

- [54] **APPARATUS FOR SORTING PARTICULATE ARTICLES**
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- [73] Assignee: **Hoppmann Corporation**, Springfield, Va.
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Related U.S. Application Data

- [63] Continuation-in-part of Ser. No. 135,225, April 19, 1971, Pat. No. 3,669,260.
- [52] U.S. Cl.**209/73, 209/86, 221/7, 221/169, 233/47 R**
- [51] Int. Cl.**B07c 5/00**
- [58] Field of Search**221/7, 169; 209/60, 199, 74, 209/73, 86; 198/33 AA; 233/46, 47 R, 27, 20 A**

[56] **References Cited**

UNITED STATES PATENTS

3,368,713	2/1968	Hurst et al.221/7
3,266,664	8/1966	Pearson et al.221/7
3,063,596	11/1962	D'Autherville221/7

2,527,174 10/1950 Bowman.....209/86 X

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Assistant Examiner—Gene A. Church
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[57] **ABSTRACT**

Apparatus for 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 discharged 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.

13 Claims, 8 Drawing Figures

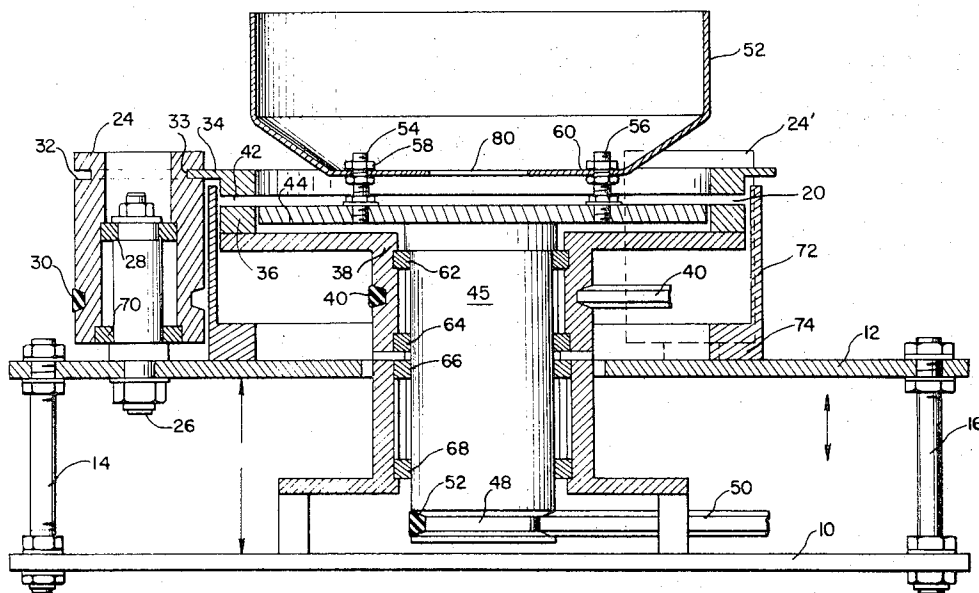
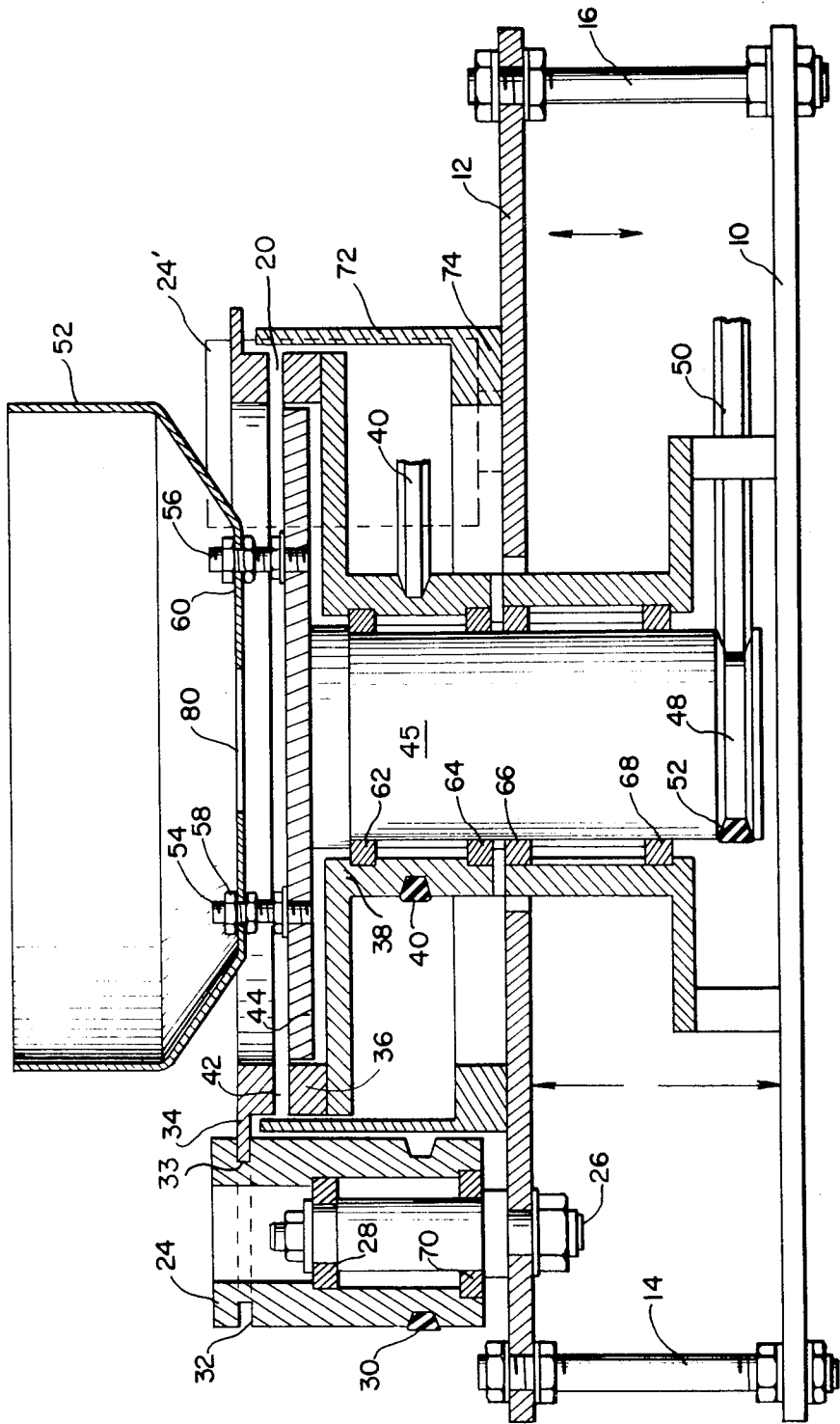


