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J. BRADY.

REGISTERING TURNSTILE.

No. 417,141. Patented Dec. 10, 1889.

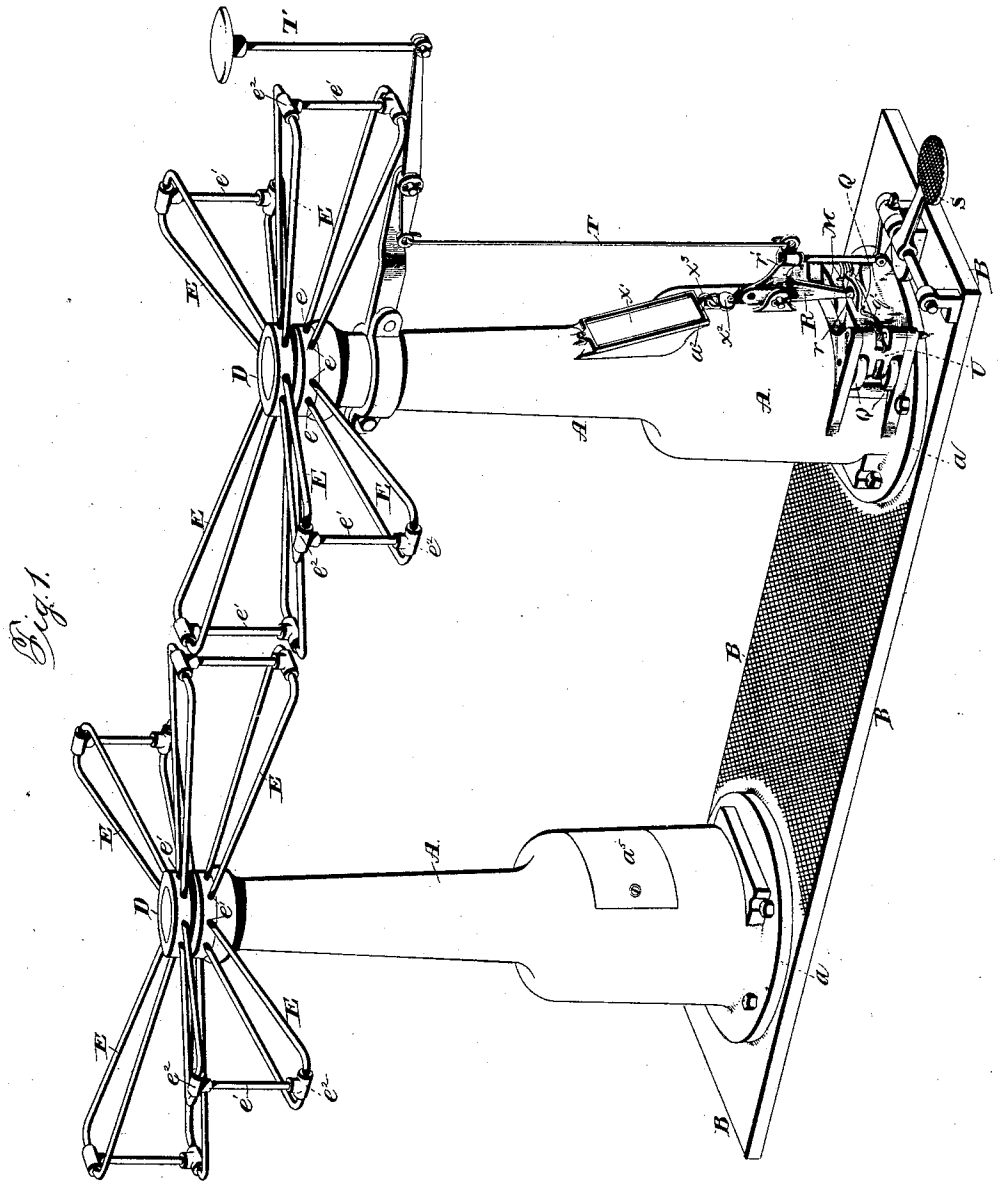


Fig. 1.

