

990,728.

H. A. GORDON.

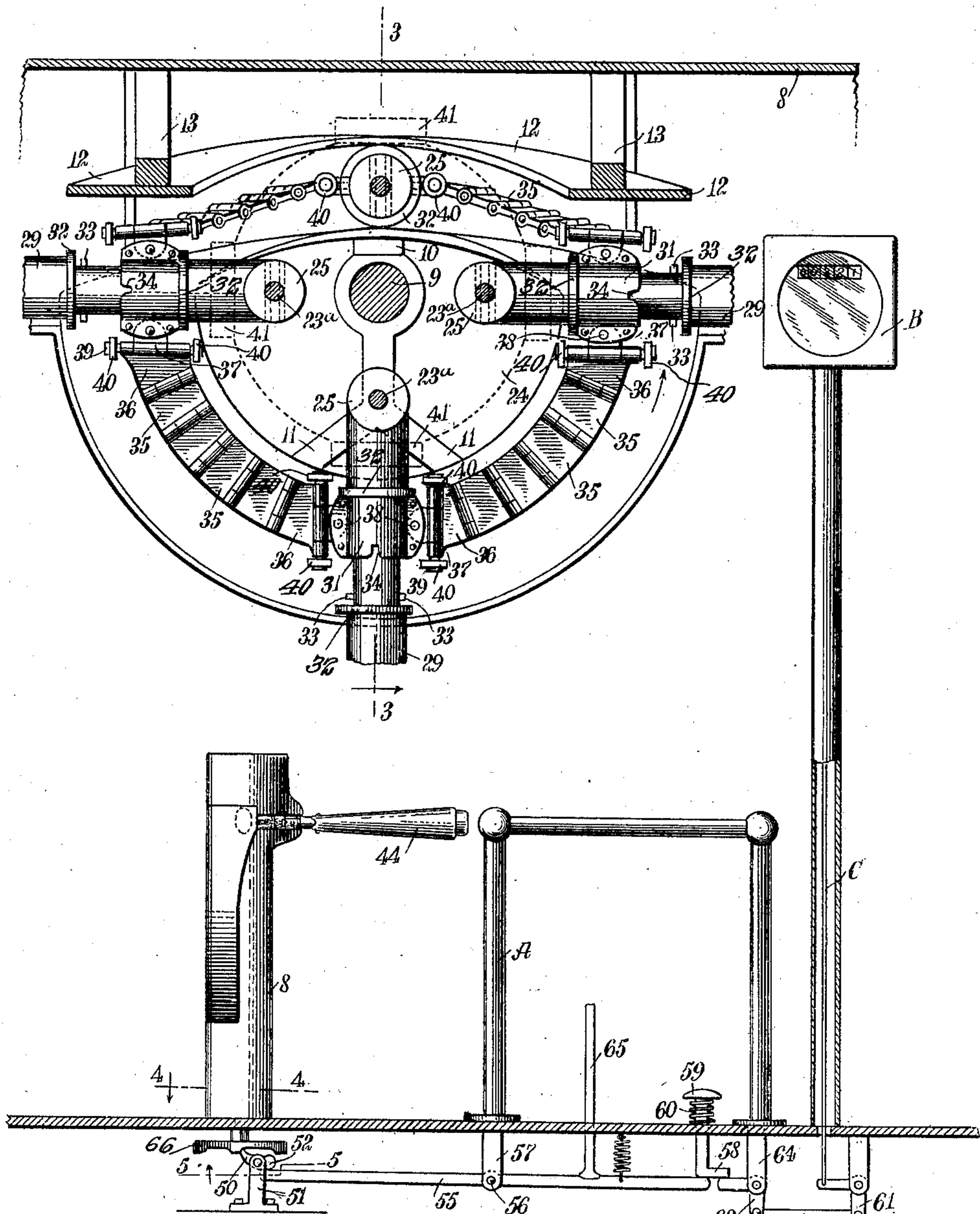
TURNSTILE.

APPLICATION FILED APR. 30, 1910.

Patented Apr. 25, 1911.

2 SHEETS—SHEET 1.

Fig. 2.



WITNESSES:

*Geo. W. Taylor*  
*E. F. Mudock*

Fig. 1.

INVENTOR  
*Hamilton A. Gordon*  
BY *Mumfords*  
ATTORNEYS

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2 SHEETS—SHEET 2.

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Fig. 3.