FIG. 1



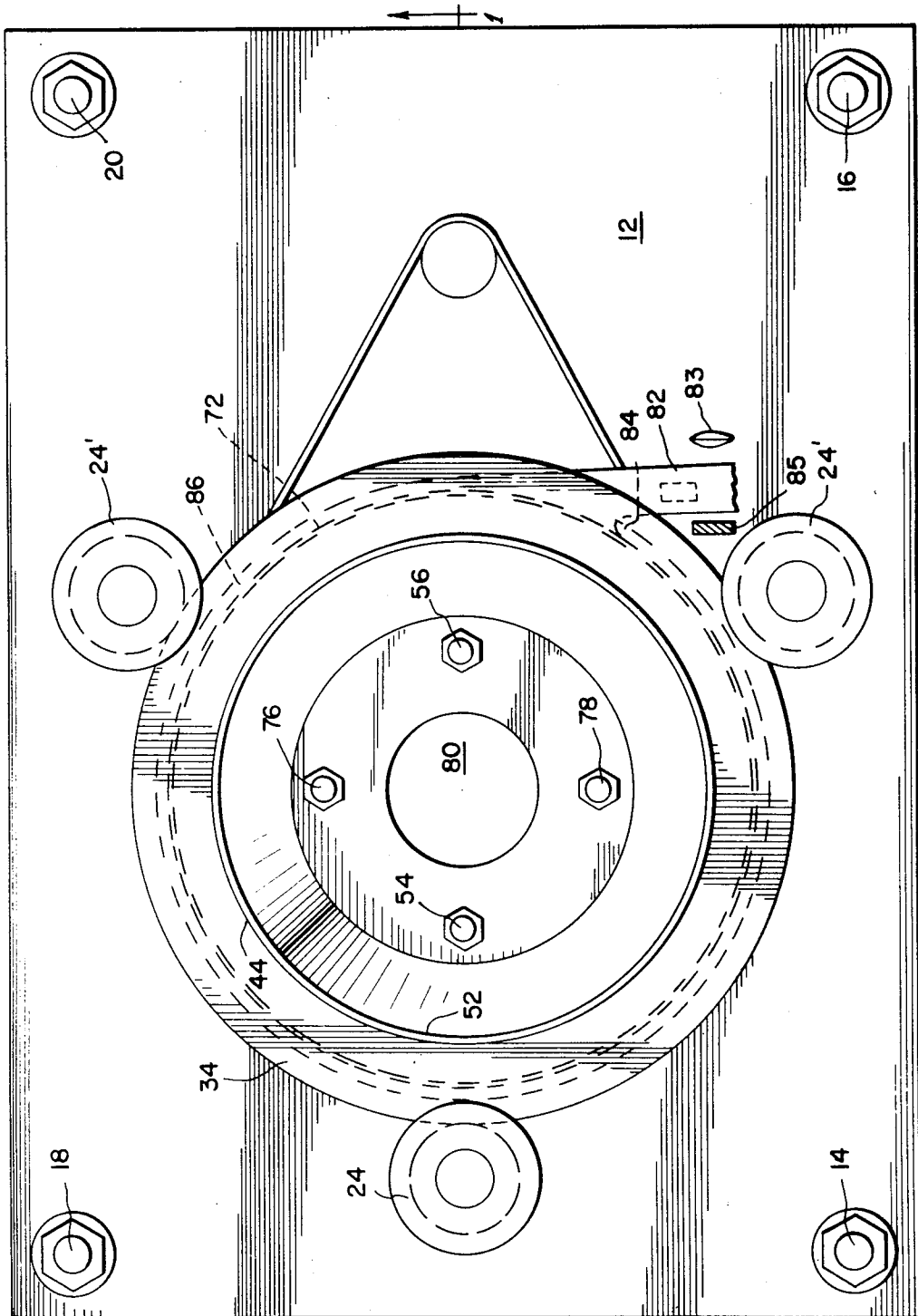


FIG. 2

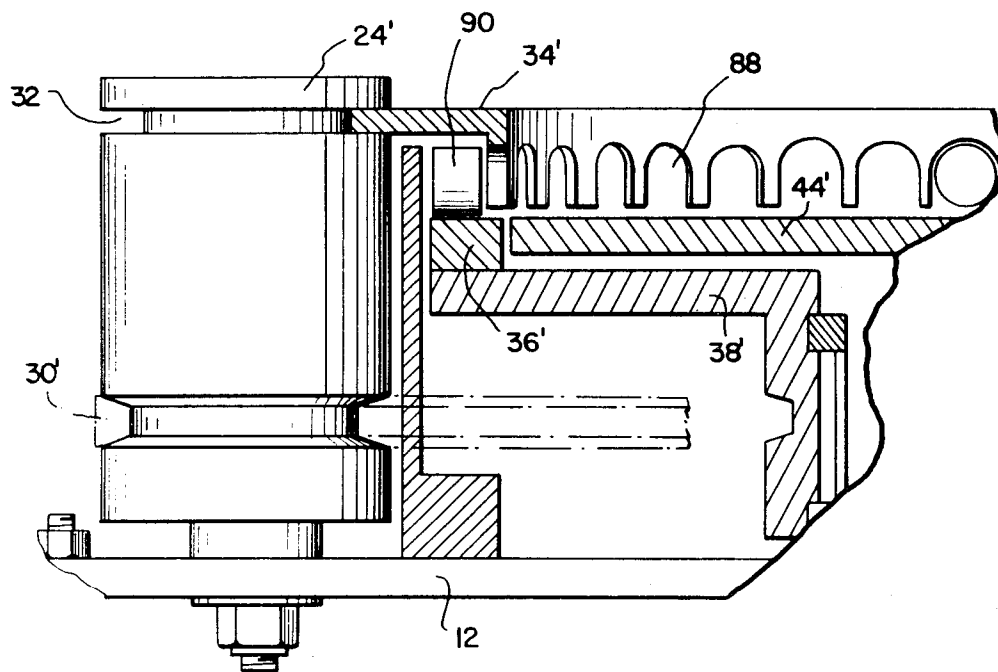


