

July 28, 1953

C. F. ANDERSON
ARTICLE-SORTING DEVICE

2,646,805

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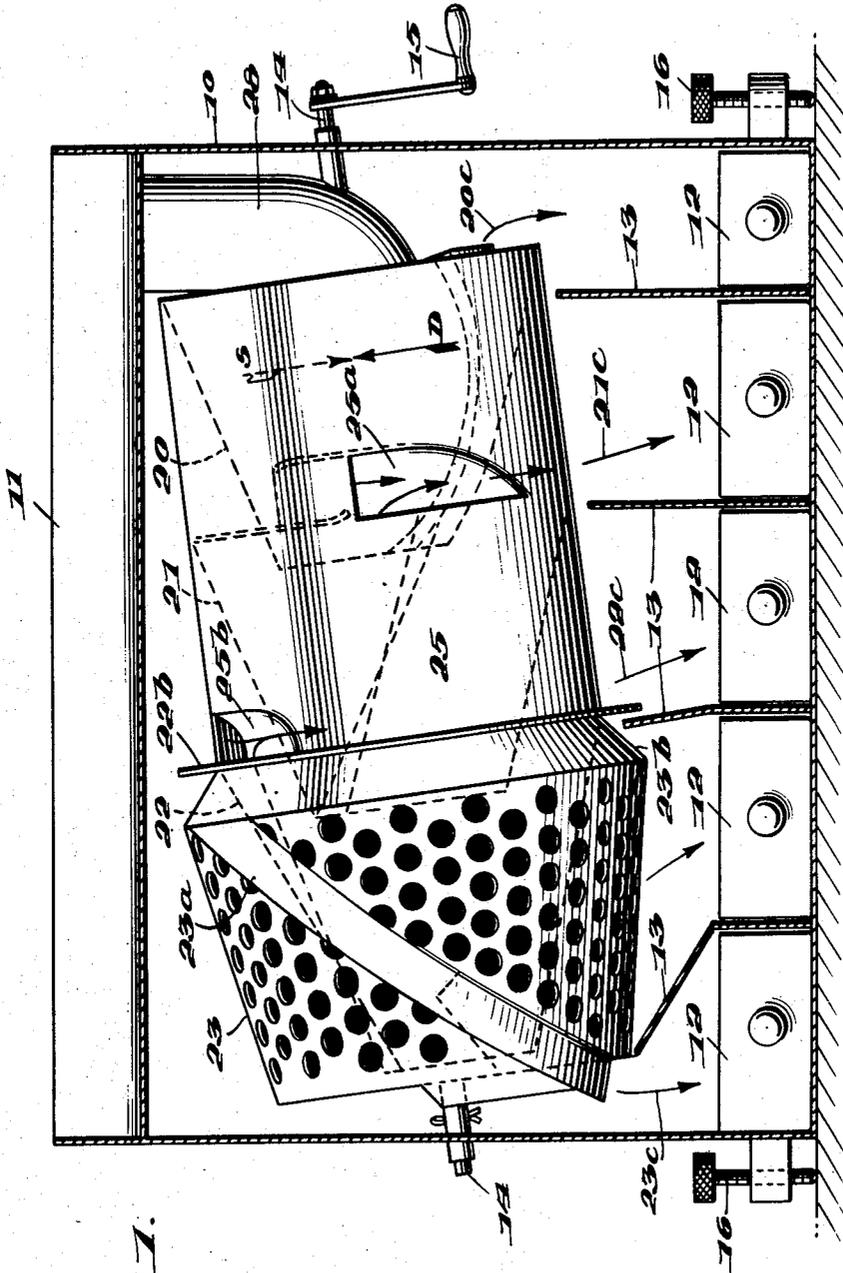


Fig. 1.