Witnesses
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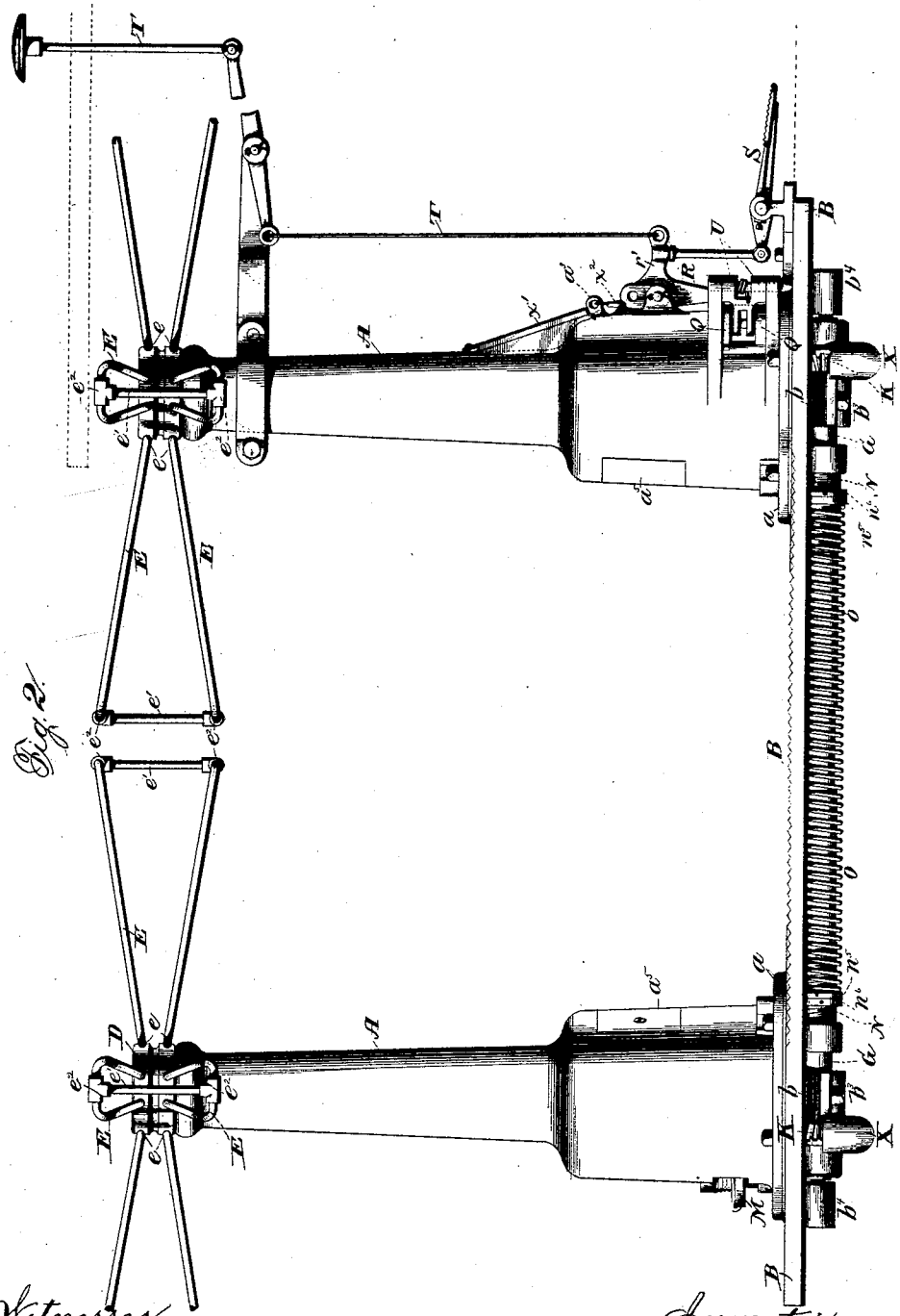


Fig. 2.