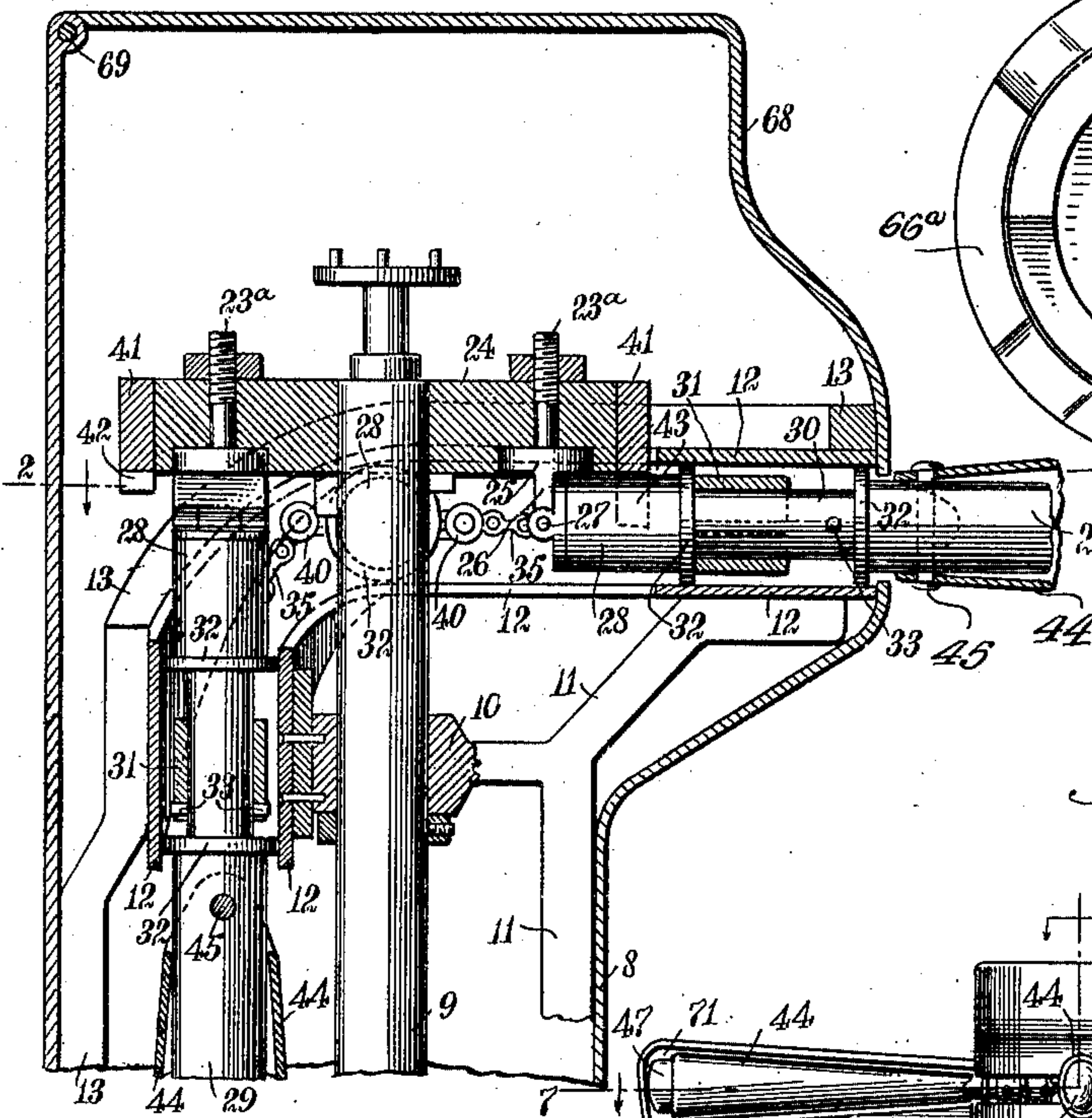


Fig. 5.

