

### [54] METHOD OF SORTING PARTICULATE ARTICLES

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233/47 R

[51] Int. Cl. .... **B07c 5/00**

[58] Field of Search ..... 221/7, 169; 198/33 AA; 209/60,  
209/199, 74, 73, 86; 233/46, 47 R, 27, 20 A

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### [57] ABSTRACT

Method of sorting, including feeding, orienting and counting, particulate articles such as coins, shells, candy, pills and the like, wherein the articles are placed upon a rotating inner plane and centrifugally discharged through a peripheral gauging aperture defined at the edges of a rotating inner plane. The peripheral aperture is defined by a pair of top and bottom outer gauging rings rotated at speeds similar to or at variance with the rotating inner plane according to the character of the articles being counted. Also, the size of the gauging aperture may be varied by vertical adjustment of the top outer ring to accommodate centrifugal discharge articles of varying dimension. The discharge articles may be guided tangentially and single file past a conventional photo electric or similar counting device. The rotating inner plane may have a horizontal surface, alternately a concave, convex or contour profile.

**20 Claims, 6 Drawing Figures**

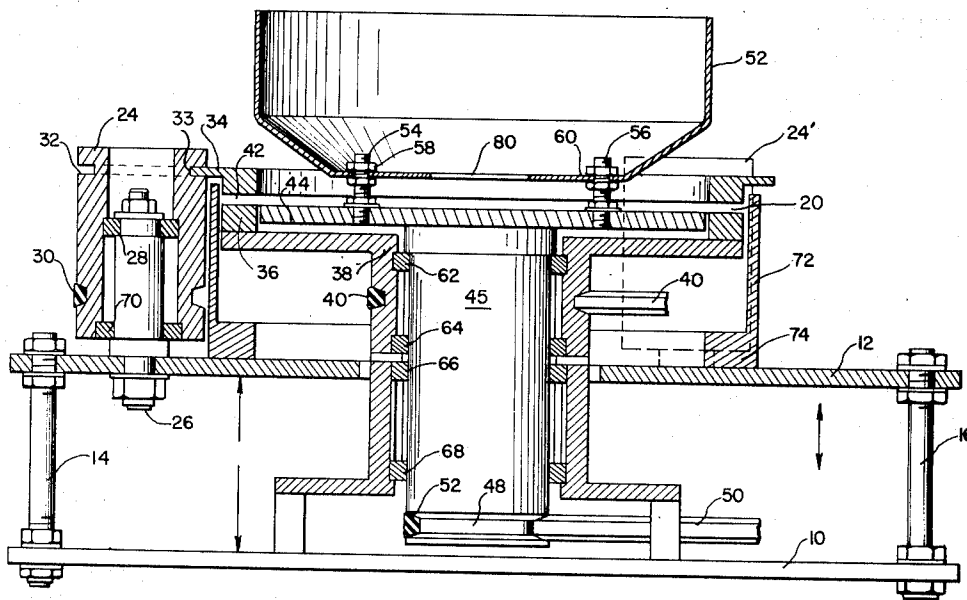
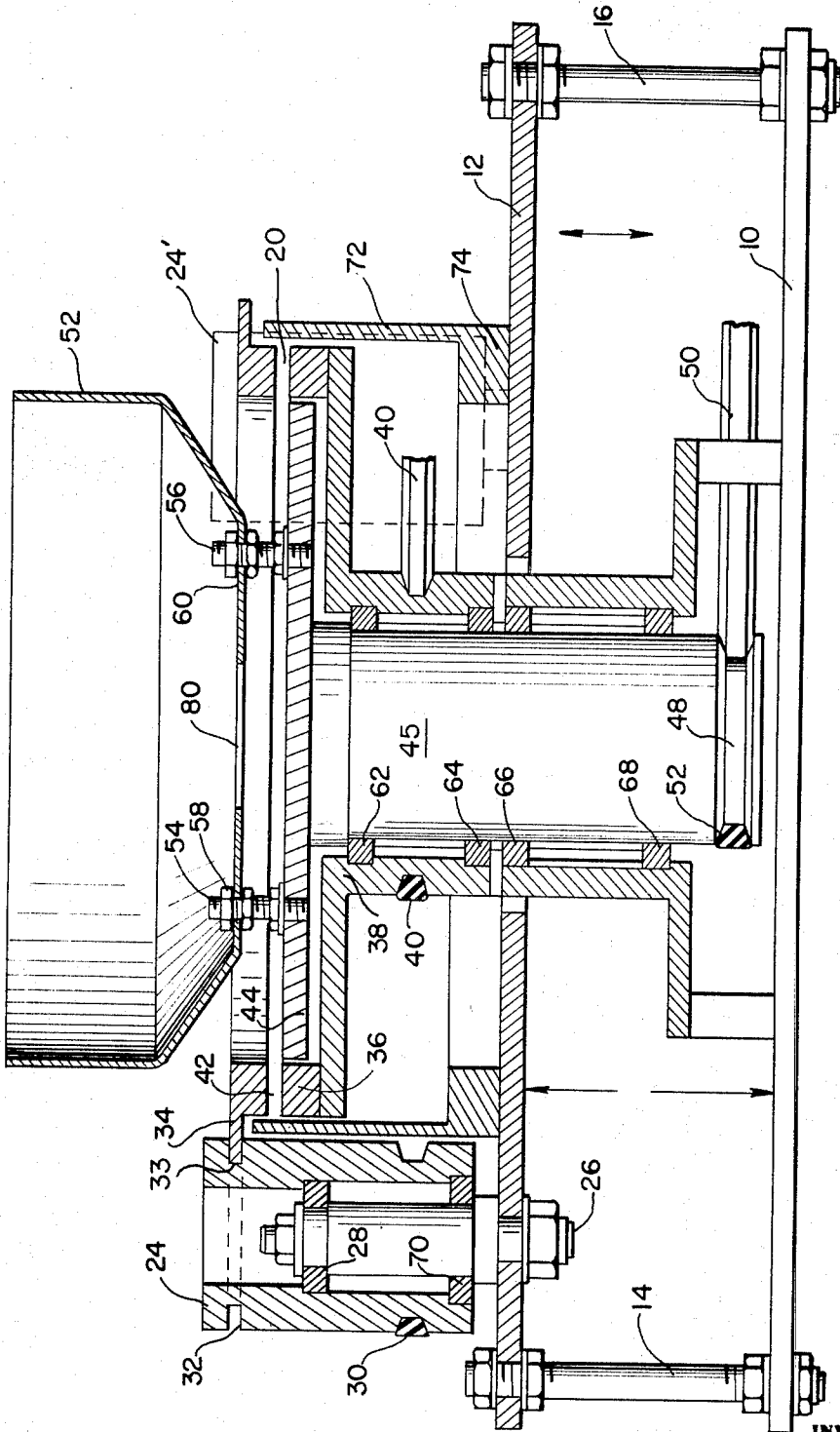