FIG. 3

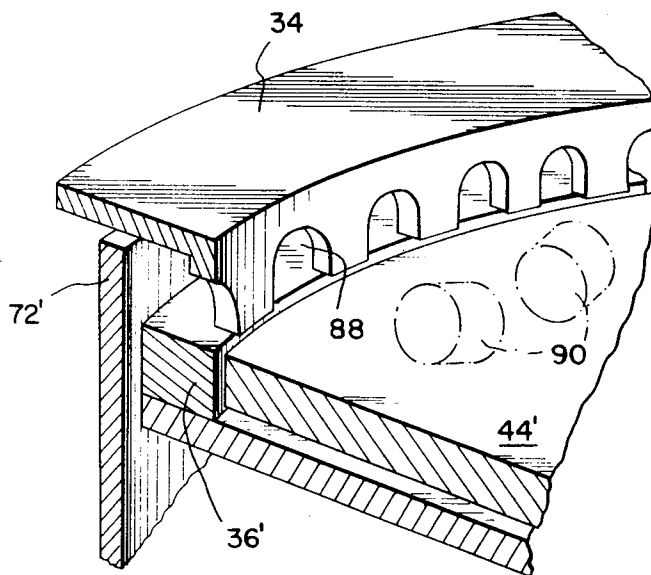


FIG. 4

FIG. 5

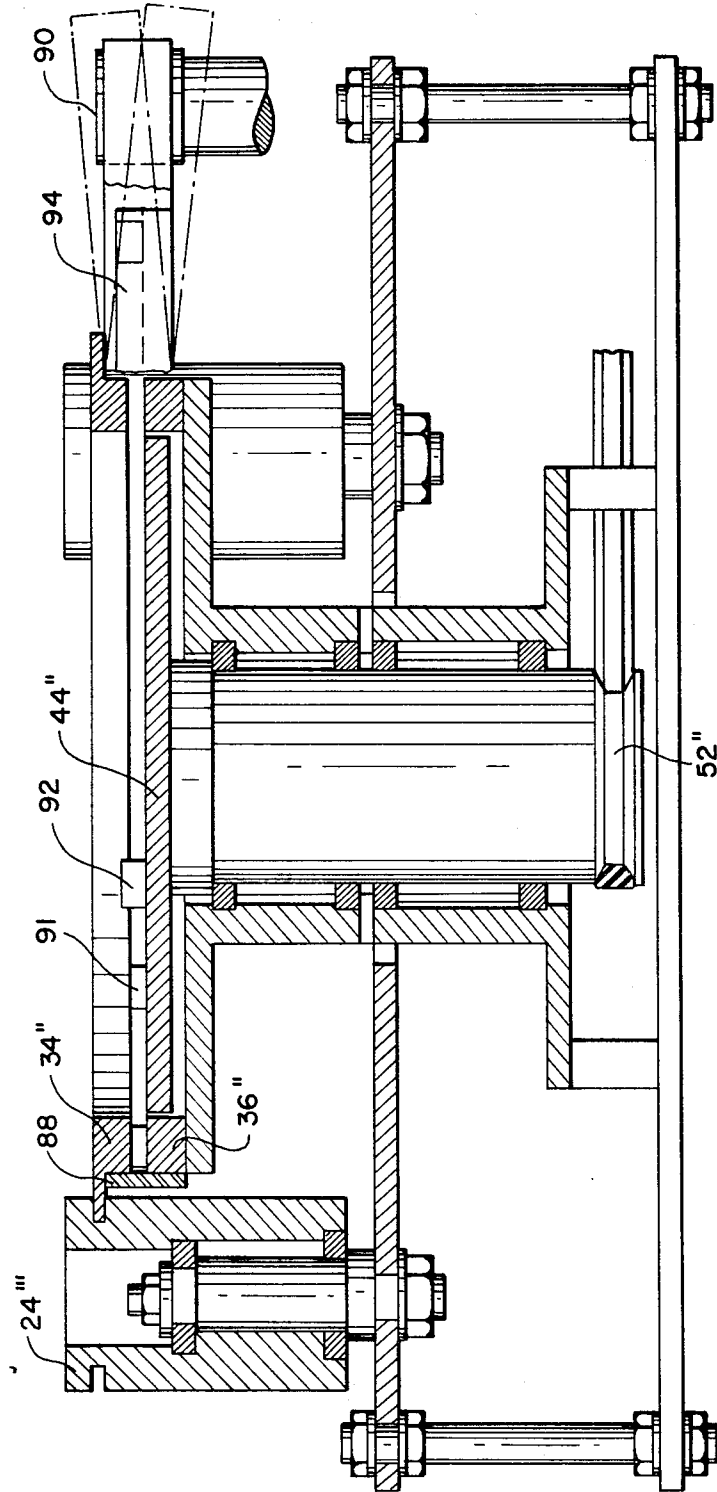


FIG. 8

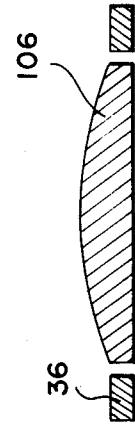
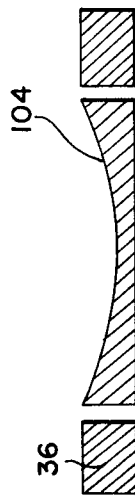