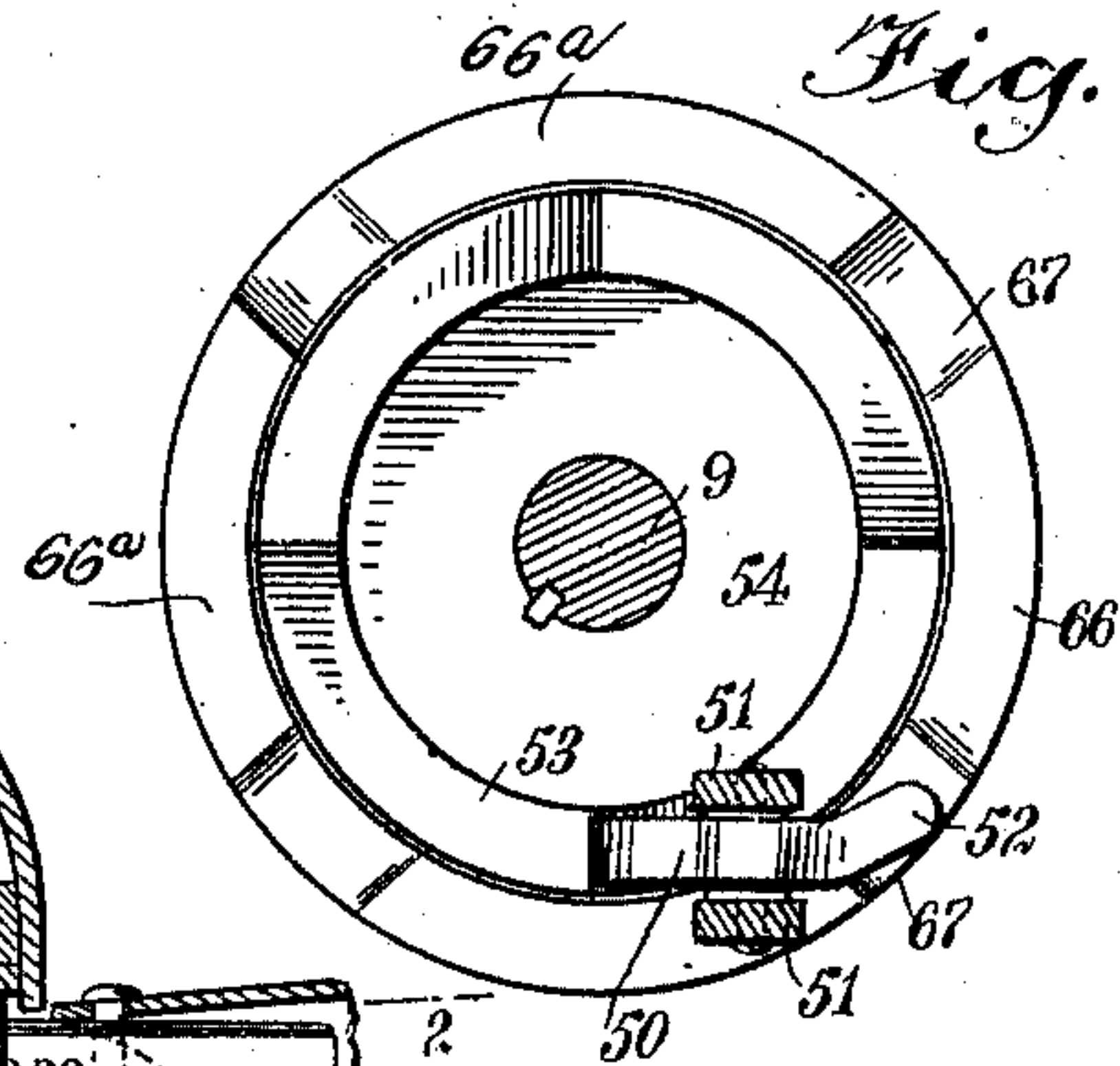


Fig. 6.

