilient yielding material; a plurality of printing dies secured to said printing drum in axial rows of circumferentially spaced individual dies; means cooperating with adjacent individual rollers for supporting an ellipsoidal object during the period of contact of one of said printing dies with said object, said means and said rollers being in object supporting relationship as each printing die reaches its position of closest travel thereto; means for inking said printing dies, and means for actuating said conveyor to deliver ellipsoidal objects to a position of contact with said printing dies and to rotate said rollers to orient the major axes of said ellipsoidal objects in parallelism with the axes of said rollers.

References Cited in the file of this patent

UNITED STATES PATENTS

626,284	Lyons	June 6, 1899
972,906	Pancoast	Oct. 18, 1910
1,132,623	Schute	Mar. 23, 1915
1,191,820	Pannier	July 18, 1916
1,193,297	Porcher	Aug. 1, 1916
1,283,579	Smith	Nov. 5, 1918
1,284,031	Ahlburg	Nov. 5, 1918
1,369,570	Stiles	Feb. 22, 1921
1,400,124	Wolverton	Dec. 13, 1921
1,611,679	Rees	Dec. 21, 1926
1,687,016	Green	Oct. 9, 1928
1,711,715	Baumgart	May 7, 1929
1,715,893	Bertinetti et al.	June 4, 1929
1,992,347	Bartlett	Jan. 2, 1934
2,040,525	Mumma et al.	May 12, 1936
2,070,980	Wyland	Feb. 16, 1937
2,134,041	Hamm	Oct. 25, 1938
2,296,645	Marsden	Sept. 22, 1942
2,335,679	Kennedy et al.	Nov. 30, 1943
2,424,006	Verrinder	July 15, 1947
2,488,230	Page	Nov. 15, 1949
2,537,397	Collender	Jan. 9, 1951
2,631,533	Schreiner	Mar. 17, 1953
2,713,934	Amori	July 26, 1955

FOREIGN PATENTS

153,133	Great Britain	Nov. 4, 1920