FIG. 1



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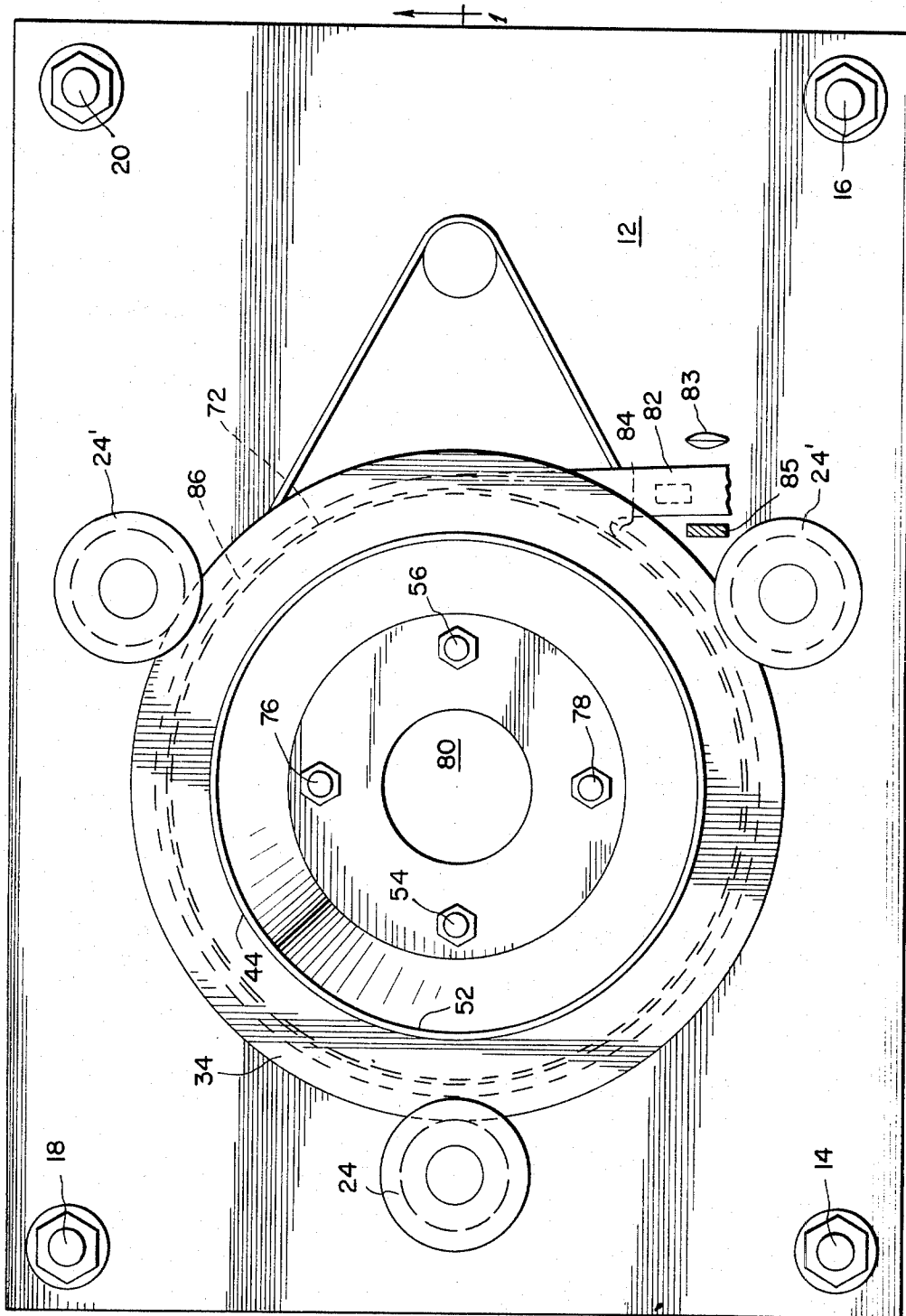


FIG. 2

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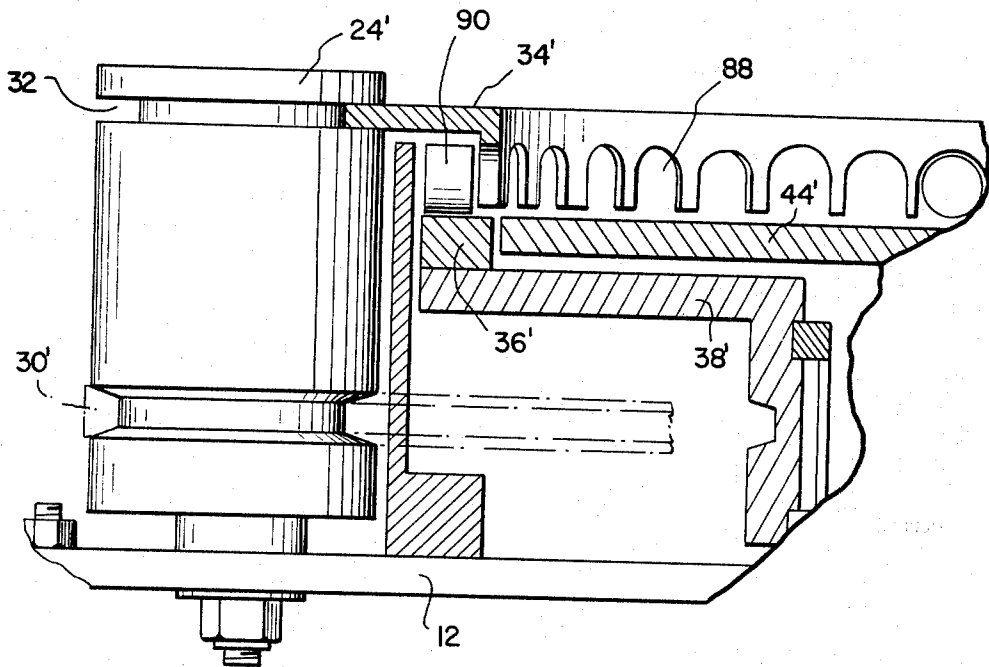