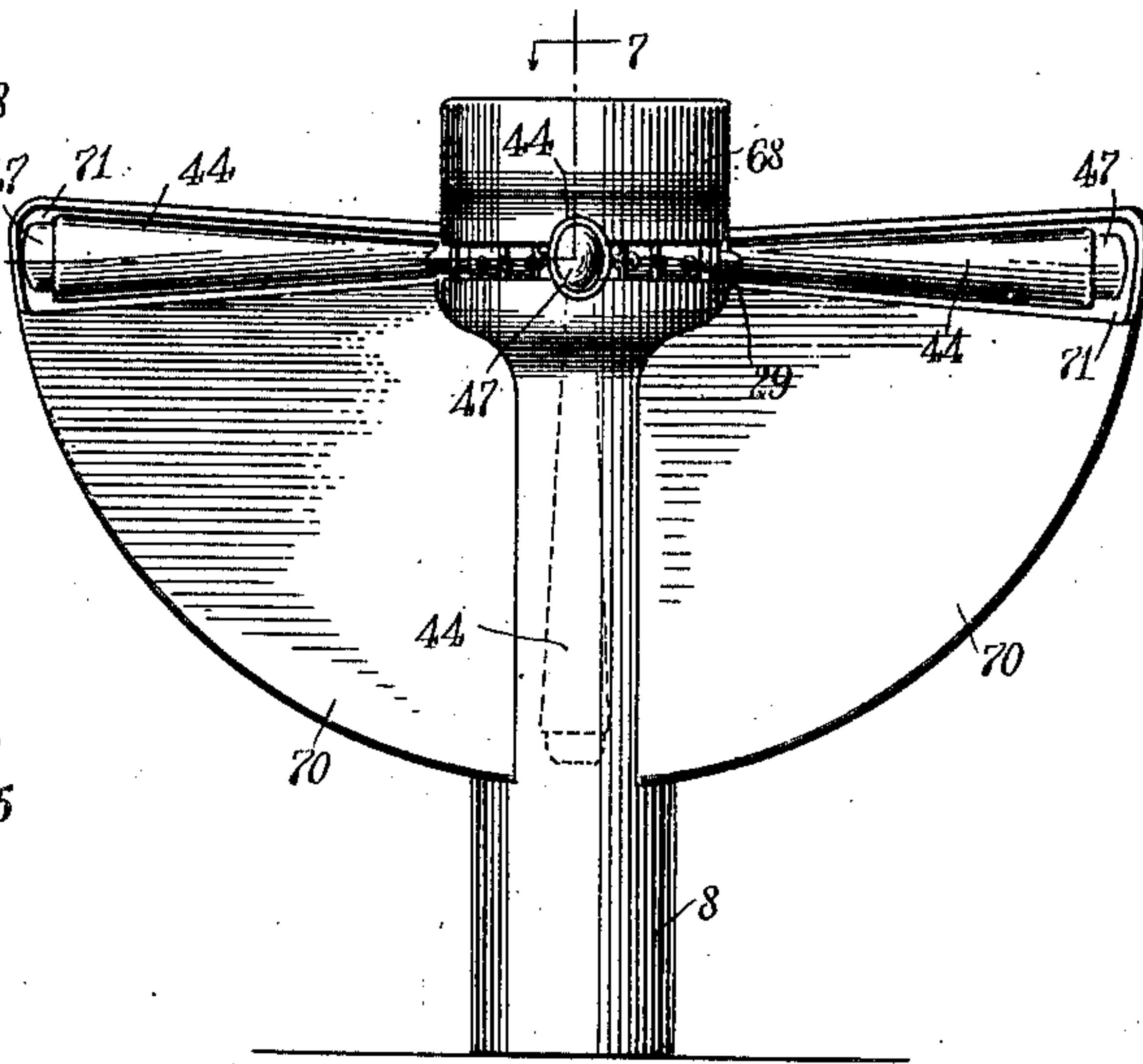
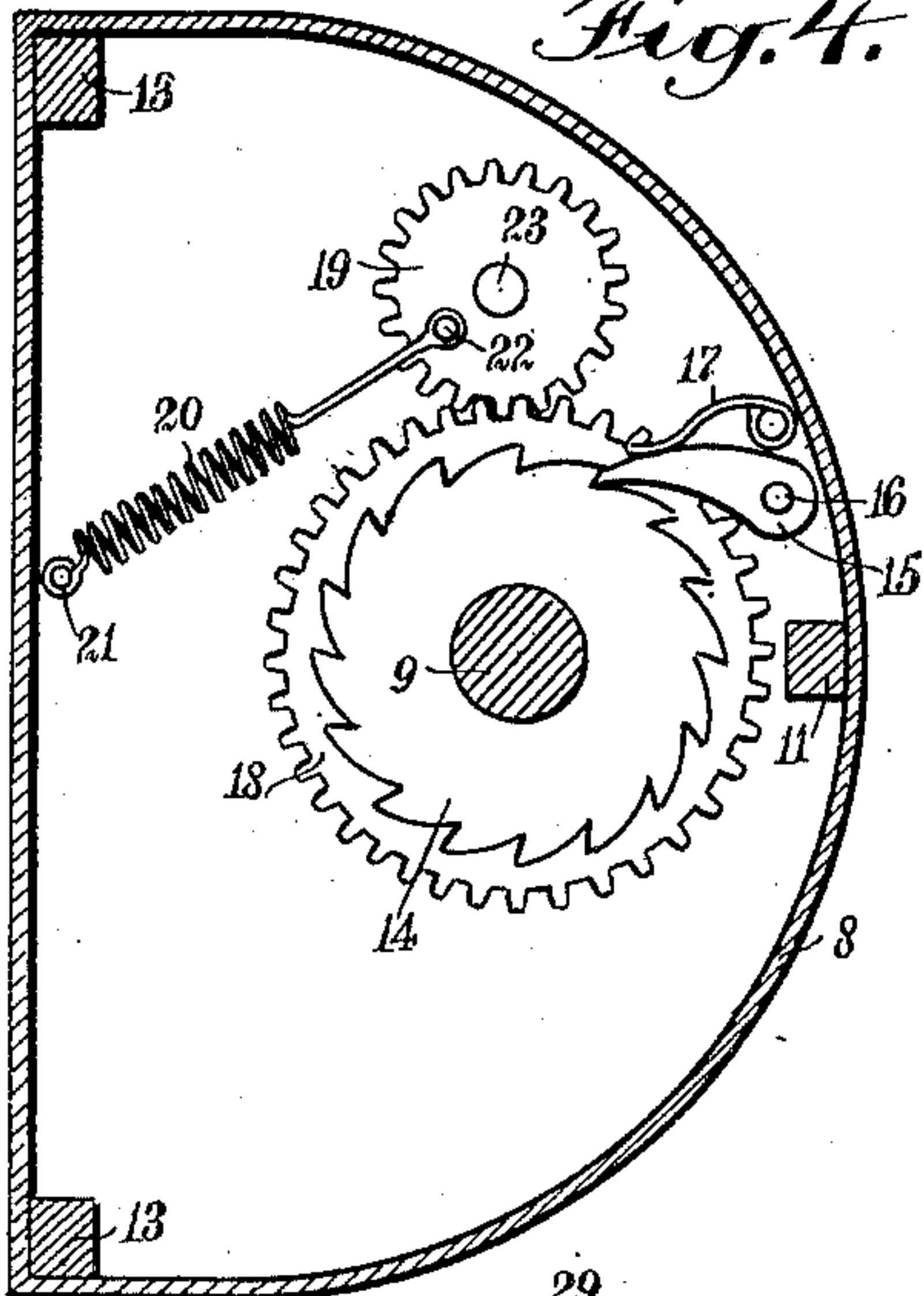