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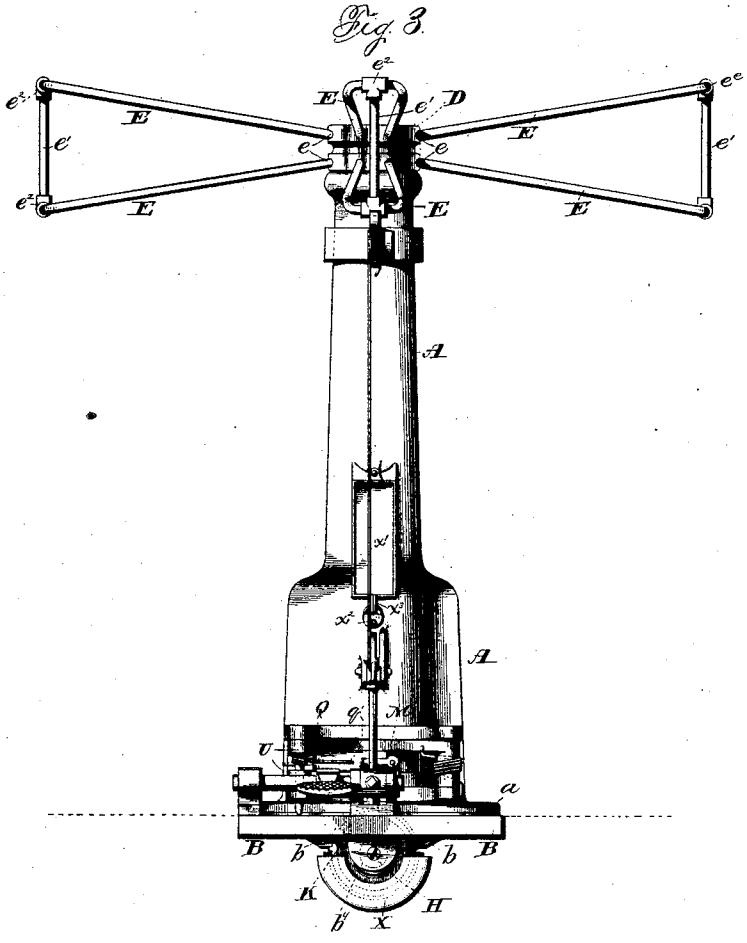
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Fig. 3.



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J. BRADY.

REGISTERING TURNSTILE.

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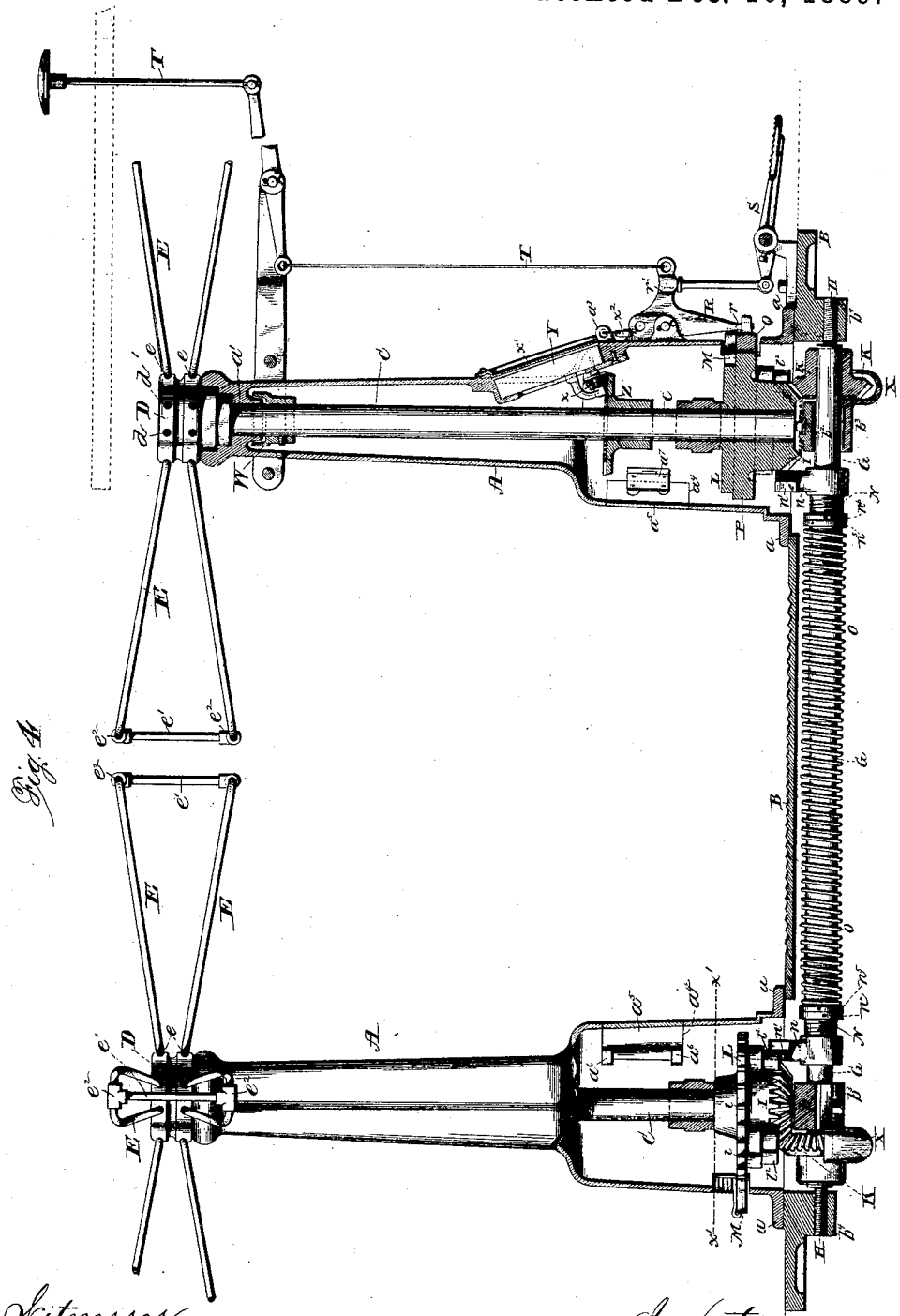