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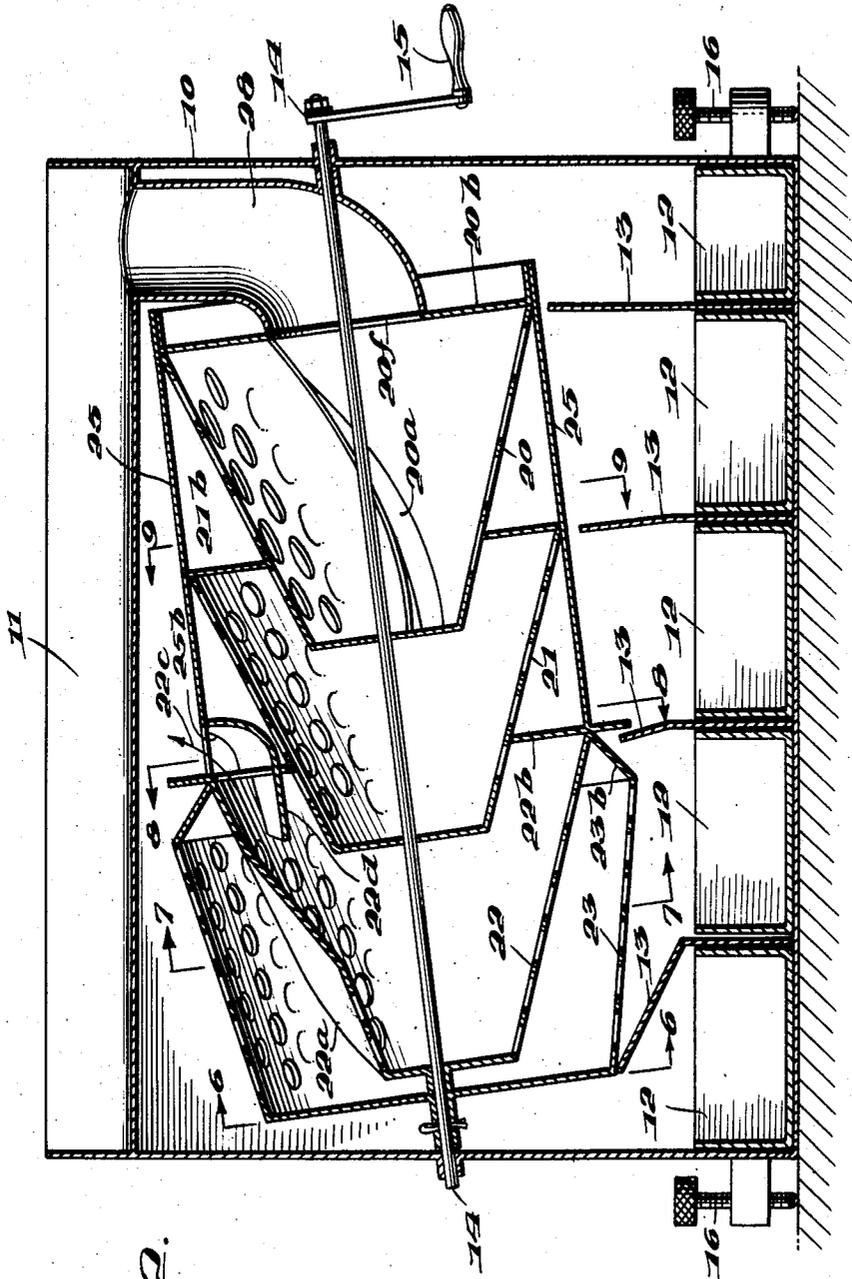


Fig. 2.

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Fig. 6.

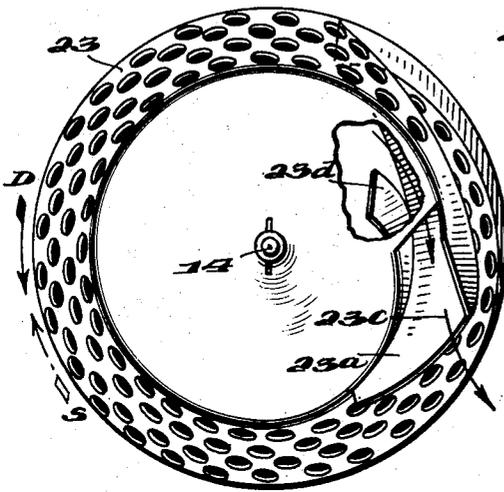


Fig. 8.