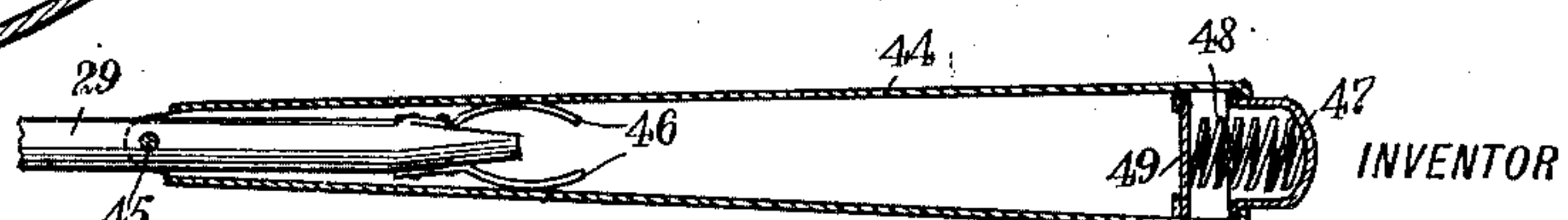
Fig. 4.



WITNESSES:

George Taylor  
E. A. Muddock

Fig. 7.



INVENTOR

Hamilton H. Gordon  
BY Munn & Co  
ATTORNEYS



# UNITED STATES PATENT OFFICE.

HAMILTON A. GORDON, OF EAST ORANGE, NEW JERSEY.

## TURNSTILE.

990,728.

Specification of Letters Patent.

Patented Apr. 25, 1911.

Application filed April 30, 1910. Serial No. 558,673.

*To all whom it may concern:*

Be it known that I, HAMILTON A. GORDON, a citizen of the United States, and a resident of East Orange, in the county of Essex and State of New Jersey, have invented a new and Improved Turnstile, of which the following is a full, clear, and exact description.

Among the principal objects which the present invention has in view are: to provide a turnstile arranged to occupy the minimum of floor space; to provide a construction wherein are employed arms elliptical in shape in cross section; to provide automatic means for partially turning the arms employed in the turnstile to economize the housing space for the structure; to provide a mechanism for rotating the arms of the turnstile to avoid jamming the same; to provide releasing means for the stile and a transmission mechanism connecting said releasing means with a visible register adapted to totalize the operations of the releasing device; and to provide an auxiliary releasing device for the turnstile, operable without affecting the said register.

One embodiment of the present invention is disclosed in the structure illustrated in the accompanying drawings, in which like characters of reference denote corresponding parts in all the views, and in which,

Figure 1 is a side elevation of a turnstile gate constructed and arranged in accordance with the present invention; Fig. 2 is a fragmentary view showing a horizontal section of the turnstile shown in Fig. 1, the section being taken on the line 2—2 in Fig. 3; Fig. 3 is a fragmentary view showing a vertical section taken on the line 3—3 in Fig. 2; Fig. 4 is a horizontal section on an enlarged scale taken on the line 4—4 in Fig. 1; Fig. 5 is a detail view in section taken on the line 5—5 in Fig. 1, showing from beneath the locking mechanism for the turnstile; Fig. 6 is a front elevation of the turnstile constructed and arranged in accordance with the present invention; and Fig. 7 is a horizontal section of an arm employed in the present invention.

The present invention is an improvement on the patent upon improvements in turnstiles issued to me under date of April 5, 1910, and bearing the number 954,182, to which reference is here made. Within a

stationary turret 8 is pivotally mounted the turnstile mast 9. The mast 9 is stepped in suitable bearings formed in the supporting floor, and is supported in vertical disposition by a bearing block 10 formed in a spider frame 11. The frame 11 is joined by two parallel track plates 12, 12. The mast 9 has fixedly mounted thereon, and at the foot thereof, a ratchet wheel 14, which is operatively engaged by a pawl 15. The pawl 15 is pivotally mounted at 16 on the bottom of the turret 8, and is actuated by a spring 17, all of which is seen in Fig. 4 of the drawings.

Fixedly mounted upon the mast 9 is a large gear wheel 18, the teeth whereof are in mesh with the teeth of a smaller gear wheel 19. The ratio between the gear wheels 18 and 19 is as one to four, that is, there are four times as many teeth in the wheel 18 as in the wheel 19, thereby securing one complete revolution of the wheel 19 for one quarter of a revolution of the wheel 18 and the mast 9 connected therewith.

The function of the intermeshed wheels 18 and 19 is to maintain the quadratic disposition of the mast 9. To accomplish this there is provided a heavy spiral spring 20, which is anchored at 21 within the turret 8, and is pivotally connected at an eccentric point 22 with the gear wheel 19. The strain of the pull of the spring 20 tends always to place the gear wheel 19 in the position where the pivot pin 22 is in direct line between a pivot 23 on which the wheel 19 is mounted and the pin 21.