FIG. 7



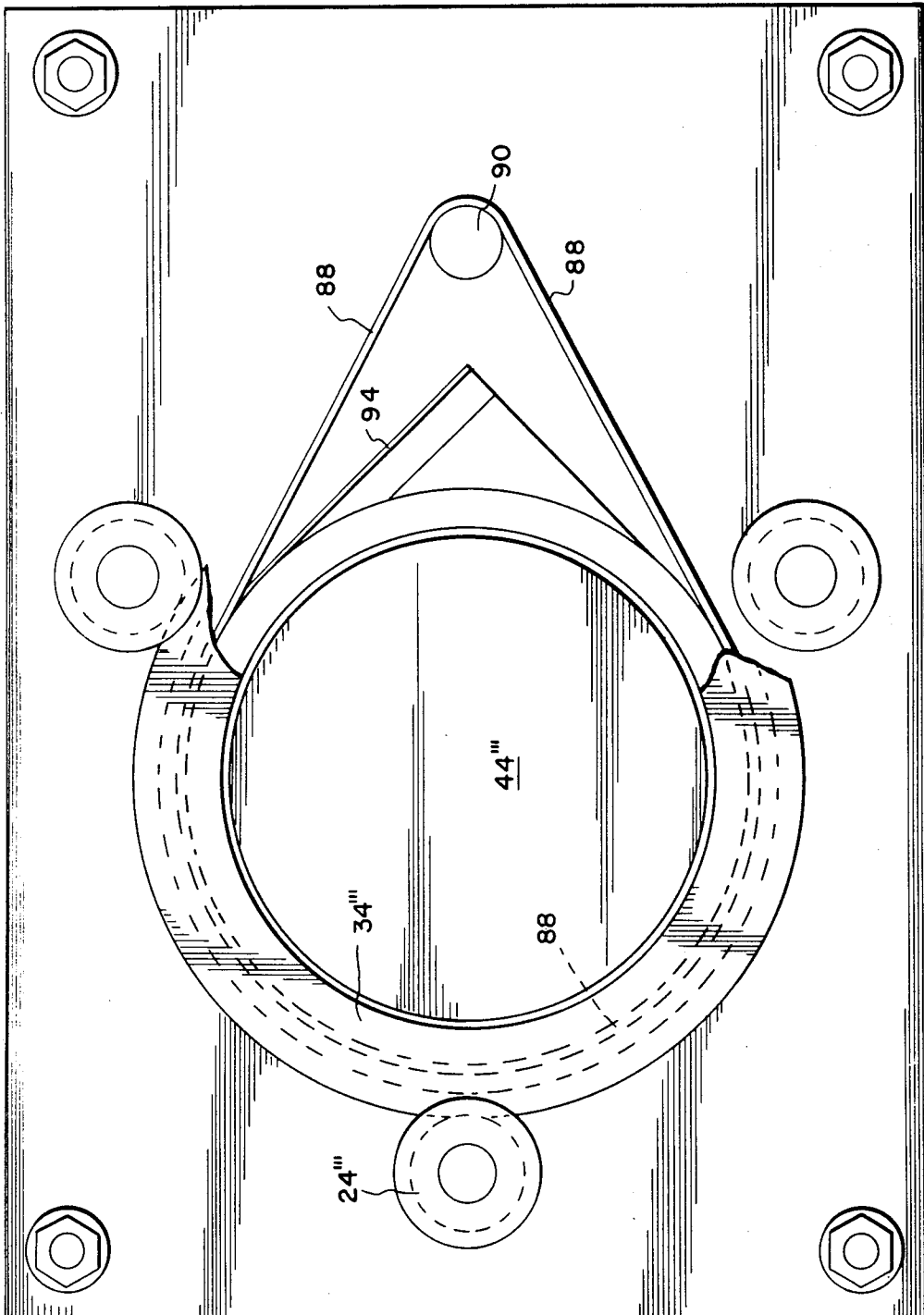


FIG. 6

APPARATUS FOR SORTING PARTICULATE ARTICLES

CROSS REFERENCES TO RELATED APPLICATIONS

A continuation-in-part of applicants' earlier filed application, Ser. No. 135,225, filed Apr. 19, 1971, now U.S. Pat. No. 3,669,260, and entitled dMETHOD OF SORTING PARTICULATE ARTICLES.

BACKGROUND OF THE INVENTION

1. Field of the Invention

Increasing attention is being given to apparatus 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 discharge d 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

U.S. Pat. Nos.

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 applicants'Autherville suggests 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 counter;

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;

FIG. 6 is a top plan thereof;

FIG. 7 is a fragmentary transverse section of a modified and concave rotating inner plate; and

FIG. 8 is a fragmentary transverse section of a modified and convex rotating inner plate.

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 nut elements. The entire assembly may be angled or tilted with respect to the vertical as an assistance in sorting by adjustment of baseplate 10 with respect to these threaded bolts.

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 42 defined between top gauging ring 34 and support or 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 42 are thrown through slot 82 which may be horizontal, alternatively inclined downwardly or upwardly (as illustrated in phantom in FIG. 5) 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 87 abutting the periphery of both rings and extending around drive pulley 90. The articles being counter, 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 off 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.

In FIG. 7 a modified inner plate 104 with a concave profile is illustrated and in FIG. 8 there is illustrated a further modification wherein inner plate 106 has a convex profile.

We claim:

1. Apparatus for sorting particulate articles comprising:

- A. a rotating inner plate, supported in a stationary base;
- B. a rotating circular support ring supported apart from said plate, as an extension of the periphery of said inner plate;
- C. a vertically adjustable rotating circular top gauging ring superposed with respect to said support ring at the periphery of said inner plate, so as to define an exit aperture equivalent in height to the dimension of the articles being sorted; and