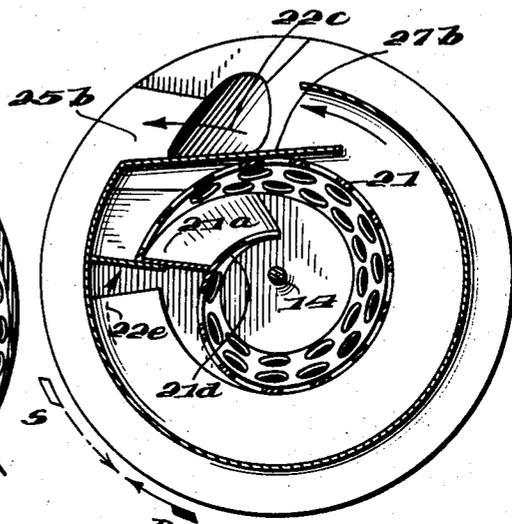


Fig. 7.

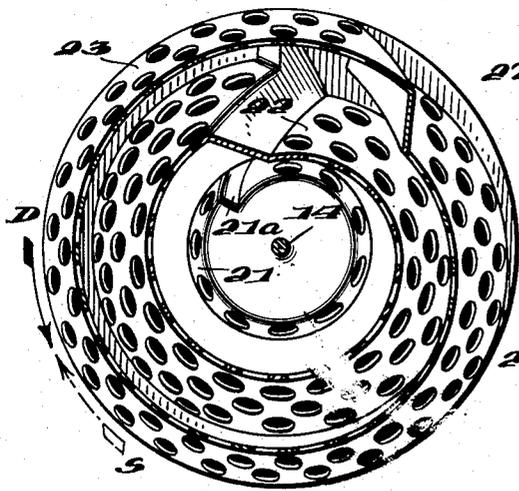
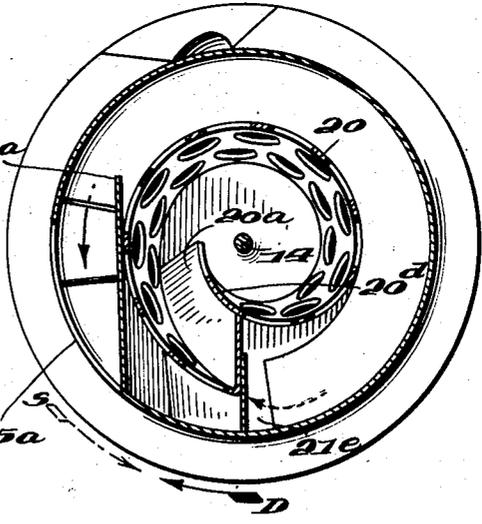


Fig. 9.



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ARTICLE SORTING DEVICE

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19 Claims. (Cl. 133-3)

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This invention relates to devices for separating solid articles according to size and is especially useful for sorting a mixture of coins into the various denominations or a mixture of such articles as tokens, ball bearings, buttons, etc.

A general object of the invention is the provision of a sorting device which is efficient in operation and of simple and compact construction. Another general object is the provision of a sorting device which employs a small number of working parts not likely to get out of order or need frequent repair or replacement. Particular objects and advantages of the features and combinations embodied in the device will be apparent from the following description of a preferred embodiment thereof.

The invention comprises the novel features and combinations of parts hereinafter described and claimed.

In the accompanying drawings of the illustrative embodiment:

Fig. 1 is a side elevation, with the rear wall broken away, of a coin sorter according to the invention.

Fig. 2 is a longitudinal section thereof.

Fig. 3 is a partially disassembled view in perspective of the rotating portion of the sorter.

Fig. 4 is a perspective view of one of the discharge provisions.

Fig. 5 is a disassembled partial perspective view similar to Fig. 3 but taken from a different direction.

Fig. 6 is an end view of the rotary portion taken on the plane 6-6 in Fig. 2 looking in the direction of the arrows with the rear wall partially broken away.

Figs. 7, 8 and 9 are sectional views taken on the planes 7-7, 8-8, and 9-9, respectively, of Fig. 2 looking in the directions of the arrows.