FIG. 3

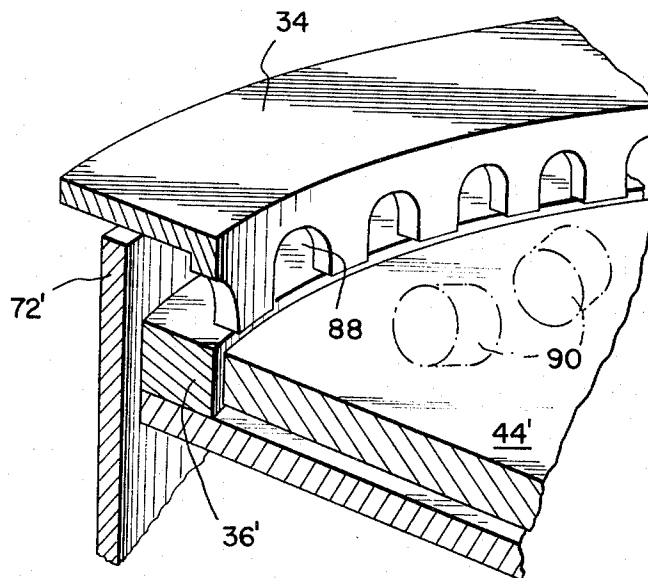


FIG. 4

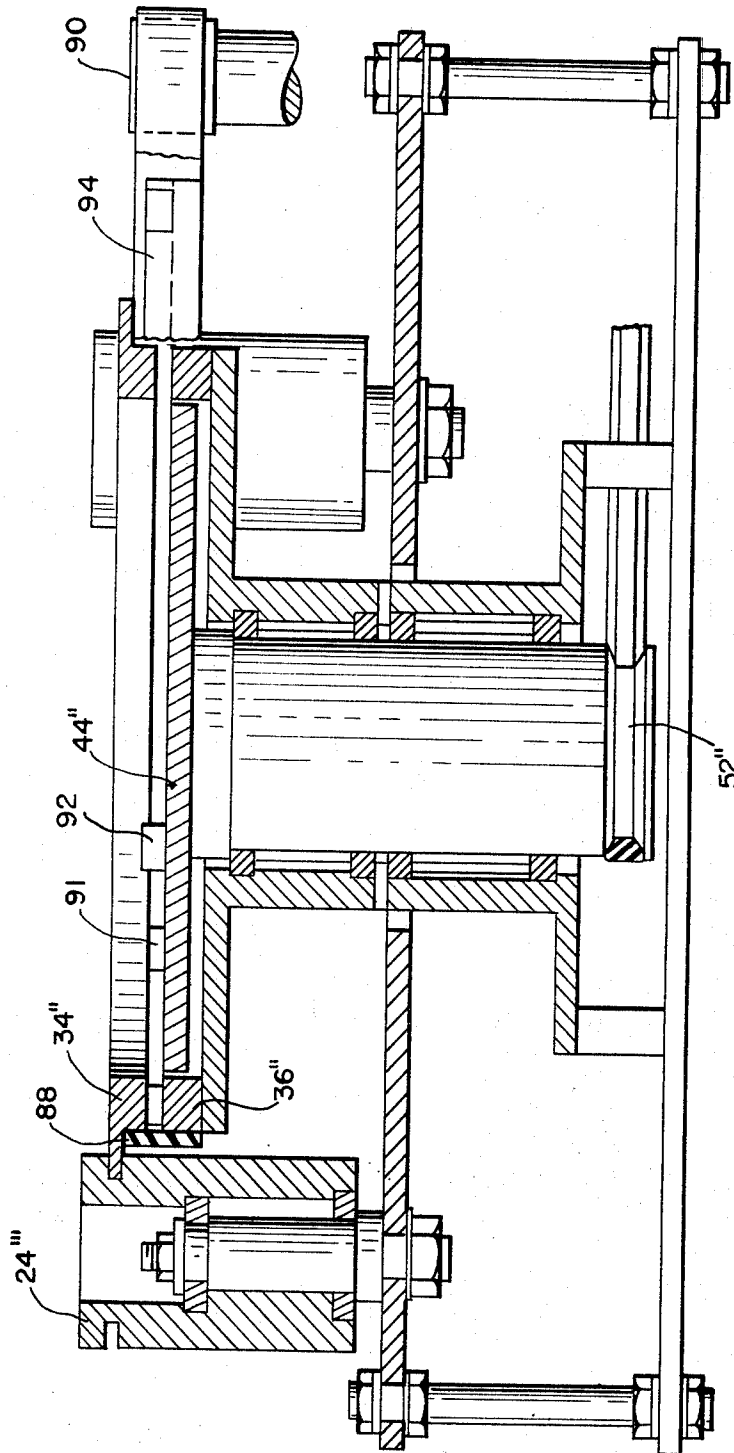
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FIG. 5