The mast 9 is provided at the top thereof with a disk 24. Disposed on the disk 24, at four equal distances thereon, are the bolts 23<sup>a</sup>, 23<sup>a</sup>. The bolts 23<sup>a</sup>, 23<sup>a</sup> are provided with heads 25, 25 from which are downwardly extended lugs 26, 26 provided to receive hinge pins 27, 27 to form the pivot for the swing of the caps 28, 28 to which the arms 29, 29 are fixedly attached. The arms 29 are cylindrical in form, and are provided with a restricted bearing section 30 to form bearings for collars 31. Rotatively mounted on the said arms 29 are wheels 32, 32, which track upon and are guided by the track plates 12, 12 upon which the turnstile arms are supported and guided.

The arms 29, 29 are four in number, and are hinged, as stated, to the bolt heads 25, and are guided by the track plates 12, 12 to



assume in three positions the outward extensions, two of which are parallel with the passage to be controlled by the turnstile and one of which is directly across the said passage. The fourth position is vertical, the arm 29 being swung on the hinge pin 27 in passing from the horizontal extension parallel with the said passage to the vertical position in the same plane with the arm which is extended across the said passage. In passing from the horizontally extended position to the vertically depended position the bolt head 25 has imparted thereto a quarter revolution, as seen by reference to Fig. 2 of the drawings, wherein the dotted lines indicating the swing of the arm 29 are shown. When now the arm 29 is raised from the vertically depended position to the upper part of the track plate 12, and upon the horizontal extension thereof, there is imparted a further quarter of a revolution to the head 25 and arm 29 connected therewith.

As I employ, for convenience, and also for economy in the utilization of space, turnstile arms which are elongated in cross section, it becomes necessary to insure the upright position of the said arms. It is to accomplish this that I have provided the said arms with pins 33, 33 extended from the sides thereof, and to register therewith I have provided recesses 34, 34 in the outer edge of the collars 31. Due to the positions assumed in the horizontal plane of the track, the collars 31, 31 are withdrawn from engagement with the pins 33, 33 while on the said horizontal plane of the said track. When in the vertical position, however, the relaxation of the chain connecting the said collars permits the drop of the then depended collar 31 to engage the pins 33. When thus engaged, and the collar 31 and arm 29 are raised, the engagement insures a presentation of the turnstile arm in proper vertical arrangement.

The collars 31, 31 are connected by short chains composed of hinge plates 35, 35. Each chain is provided at the end thereof with angular plates 36, 36. The plates 36, 36 are hingedly connected to hinge clips 37, 37, which in turn are pivoted horizontally and at 38 to the collars 31. The hinge clips 37 and plates 36 are connected by short shafts 39, at the outer ends whereof are provided small carrying rollers 40, 40. When thus connected the collars 31, 31 and chains formed by the plates 35 and 36 constitute an endless belt, having equally spaced thereon the collars 31, and thereby holding in angular spaced relation the arms 29, 29.

When in the course of operation each of the collars, and the plates 36, 36 directly connected therewith, pass from the horizontal to the vertical plane of the track, it will be found that the parallel disposition of

the shafts 39, 39 accommodates the structural arrangement of the lower track plate 12 at the bend thereof from the horizontal to the vertical plane. Also, it will be found when, due to the sag of the chains in the vertical position, the collars 31 are lowered to engage the pins 33, 33, the hinge of the said shafts 39 assumes a position parallel with the hinge of the arms 29 laterally extended.

The disk 24 is provided with a series of inverted yokes 41, 41. The bifurcated extensions of the yokes 41 are adapted to straddle the caps 28, and to form therefor, when the arms 29 are held in horizontal extension, reinforcing or holding members for the said arms. The lugs 42 and 43 of the said yokes are unequal in length, the short extension 42 being provided on what may be termed the following side of the cap 28, while the longer extension 43 is formed on the forward side of the said cap, as it is against the forward side that the thrust of the arm 29 and cap 28 is received on the disk 24 and mast 9. The engagement between the hinge lugs 26 and the yokes 41 with the arms 29 forms a rigid construction and arrangement for the turnstile arms when held in horizontal extension.

The turnstile bars 44 are mounted on the ends of the arms 29, and are preferably constructed of sheet metal to produce lightness in weight, and are given an elliptical shape in cross section. The bars 44 are pivoted by means of a pin 45 extended vertically through the arm 29. (See Fig. 7 of the drawings.) The arm 29 is extended within the body of the bar 44, and is provided at the end thereof with two leaf springs 46, the tension whereof maintains the aligned extension of the bar 44 with the arm 29. The interposition of the springs 46 between the bars 44 and the arms 29 forms a buffering or cushioning construction whereby injury to a person is prevented when falling against or striking upon the turnstile bar. The end of the bar 44 is provided with a cap 47 extended from the end thereof, and maintained there by a spiral spring 48. The spring 48 is seated on a fixed plate 49, fixedly mounted within the body of the bar 44. The pressure of the spring 48 maintains the cap 47 in extended position. By means of this arrangement, should a person be thrust against the end of the bars 44 as the same are being swung from the position parallel with, to the position transverse to, the passage controlled by the turnstile, the person would not be severely hurt, the spring 48 yielding and thereby buffering or cushioning the blow.

