May 21, 1968 E. M. TRIKILIS 3,383,797

TURNSTILE

Filed March 21, 1966

Fig. 1.

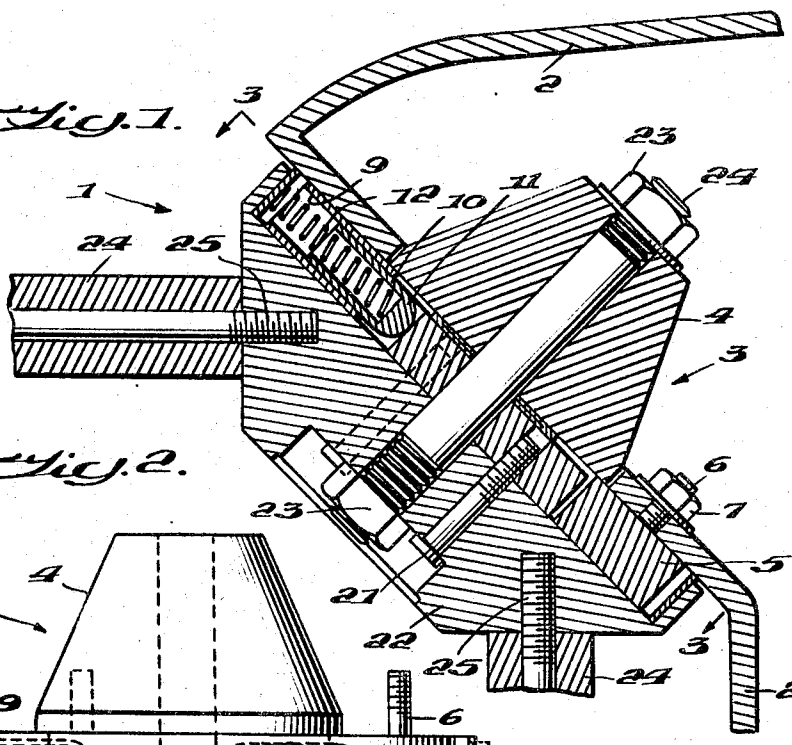

Fig. 2.

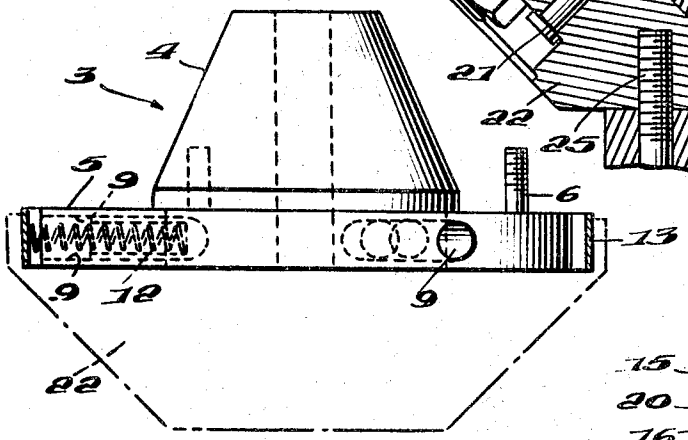

Fig. 4.

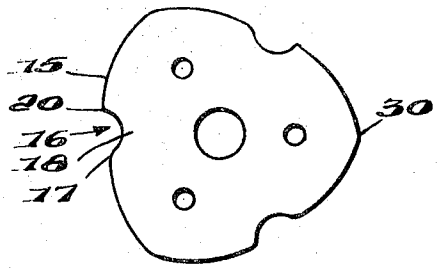

Fig. 3.

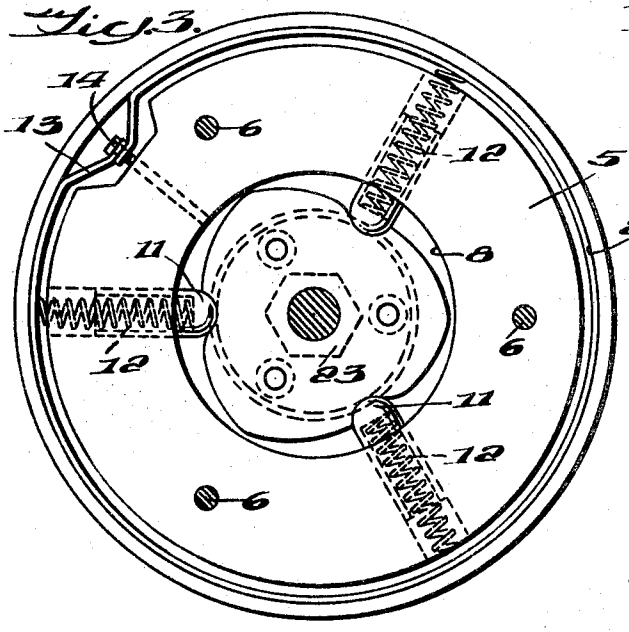

Fig. 5.