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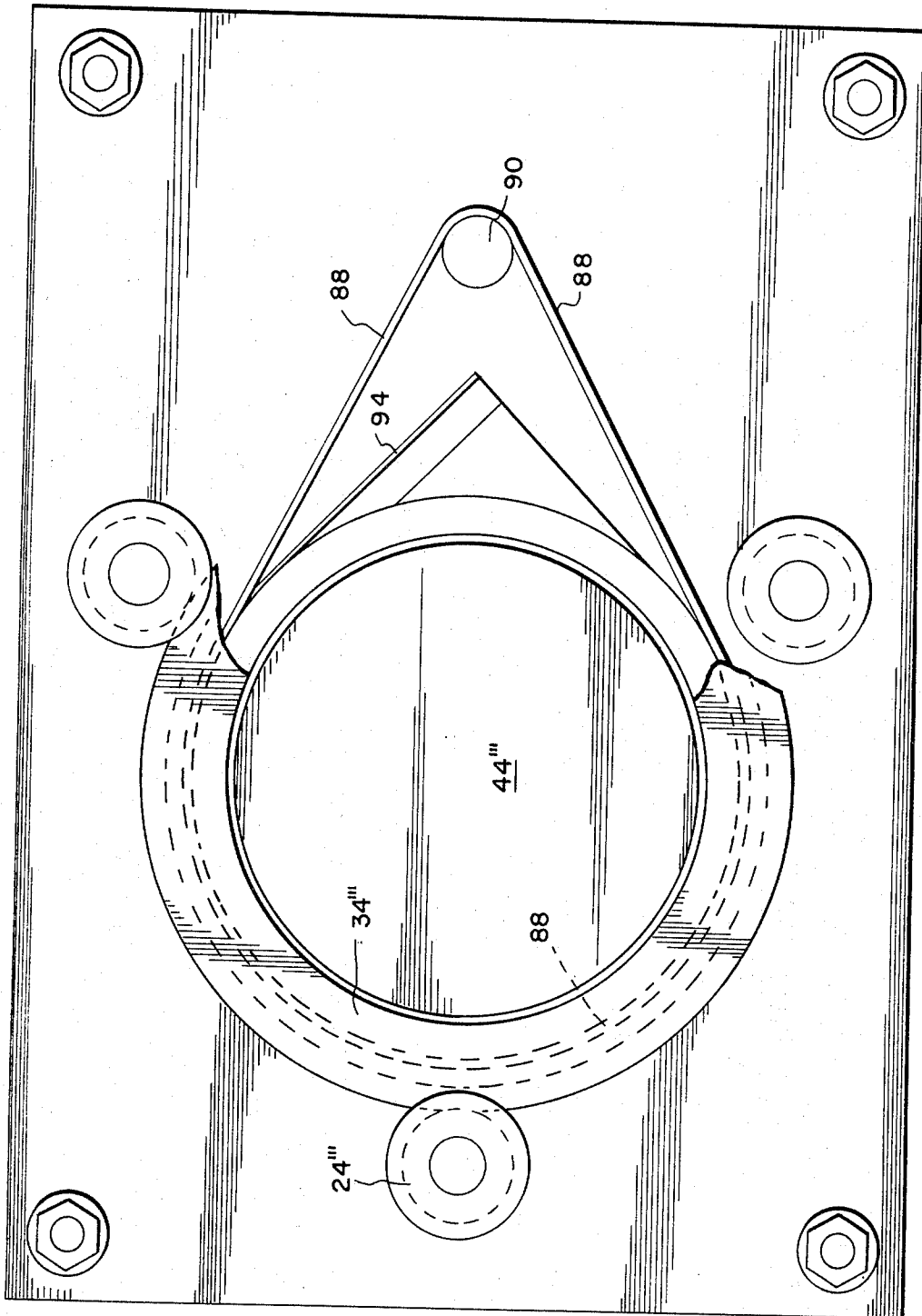