It is to control the turning of the mast 9 that I have provided a latch 50. The latch 50 is pivotally mounted in brackets 51, sta-



tionarily secured or set in the body of the structure upon which the turnstile is mounted. The latch may be of any suitable shape, that shown in the drawings being a pawl having a weighted tail piece 52. The head or tooth of the pawl normally rests on a crowned toothed flange 53 of the disk 54. The disk 54 is fixedly mounted upon the lower extension of the mast 9. There are four teeth formed on the flange 53, each being disposed with reference to the latch 50, so that when the said latch is engaged with one of the said teeth, one of the bars 44 is extended across the passage controlled by the turnstile. From this position the bar may not be retracted because the ratchet wheel 14 and the pawl 15 engaged therewith prevent the reversal of the rotation of the mast 9. The said bar 44 may not be moved forward from the position because of the engagement of the latch 50 by the teeth of the disk 54. To permit the forward movement (and as arranged, the entrance movement) of the turnstile bar 44, it is necessary to remove the tooth of the latch 50 from engagement with the tooth on the flange 53, and for this purpose there is provided a rocking lever 55.

The rocking lever 55 is pivoted at 56 in a standard 57. One extension of the lever 55 rests under the tail piece 52 of the latch 50, while the opposite extreme of the lever rests under the foot 58 of a foot operated floor button 59. The button 59 is provided with the usual shank, and is supported in raised position by a spring 60. The button 59 is disposed with reference to the convenience of the attendant of the stile, his position being within the railing A with which the structure is provided.

In the application of a turnstile constructed in accordance with this invention, as illustrated in the drawings and in Fig. 1 thereof, is shown its adaptation to the type of street cars known as the "pay-as-you-enter" car. In this car the bars 44 are arranged to successively close the passage between the sides of the car body and the railing A provided for the conductor or attendant. When the conductor desires to permit a passenger to pass he depresses the button 59, thereby releasing the mast 9 so that the bar 44 may be moved to a position parallel with the passage between the turret 8 and the railing A. The same operation which releases the mast registers the operation in a register B. The register B is of any approved type, and situated in the car at any desired station. The operating mechanism of the register is connected by means of a flexible member C to a bell crank 61. The bell crank 61 is connected to a second bell crank 62 by a connecting rod 63. The bell crank 62 is pivoted in a bracket 64 ad-

jacent to the button 59, and so disposed that one arm thereof rests below the foot 58 of the said button. Due to this arrangement, whenever the button 59 is operated to release the mast 9, the register B is operated to add to the recorded total therein displayed. The register B would usually represent a cash or fare register.

Connected with the lever 55, and disposed between the standard 57 and the button 59 is a rod 65. The rod 65 is provided as an independent operating device for the lever 55, whereby the mast 9 may be released without operating the said button 59. The reason for the arrangement is that in practice, and upon many roads, the fare register is not intended to register a transfer. It is necessary, therefore, to provide some releasing device for the mast 9 independent of the button 59. When in operation of the invention a transfer passenger, or an under aged child, is passed through the turnstile, the turnstile is released by depressing the rod 65.

When, in the operation, the bar 44 is moved to rotate the mast 9 more than the one-eighth of a complete revolution, the gear wheel 19 is thereby rotated more than a half of its complete revolution, and carries the pivot pin 22 and the spring 20 connected therewith over the dead center and to the far side of the said gear wheel. The pressure of the person up to this point has been required to move the said bar 44. From this point, however, the spring 20 exerting the pull, rotates the gear wheel 19, and thereby the wheel 18 and mast 9, carrying the said mast around to the full quarter revolution, where it is arrested by the spring 20 resuming the position in line with the dead center on the one side of the gear wheel 19, and also by the next succeeding tooth formed on the flange 53 of the disk 54 contacting with the latch 50.

To insure the action of the latch 50, the disk 54 is provided with an annular flange 66, formed concentric with the flange 53, and having raised surfaces 66<sup>a</sup> so formed that when the tail piece 52 of the said latch 50 is riding on the said surfaces the said latch is in engagement with the teeth on the flange 53. Between each of the said surfaces is a depressed portion 67, so disposed that when in this position the tail piece 52 can be raised to remove the latch from engagement with the tooth in the flange 53. Immediately, however, the mast 9 and the disk 54 rotates, the next succeeding raised surface of the flange 66 strikes upon the tail piece 52, setting the toothed end of the latch 50 upward in the path of the next succeeding tooth of the flange 53.