The sorter in the form illustrated in the drawings comprises a housing or outer casing 10, which in the form shown has its top portion formed as or provided with a tray or feed hopper 11 to receive the articles to be sorted. The bottom of the housing 10 is provided with a plurality of receptacles or hoppers shown as drawers 12 and with suitable partitions or baffles 13 for guiding the sorted articles thereto.

Within the casing 10 is arranged the sorting assemblage shown as carried on a rotating shaft 14 arranged on an inclined axis and provided with rotating means exemplified by the handle 15. The casing may also be provided with adjusting means such as the thumb screws 16 for leveling the device on uneven or inclined surfaces

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or for adjusting the inclination of the axis 14 relative to the horizontal.

In the preferred embodiment the rotating sorting device carried by the shaft 14 comprises an assemblage of generally conical spiral drums 20, 21, 22 and 23, adjacent ones of which are at least partially nested one within the other as shown. Each of the drums 20, 21, 22, 23 has a foraminous peripheral surface generally spiral in cross-section and generally conical or frusto-conical in longitudinal section. Each of the drums as shown comprises an inclined baffle strip or step 20a, 21a, 22a, 23a interposed between overlapping portions of the spiral cross-section thereof and each baffle strip winds helically about the axis of the drum so that on rotation of the drum in the discharge direction D the articles abut against the baffle strip or step and are urged thereby toward one end of the drum, while on rotation of the drum in the opposite direction said articles cascade across the overlapping portions of the spiral and are not moved longitudinally of the drum by said winding baffle strip.

As will be apparent from the drawings all the baffle strips, viewed from inside the drums, face clockwise as seen in Figs. 8 and 9, so that in this embodiment all of the drums urge the articles retained thereby toward discharge position when the drums are rotated clockwise as viewed in Figs. 8 and 9. For uniformity such discharge rotation throughout the drawings is indicated by a solid arrow D while the other or sorting direction of rotation is indicated by the dotted arrow S.

In the illustrative embodiment the drums 20, 21 and 22 all discharge toward their larger ends and therefore in these drums the spirals wind about the axis 14 in a right-hand direction. In this form the drum 23 is arranged to discharge at its smaller or rear end and therefore the step 23a, while inwardly facing in the same direction as the steps of the other drums, winds in the left-hand sense about the axis 14.

Further in the form shown each of the drums at its larger or entrance end is provided with a head 20b, 21b, 22b, 23b and each of the heads 20b, 21b, 22b is provided with an egress opening therein through which the articles retained by the associated drum may be discharged as indicated at 20c, 21c, 22c. In the drum 23, however, the egress opening is formed in the opposite head of the drum as indicated at 23c.

To prevent articles from passing outwardly through these egress openings during the rotation of the drums in the sorting direction, each

drum is preferably provided with an internal hood above said egress opening, conveniently formed by extending the inner convolution of the spiral over and beyond the step at least adjacent said egress opening. Such construction is shown at 20d, 21d, 22d and 23d respectively.

As is best shown in Fig. 2, means is provided for delivering the coins passing the first of the drums into the second thereof, etc., and in the case of the first three drums this means comprises a casing 25, cylindrical in the form shown, forming a vestibule section about non-nesting portions of the adjacent drums. In the case of the last two drums 22 and 23, this means is constituted by the head 23b which is arranged so that it and the drum 23 embrace the entire foraminous area of the drum 22. Further, as best shown in connection with head 21b in Fig. 5, the respective heads 21b, 22b are provided with ingress openings 21e, 22e, extending from the vestibule sections into the associated cones in spaced peripheral relation to the steps and egress openings thereof. Further, to insure passage to the next succeeding cone of the articles passing through the perforations of the drums 20, 21 and into the vestibule sections, each of these vestibule sections is provided with a baffle as shown at 25, Fig. 5, inclined or helically arranged adjacent the ingress opening to guide the articles thereto in the sorting direction of rotation.

As is further well illustrated in Fig. 1, the casing or vestibule sections are themselves provided with egress ports 25a and 25b adjacent the egress openings in the adjacent heads 21b, 22b, and in the forms shown hoods or lead-out chutes 27a and 27b (see Figs. 4, 5, 8 and 9) are associated with the egress ports in overlying relation to the egress openings to insure discharge of articles passing outwardly through the latter.