Fig. 4.

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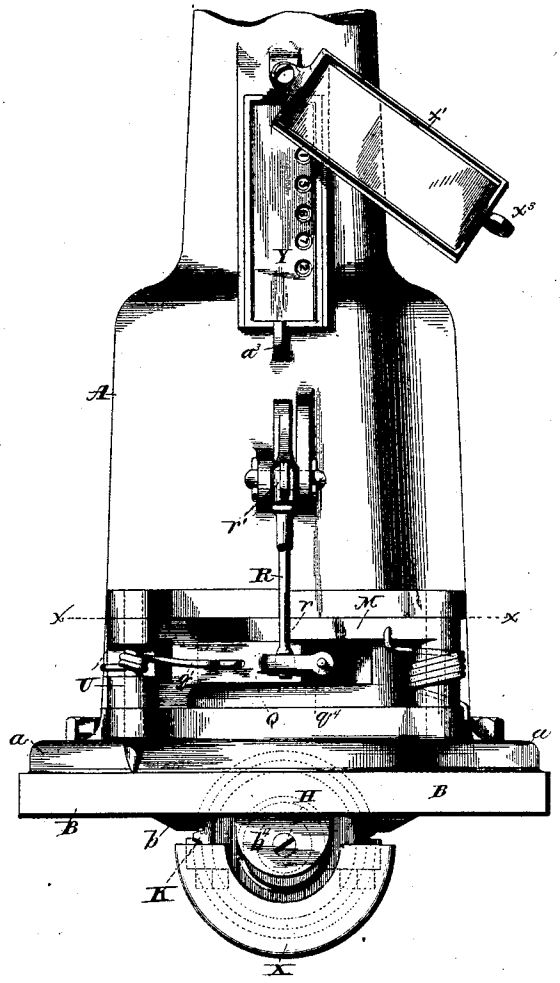
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Fig. 5.



Witnesses
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Fig. 6.

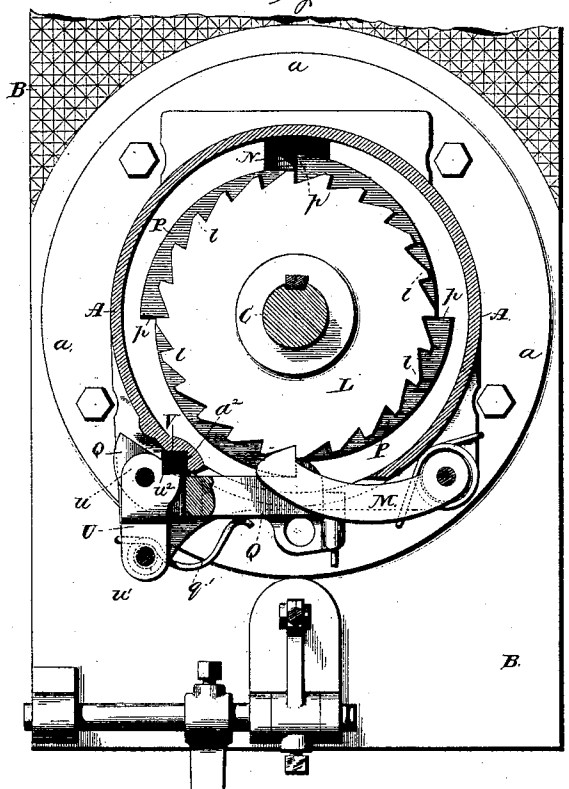


Fig. 7.