FIG. 6

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## METHOD OF SORTING PARTICULATE ARTICLES

## BACKGROUND OF THE INVENTION

## 1. Field of the Invention

Increasing attention is being given to methods for sorting particulate matter such as coins, shells, pills, and the like. Recent inventors have evolved a plurality of rotating devices which centrifugally discharge articles to be counted from the edges of the rotating plane. Traditionally, centrifugally discharged articles are forced through a stationary exit aperture and thence counted, as they are tangentially ejected. A primary shortcoming of utilizing stationary exit apertures is the tendency of such devices to become jammed with the article, necessitating shutdown for clearing of the aperture in order to continue counting.

## 2. Description of the Prior Art

2,632,588	Hoar
2,763,108	Garrett
3,063,596	d'Autherville
3,170,627	Pearson
3,215,310	Hurst
3,253,604	Read
3,266,664	Pearson
3,368,713	Hurst

## SUMMARY OF THE INVENTION

According to applicant's method the articles being fed and oriented are centrifugally discharged; through an aperture defined by a rotating top gauging ring and a rotating lower outer support ring. Since the gauging ring and support ring are rotating simultaneously with a rotating, inner circular plane, jamming during centrifugal discharge is avoided. Also, the inner plane, gauging ring and outer ring rotating speeds may be varied to effect centrifugal discharge, accommodated to the gravitational characteristics or mass configuration of the articles being counted. D'Autherville suggest inclining the rotating discs so as to affect a measure of control. However, his discharge gates are stationary and, it is submitted, subject to jamming.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a vertical sectional view of a proposed form of the apparatus showing a feeding hopper mounted upon a rotating inner disc, adjacent with the outer rotating top gauging ring and outer rotating lower support ring;

FIG. 2 is a top plan thereof;

FIG. 3 is a fragmentary vertical section of a modified gauging ring which has curvate apertures in the lower surface of its vertical wall, configured as the cross-section of the articles being counted;

FIG. 4 is a fragmentary perspective, slightly enlarged, showing the feeding of round articles such as pills through the curvate apertures in the gauging ring;

FIG. 5 is a fragmentary vertical section of a modified method of counting, wherein the top gauging ring and lower support ring discs are rotated simultaneously by means of a single peripheral belt; and

FIG. 6 is a top plan thereof.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. 1 there is illustrated a device for counting particulate articles according to the present method and including a baseplate 10 and an intermediate plate 12 secured to each other by a plurality of threaded bolts 14, 16, 18 and 20 having suitable washer and knot elements.

Inner rotating discharge plate 44 is mounted upon hub 45 which is seated in bearings 62, 64, 66, 68 and driven rotatably by means of belt 50. An outer support ring 36 is supported upon rotating cradle 38, which is driven by means of belt 40 at a speed identical to the rate of rotation of discharge plate 44 or variant therewith. Gauging ring 34 is supported above outer discharge ring 36 by means of a plurality of drive pulleys 24 including groove 32, engaging the edge 33 of gauging ring 34.

Pulley 24 is driven by the belt 30 and may be supported upon shaft 28 having bearings 28 and 70. The belt 30 may be used to drive pulley 24 at speeds consistent with belt 40 and 50 or at variance therewith, according to the gravitational characteristics or configuration of the articles being counted. As illustrated in FIG. 1, there is a stationary outer baffle 72, supported upon base 74, resting upon plate 12, and extending vertically so as to overlap aperture 82 defined between gauging ring 34 and discharge plate 36.