Any articles which may pass outwardly through the ingress openings 21e, 22e into the vestibule section, on rotation of the assemblage in the discharging direction, pass into the open inner ends of the hoods or chutes 27a, 27b and are likewise discharged through said egress ports.

In the case of the end drums 20 and 23, which discharge at the ends of the assemblage respectively, no egress ports or baffles such as those just described are necessary or provided. If desired the discharge ends of the spiral baffle or step members 20a, 21a, etc. may be extended, as best shown in Fig. 5, to project through the egress openings above mentioned to insure alignment of parts and satisfactory discharge operation.

For entering articles to be sorted into the first of the sorting drums 20, the head 20b in the form shown is provided with a central opening 20f, and the casing 10 is provided with a feed chute or tube 28 leading from the feed tray or hopper 11 and discharging into drum 20 through the opening 20f.

From the foregoing description it will be apparent that for the sorting of mixed coins or like articles, it is merely necessary to dump the mixture into the tray 11 and feed a quantity thereof through tube 28 into the rotatable assemblage. By rotating the assemblage in the sorting direction indicated by the arrow S, counterclockwise in the form shown, articles smaller than the grading apertures of cone 20 pass therethrough into the cone 21 either directly or by way of its vestibule and ingress opening, while articles too large to pass the grading openings of cone 20 are retained therein. The repeated cascading of the articles in this cone over the step portion assures

passage through the grading apertures of all articles capable of being passed by the screen.

At the same time, the articles which enter the second grading cone 21 are sorted therein and all articles passing the somewhat smaller grading apertures thereof enter cone 22 either directly or by way of its associated vestibule and ingress opening.

The articles passing through the still smaller apertures of cone 22 enter cone 23 and are tumbled and sorted therein. All the articles passing through the grading openings of cone 23 are delivered directly to the receptacle 12 underlying the same.

After the assemblage has been rotated in the sorting direction for a sufficient length of time to accumulate a reasonable load of articles retained in the respective drums, to unload the device it is merely necessary to reverse the direction of rotation. When this is done, the step risers 20a, 21a, 22a respectively urge the contents of their cones toward the larger ends thereof causing them to pass outwardly through the egress openings and to the underlying hoppers or receptacles 12. The reversely winding step 23a of cone 23 causes the articles retained therein to be advanced to the smaller end thereof and be discharged therefrom into the last of the receptacles 12 in the form shown. During this discharging operation any articles passing from cones 21 and 22 into the associated vestibules are discharged through the egress ports thereof with the other articles being discharged from the respective cones.

For purposes of illustration a device has been shown which is rotated counterclockwise for sorting and clockwise for discharging, as viewed from the entrance end, but it will be obvious that the device may be designed with reversed directions of rotation, and that in this and other respects the construction may be modified without departing from the invention. It is therefore to be understood that the specific embodiment herein disclosed is illustrative and not restrictive of the invention, the scope of the invention being defined in the appended claims, and that all modifications which come within the meaning or the range of equivalency of the claims are therefore intended to be included therein.

I claim as my invention:

1. An article sorting device comprising a generally conical drum mounted for rotation on an inclined axis, said drum being foraminous and comprising at least substantially one turn of generally spiral cross-section and a baffle strip interposed between juxtaposed portions thereof, said baffle strip winding helically about said axis, whereby on rotation of the drum in the direction to move articles therein outwardly of its spiral cross-section, said articles abut against said baffle strip and are urged thereby toward one end of the drum, while on rotation of the drum in the opposite direction said articles cascade and are not moved longitudinally of the drum by said winding baffle strip.

2. A device according to claim 1, said drum having a head at said first-named end and said head having an egress opening therein arranged in article receiving position adjacent the article-pushing side of said baffle.

3. A device according to claim 2, having an internal hood above said egress opening.

4. A device according to claim 1, in which said baffle strip winds in the direction to urge the articles toward the larger end of the drum.

5. A device according to claim 4, said drum

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having a head at said larger end, said head having an egress opening therein arranged in article receiving position adjacent the article-pushing side of said baffle, and having an ingress opening therein in peripherally spaced relation to said egress opening.