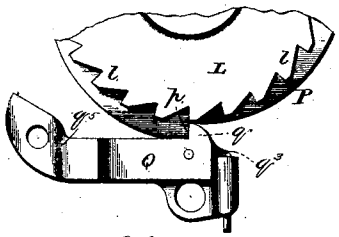


Fig. 8.

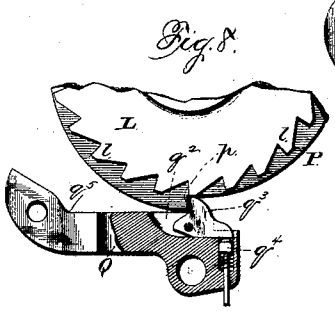


Fig. 9.

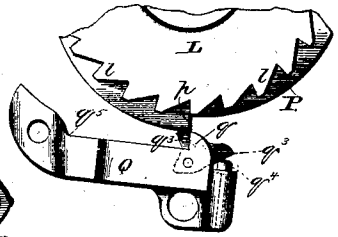


Fig. 10

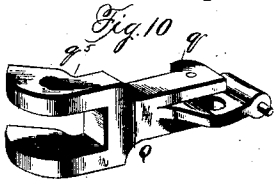
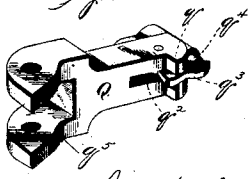


Fig. 11.



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J. BRADY.

REGISTERING TURNSTILE.

No. 417,141. Patented Dec. 10, 1889.

Fig. 12

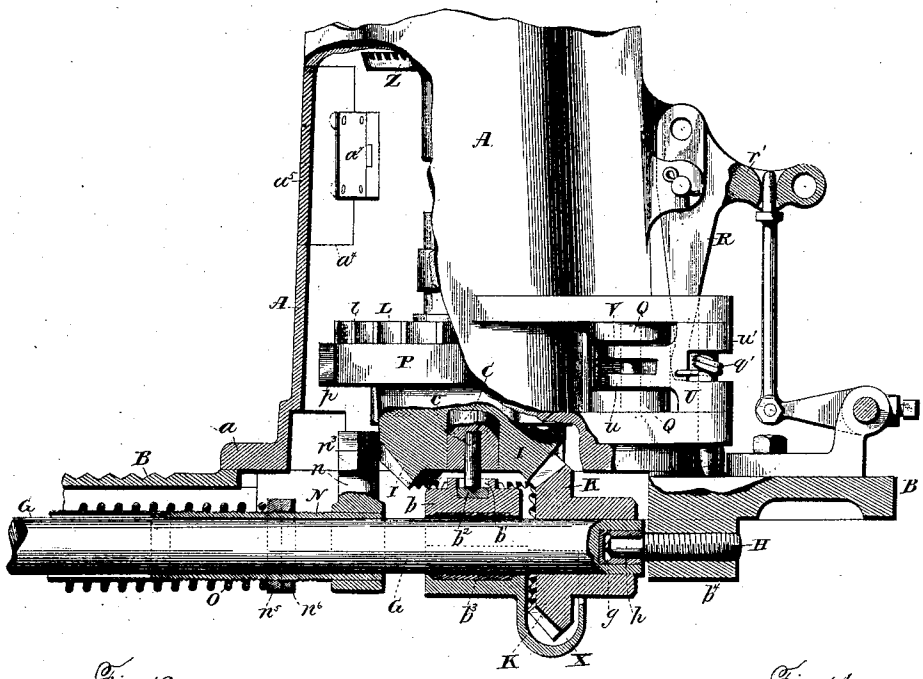


Fig. 13

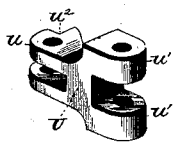


Fig. 15

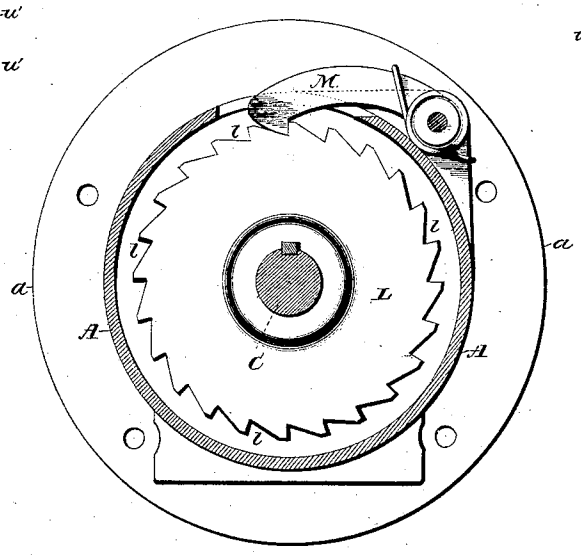
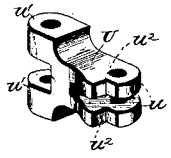


Fig. 14



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J. BRADY.