- D. drive means independently engaging said inner plate, said support ring and said top gauging ring, so as to rotate said inner plate at a velocity sufficient to discharge articles from said plate, and through said exit aperture.

2. Apparatus for sorting particulate articles as in claim 1, including

- E. a tangential guide leading from said exit aperture, so as to guide away articles discharged through said aperture.

3. Apparatus for sorting particulate articles as in claim 2, said drive means including means varying the speed of rotation of said top gauging ring with respect to said lower support ring.

4. Apparatus for sorting particulate articles as in claim 3, including a stationary outer baffle extending vertically across said exit aperture intermediate, except in the area of said tangential guide.

5. Apparatus for sorting particulate articles as in claim 4, said top gauging ring having an inner wall extending downwardly across said exit aperture, said wall

including a plurality of apertures configured to register with articles being discharged there-through.

6. Apparatus for sorting particulate articles as in claim 2, including a circular belt engaging the outer periphery of said top gauging ring and said bottom support ring and a laterally spaced pulley so as to extend over and above said aperture, except in the area of said tangential guide.

7. Apparatus for sorting particulate articles as in claim 1, said drive means including means independently varying the speed of rotation of said inner plate, said top gauging ring and said bottom support ring.

8. Apparatus for sorting particulate articles as in claim 4, including means tilting said apparatus with respect to vertical as an assistance in sorting.

9. Apparatus for sorting particulate articles as in claim 8, including an article feeding hopper secured to said inner plate, so as to feed articles centrally of said plate.

10. Apparatus for sorting particulate articles as in claim 9, said hopper being vertically adjustable with respect to said inner plate.

11. Apparatus for sorting particulate articles as in claim 1, wherein said outer support ring and said inner plate are aligned horizontally.

12. Apparatus for sorting particulate articles as in claim 11, said inner plate having a concave profile.

13. Apparatus for sorting particulate articles as in claim 11, said rotating inner plate having a convex profile and its outer periphery being aligned horizontally with said support ring.

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