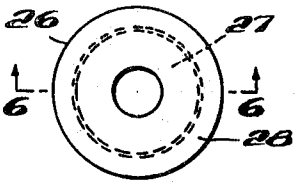

Fig. 6.

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TURNSTILE

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ABSTRACT OF THE DISCLOSURE

A turnstile having a fixed and movable head, a plurality of cam followers are carried by the fixed head for mechanically cooperating with an undulating cam attached to the movable head.

The present invention relates to a cam controlled rotatable barrier and more particularly to a novel turnstile utilizing a cam controlled assembly.

Various types of rotatable barriers are presently being used today; however, they display certain disadvantages. One such disadvantage is that these prior art devices are complicated in structure due to the great number of parts that make up their assemblies. Their complex structure not only adds to their weight and expense of manufacture and shipment, but also greatly increases their maintenance cost for keeping the assemblies in proper running condition.

Another decided disadvantage of the prior art devices is the excessive noise or audible disturbance that occurs when these turnstiles are subjected to continuous use. These audible disturbances are particularly present in public transportation terminals, where a plurality of turnstiles are arranged.

The present invention contemplates a rotating barrier or turnstile barrier having a supporting frame and a fixed and movable head. The fixed head is rigidly attached to the supporting frame and carries a plurality of cam followers. The movable head, on the other hand, is rotatably secured to the fixed head. An undulating cam is arranged so that it is fixedly attached to said movable head assembly, thereby to mechanically cooperate with the cam followers.

The present invention provides a mechanism which overcomes the prior art disadvantages by arranging a turnstile which is light in weight, precisionally balanced and composed of a minimum number of operating parts. The turnstile mechanism of this invention displays the further advantageous characteristics of being self-positioning and self-locking for either clockwise or counter-clockwise rotation of the movable head assembly. These self-locking and self-positioning characteristics are accomplished because of the novel arrangement of the undulating cam, heads and cam followers of this invention.

A more complete appreciation of the invention, and many of the attendant advantages thereof will be readily appreciated by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

FIG. 1 is a sectional side view of the invention;

FIG. 2 is a view of the fixed head comprising one component of the invention;

FIG. 3 is a view taken along lines 3—3 of FIG. 1;

FIG. 4 is a top plan view of the undulating cam component of the invention;

FIG. 5 is a top plan view of the washer component of the invention; and

FIG. 6 is a section view of the washer taken along lines 6—6 of FIG. 5.

The novel turnstile of this invention is shown generally as **1** and is supported in an elevated position by supporting turnstile housing **2**.

The turnstile of this invention carries a fixed head assembly, indicated generally by **3**, that comprises two integral sections—a conical section **4** and an enlarged cylindrical base section **5**. The base section **5** is rigidly secured to the supporting housing **2** by means of supporting screws **6** and bolt **7** and carries an inner cam recess **8**. Extending radially outwardly from said cam recess **8** are a series of openings **9** into which cam followers **10** are positioned. These cam followers are elongated in shape and carry a rounded head **11** at one end. The other end of the cam followers is hollow for housing one end of a suitable compression spring **12**. The cam followers and spring are prevented from moving radially outwardly from the opening **9** because of the flexible metal ring **13** which is arranged peripherally around the cylindrical base section **5** and secured to the base section by means of screw **14**.

Seated to rotate within the recess **8** of the base section is an undulating cam **15**. This cam, as illustrated in FIG. 4, is generally triangular in shape. On each side edge of the cam there is provided a detent, generally indicated by **16**, which extends peripherally inwardly. Each detent **16** carries a gradually sloped riding surface **17**, resting surface **18** and sharp stop edge **20** arranged immediately adjacent to one another along the edge of each cam side.

Rigidly secured to the undulating cam **15** by means of bolts **21** is a generally conical movable head **22**. This movable head **22** is rotatably attached to the fixed head by means of blots **23** and spindle shaft **24** which extends axially through both the movable head **22** and fixed head **4**. The movable head **22** carries a recess portion **31** which acts to house both the cam **15** and base section **5** of the fixed head **4**.