As illustrated in FIG. 2, plate 72 includes at one side tangential slot 82 defined by outer edge 86 and rounded inner shoulder 84. As will be apparent, articles centrifugally discharged through aperture 82 are thrown through slot 82 which may be horizontal, alternatively inclined downwardly or upwardly adjacent a photocell or similar counting device 83-85.

In FIGS. 3 and 4 there is illustrated variant gauging ring having curvate apertures 88 in the lower face of the inner wall of the gauging ring. Round articles, such as pills 90 are admitted through the apertures 88, only as they are aligned in the desired vertical position, which may be the position selected for counting by photocell, and packaging or the like.

In FIGS. 5 and 6 there is illustrated a further modification of a suggested counting apparatus wherein the outer gauging ring 34' and the lower discharge ring 36'' are rotated at identical speeds by means of an outer belt 88 abutting the periphery of both rings and extending around drive pulley 90. The articles being counted, 91 are admitted through the discharge aperture only when they are on their sides conversely, article 92 is not centrifugally discharged, since it is vertically upright. As will be apparent, the height of the gauging ring with respect to the outer support ring in all modifications of the invention may be varied by adjustment of plate 12 upon thread bolts 14, 16, 18 and 20.

We claim:

1. Method of sorting particulate articles comprising:
  - a. centrifugally distributing said articles upon a rotating inner plane;
  - b. defining a rotating exit at the periphery of said rotating inner plane by:
    - i. rotating a circular top ring as a gauging ring, and
    - ii. rotating a circular lower ring as a support ring;
  - c. gauging centrifugal discharge of said articles through said exit; and
  - d. tangentially guiding said articles away from said plane, sequentially of gauging.
2. Method of sorting particulate articles as in claim 1, wherein said rotating plane is circular.
3. Method of sorting particulate articles as in claim 2, including:
  - a. varying gauging of said articles by vertical adjustment of said top gauging ring with respect to said lower rotating outer support ring.
4. Method of sorting particulate articles as in claim 2, including:
  - a. varying the speed of rotating said top gauging ring with respect to the speed of rotating of said lower support ring.
5. Method of sorting particulate articles as in claim 2, including:
  - a. varying the speeds of rotating said gauging ring and said lower support ring with respect to the speed of rotating of said rotating plane.
6. Method of sorting particulate articles as in claim 2, including:
  - a. varying the speed of rotating of said lower support ring with respect to the speed of rotating said gauging ring.
7. Method of sorting particulate articles as in claim 3, wherein said gauging ring includes an inner wall vertically extending above said horizontal exit and said rotating plane.
8. Method of sorting particulate articles as in claim 7, said inner wall including a plurality of apertures defined in its lower edge and configured similarly to the cross section of articles being counted.

9. Method of sorting particulate articles as in claim 3, including tilting the axis of said rotating plane, said gauging ring and said outer ring during sorting.

10. Method of sorting particulate articles as in claim 4, including:

a. feeding of said articles on to said rotating plane by hopper means.

11. Method of sorting particulate articles as in claim 4, including:

a. feeding of said articles on to said rotating plane by a hopper means secured to said rotating plane.

12. Method of sorting particulate articles as in claim 3, wherein said tangentially guiding of said articles is by means of a circular baffle and a tangential discharge chute.

13. Method of sorting particulate articles as in claim 3, including simultaneously rotating said gauging ring and said lower support ring via a belt means engaging their outer periphery.

14. Method of sorting particulate articles as in claim 2,

wherein said rotating of said circular lower ring is aligned horizontally with rotating of said inner plane.

15. Method of sorting particulate articles as in claim 1, wherein said rotating plane has a horizontal profile.

16. Method of sorting particulate articles as in claim 1, wherein said rotating plane has a concave profile.

17. Method of sorting particulate articles as in claim 1, wherein said rotating plane has a convex profile.

18. Method of sorting particulate articles as in claim 1, including guiding of said article upwardly from said rotating plane.

19. Method of sorting particulate articles as in claim 1, wherein including guiding of said article downwardly from said rotating plane.

20. Method of sorting particulate articles as in claim 1, wherein including guiding of said article horizontally from said rotating plane.

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