6. A device according to claim 5, further comprising a vestibule section adjacent said head arranged for feeding articles to said ingress opening, and comprising a baffle inclined in a direction for guiding articles to said ingress opening when the drum is rotating in said opposite direction.

7. A device according to claim 6, said vestibule section comprising an egress port aligned with said egress opening.

8. A device according to claim 7, said vestibule section further comprising means for delivering articles from said egress opening and vestibule to said egress port.

9. A device according to claim 1, in which said baffle strip winds in the direction to urge the articles toward the smaller end of the drum.

10. A sorting device comprising a generally conical foraminous drum mounted on an inclined axis and having a longitudinally extending helical step in its peripheral surface, said step presenting an abutment face at one side thereof and being inclined in the longitudinal direction to push toward one end of the drum articles positioned therein when the drum is rotated in one direction, said step presenting a ramping face at the other side thereof so that it is substantially ineffective to push articles towards either end of the drum when the drum is rotated in the opposite direction.

11. A sorting device comprising a drum having a foraminous peripheral surface, said surface being generally spiral in transverse cross-section and generally conical in longitudinal section and having a longitudinally helical step therein between the contiguous ends of its spiral cross-section.

12. A nested multi-drum sorting device for sorting articles according to size, comprising an assemblage of generally conical perforated spiral drums adjacent ones of which are partially nested one within the other, said assemblage being mounted for rotation on an inclined axis, said drums having similarly facing steps in their peripheral surfaces presenting abutment faces in one direction and ramping faces in the other by which, respectively, articles are discharged longitudinally from the drums in one direction of rotation thereof and caused to cascade for sorting when the drum assembly is rotated in the opposite direction, and said assemblage comprising means for delivering the articles passing through the perforations of each preceding drum to the next succeeding drum as the drum assemblage is rotated in said opposite direction.

13. A device according to claim 12, said last-named means comprising a casing about the non-nesting portions of two adjacent drums.

14. A device according to claim 13, said casing being generally cylindrical, and being provided with means for delivering into the second of said

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drums articles entering said casing from the first of said drums.

15. A device according to claim 12, said last-named means comprising a generally conical casing about the non-nesting portions of two adjacent drums.

16. A device according to claim 15, in which the spiral steps of said last two drums wind in opposite directions to longitudinally discharge articles from the opposite ends of said respective drums on rotation of the drum in said one direction of rotation.

17. A sorting device comprising two at least partially nested drums each having a foraminous peripheral surface, said surfaces being generally spiral in cross-section and having longitudinally helical steps therein between their overlapping portions, said helical steps winding helically in opposite directions so that on rotation of said drums in one direction contents thereof are discharged longitudinally therefrom at opposite ends of the drums, respectively.

18. A sorting device comprising two at least partially nested drums each having a foraminous peripheral surface, said surfaces being generally spiral in cross-section and having longitudinally helical steps therein between juxtaposed portions thereof for pushing articles longitudinally of the drums on rotation of the drums in one direction, said drums comprising heads having egress openings arranged to receive the articles pushed longitudinally by said steps and said drums comprising internal hoods above said egress openings.

19. An article sorting device comprising a foraminous drum mounted for rotation about its longitudinal axis, said drum comprising at least substantially one turn of generally spiral cross-section and a baffle strip interposed between the juxtaposed portions thereof, said baffle strip winding helically about said axis, whereby on rotation of the drum in the direction to move articles therein outwardly of its spiral cross-section, said articles abut against said baffle strip and are urged thereby toward one end of the drum, while on rotation of the drum in the opposite direction said articles cascade and are not moved longitudinally of the drum by said winding baffle strip, said drum having a head at said first-named end and having an egress opening in said head adjacent the article-pushing side of said baffle, and said drum having an internal hood above said egress opening for preventing articles from entering the same when the drum is rotated in said opposite direction.

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References Cited in the file of this patent
UNITED STATES PATENTS

Number	Name	Date
12,486	Martz	Mar. 6, 1855
211,893	Duhem	Feb. 4, 1879
284,405	Forder	Sept. 4, 1883
962,048	Peterson	June 21, 1910
2,461,366	Bletso	Feb. 8, 1949