The turret 8 is provided with a removable cover 68, which is hinged at 69 to the back



of the turret. The said turret is further provided with wing casings 70 to provide an inclosed path for the rearwardly and vertically disposed bars 44. The casings 70, 5 70 are provided with front side openings 71, 71, out of one of which and into the other of which pass the bars 44, 44 when passing to or being retracted from the extended position wherein the passage between the turret 8 and the railing A is closed. 10

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A turnstile, comprising a rotary member; a track having a horizontal and a vertical section; a series of hinge blocks pivotally mounted in quadratic relation on said rotary member; a series of arms hingedly connected to said blocks; supporting members for said arms mounted on said track; a series of collars mounted on said arms, said collars having recesses formed in the edge thereof; pins mounted on the sides of said arms to be engaged by said recesses; and 25 flexible connections between said collars.

2. A turnstile, comprising a rotary member; a track having a horizontal and a vertical section; a series of hinge blocks pivotally mounted on said rotary member and 30 in quadratic relation thereon; a series of arms hinged to said blocks, said arms being elongated in cross section; a plurality of rolling carrier members mounted on said arms to track on said track; an endless 35 belt connecting said arms; and projected members carried by said arms, adapted to be holdingly engaged by said belt when said members are disposed in radial relation to said rotary member to maintain the edge-wise position of said arms when moved from 40 the vertical to the horizontal sections of said track.

3. A turnstile, comprising a rotary member; a track having a horizontal and a vertical section; a series of hinge blocks pivotally mounted on said rotary member in quadratic relation; a series of arms hingedly connected to said blocks, said arms being elongated in cross section; an endless flexible 50 belt connecting the said arms; and means mounted on said endless belt for maintaining the hinge of each of said blocks parallel with the hinge of the adjacent block while the arm connected therewith is in the vertical section of said track. 55

4. A turnstile, comprising a rotary member; a track having a horizontal and a vertical half section; a series of hinge blocks axially mounted on said rotary member and 60 in quadratic relation thereon; a series of arms hingedly secured to said blocks, said arms being elongated in cross section and vertically supported on said horizontal section of said track; pins extended between the

opposite sides of said arms; a series of collars, one mounted on each of said arms, said collars having recesses formed in the edges thereof to engage said pins; and flexible connectors for said collars arranged to permit the said collars to sag when in the vertical section of said track. 65 70

5. A turnstile, embodying a rotary member, a track having a horizontal and a vertical section, a series of pivoted arms therefor, comprising a rigid portion, a tubular 75 portion pivotally connected to the said rigid portion to swing in a horizontal plane, and resilient members disposed between said rigid portion and said tubular portion to normally maintain the said tubular portion 80 in line with said rigid portion to form a yielding structure.

6. A turnstile, embodying a rotary member, a track having a horizontal and a vertical section, a plurality of hinge blocks 85 axially mounted on said rotary member in quadratic relation, a plurality of arms therefor pivoted to swing laterally, each comprising a short rigid portion hingedly connected with said hinge blocks, and a hollow section yieldingly mounted on said rigid portion 90 and adapted to be extended in the path closed by said turnstile.

7. A turnstile, embodying a rotary member, a track having a horizontal and a vertical section, a plurality of hinge blocks 95 axially mounted on said rotary member in quadratic relation, a plurality of arms therefor pivoted to swing laterally, each comprising a short rigid portion hingedly connected to said hinge blocks, a tubular section yieldingly connected to said rigid portion, and a yielding end cap for said tubular section adapted to yield to pressure applied to said cap endwise to said tubular section. 100 105

8. A turnstile, embodying a rotary member, a track having a horizontal and a vertical section, a plurality of hinge blocks axially mounted on said rotary member in quadratic relation, a plurality of arms therefor pivoted to swing laterally, each comprising a short rigid portion hingedly connected to said hinge blocks, a tubular section yieldingly connected to said rigid portion, a yielding hollow cap piece slidably mounted 110 115 on the end of said tubular section; and a compression spring mounted within said tubular section and said cap to normally extend the latter from said tubular section.

9. A turnstile, embodying a rotary member, a track having a horizontal and a vertical section, a series of arms slidably mounted on said track to be disposed thereby alternately in a horizontal and a vertical plane, and a locking device for said rotary 120 125 member, comprising a disk fixedly mounted on said rotary member, and having a series of four ratchet teeth disposed in quadratic



relation an annular flange mounted on said  
disk concentric with said teeth, said flange  
having a series of recesses adjacent to said  
teeth; a pawl pivotally mounted in juxtapo-  
5 sition to said disk adapted to engage said  
teeth and having a tail piece to engage said  
annular flange to cause the said pawl to  
engage said teeth, and adapted to aline with  
said recesses when said pawl is engaged with  
10 said teeth; and an operating mechanism for

said pawl engaging said tail piece to lift  
the same within said recesses.

In testimony whereof I have signed this  
specification in the presence of two subscrib-  
ing witnesses.

15

HAMILTON A. GORDON.

Witnesses:

E. F. MURDOCK,

PHILIP D. ROLLHAUS.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,  
Washington, D. C."

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