Elongated conventional barrier arms **24** are attached to the movable head **22** by means of screws **25** and extend outwardly from the movable head. In the preferred embodiment, the movable head carries three barrier arms arranged at approximately 120° angles from one another. In this arrangement, at least one barrier will always project longitudinally across the pathway in order to block exit or egress therethrough.

The undulating cam **15** is so positioned within the inner recess **8** of the base section **5** that, when the detents **16** are arranged directly opposite to the openings **9**, the cam followers **10** project radially inwardly into the space provided by the detents **16**.

FIGS. 5 and 6 illustrate a spring washer **26** which is adapted to be positioned between the movable head **22** and the fixed head **3**, and provides the only contact therebetween. This washer comprises a circular compressible spring **27** which is embedded within a molded sheath **28** of any suitable organic plastic material, such as Teflon. This spring washer provides a more suitable adjustment for regulating the speed of rotation of the movable head **22** about the fixed head **3**. For example, by tightening the bolt **23**, the spring washer is compressed, thereby restricting the rotational movement of the movable head **22**. If it is so desired that the movable head should be rotated with ease, the bolt **23** accordingly is loosened, allowing the spring washer to expand outwardly. The organic plastic material molded sheath acts as a noise-free lubricating means for facilitating the adjustment in the rotational movement of the turnstile.

The operation of the novel turnstile may be described as follows. When the turnstile is in a non-operating position, the cam followers **10**, extending radially inwardly, contact the resting surface **18** of the detents **16**. One barrier **24** thereby extends across the pathway preventing any possible movement therethrough. When a person walks through the pathway and begins to apply pressure against the barrier **24**, a rotational movement is imparted to the

movable head **22** and cam **15**. Viewing FIG. 3, the rotational movement would be counter-clockwise. This rotational movement allows the heads **11** of the spring actuated cam followers **10** to slide outwardly along the riding surface **17** towards the apex **30** of the triangular cam. If enough movement of the barrier is effectuated, the heads **11** slide over the apex **30** and along the edge surface of the cam until they again settle in the next detent.

Since the detents **16** also carry a stop edge **20**, any clockwise movement of the movable head **22** is prevented, thus limiting the movement of the movable head to only one direction. It is understood that the turnstile may be modified to provide movement in the opposite direction than that mentioned by merely utilizing an undulated cam whose detent surfaces are arranged opposite to that illustrated in the drawing. In this manner, the rotational movement of the movable head would be limited to only clockwise rotation. Further, should a bi-directional turnstile be desired, the undulating cam may be modified to eliminate the sharp edge surface in the detents.

The operating features of this invention are not limited to turnstiles, but are equally applicable to any type of rotating device, such as a revolving door.

Obviously, numerous modifications and variations of the present invention are possible in light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

I claim:

1. A rotating barrier comprising a supporting frame; a fixed head rigidly attached to said supporting frame, said fixed head having a base section which defines a fixed head recess portion; a plurality of cam followers mounted within the base section; a movable head, also having a recess portion, rotatably secured to said fixed head; an undulating cam fixedly mounted within said movable head recess carrying a plurality of detents, said cam followers being resiliently mounted in said base section to project radially inwardly into the fixed head recess and into contact with the cam, said movable head also carrying a plurality of outward extending barrier arms.

2. The rotating barrier of claim **1** wherein the undulating cam is triangular in shape, each side of said triangular cam having a recessed detent.

3. The rotating barrier of claim **2** whercin said detents carry riding and resting surfaces.

4. The rotating barrier of claim **3** wherein said detents also carry stop edges.

5. The rotating barrier of claim **1** wherein said cam followers are radially mounted within said fixed head and are adapted to project radially inwardly from said fixed head.

6. The rotating barrier of claim **5** wherein said fixed head carries a plurality of radially extending openings adapted to receive said cam followers.

7. The rotating barrier of claim **6** including a plurality of barrier arms extending outwardly from said movable head.

8. The rotating barrier of claim **1** including a flexible washer mounted in contact relationship with said fixed and movable heads, said washer comprising a compressible spring embedded within a plastic mounting.

9. A turnstile comprising a supporting frame, a fixed head, having a hollow circular base section, rigidly attached to said supporting frame, a plurality of cam followers mounted within said circular base section, said cam followers being resiliently mounted to project radially inwardly from said base section, a movable head rotatably secured to said fixed head, an undulating cam fixedly attached to said movable head to mechanically cooperate with said cam followers, said undulating cam being triangular in shape and carrying on each side thereof a detent located between the apex points of the triangular cam edge surfaces, each of said detents having a sharp stop edge, a sloped riding surface and a resting surface, and said movable head also carrying a plurality of outwardly extending barrier arms.

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