REGISTERING TURNSTILE.

No. 417,141. Patented Dec. 10, 1889.

Fig. 16.

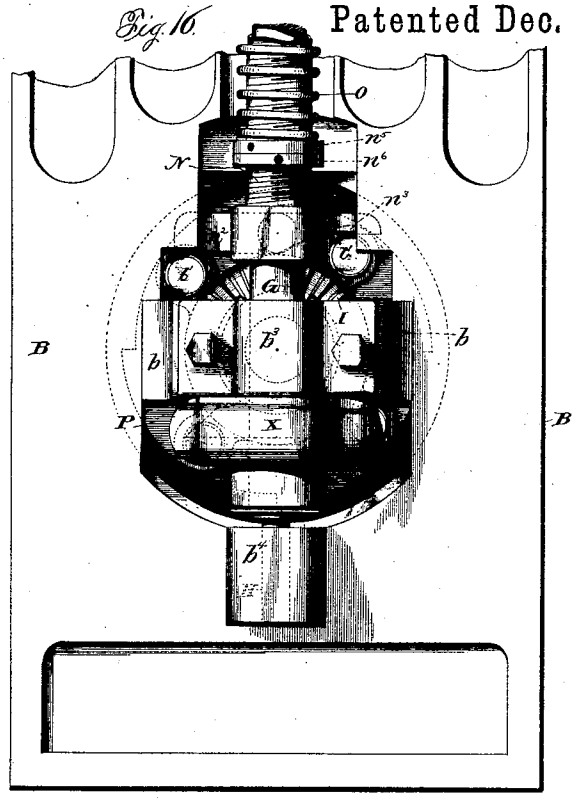


Fig. 18.

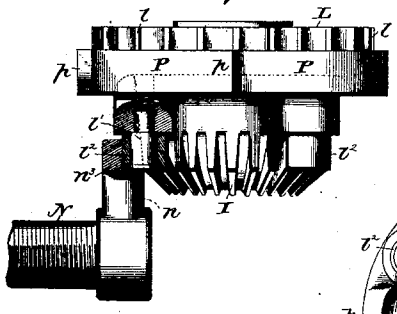


Fig. 17.

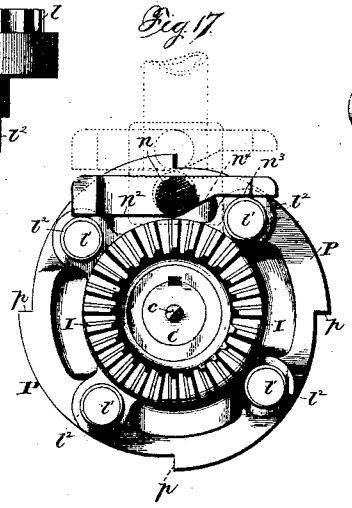
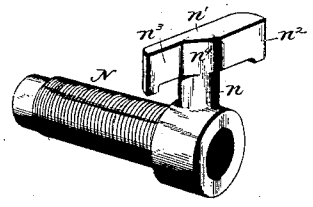


Fig. 19.



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UNITED STATES PATENT OFFICE.

JAMES BRADY, OF BROOKLYN, ASSIGNOR TO THE AMERICAN PASSIMETRE COMPANY, OF NEW YORK, N. Y.

REGISTERING-TURNSTILE.

SPECIFICATION forming part of Letters Patent No. 417,141, dated December 10, 1889.

Application filed February 4, 1888. Serial No. 263,043. (No model.)

To all whom it may concern:

Be it known that I, JAMES BRADY, of Brooklyn, in the county of Kings, and in the State of New York, have invented certain new and useful Improvements in Turnstiles; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of a complete apparatus containing my improvements. Fig. 2 is a side elevation of the same. Fig. 3 is an end elevation of said apparatus. Fig. 4 is a vertical section of the same upon a central longitudinal line. Fig. 5 is an enlarged end elevation of the lower portion of one of the turnstiles with the hand and foot portions of the tripping mechanism removed. Fig. 6 is a section of the same upon line $x\ x$ of Fig. 5. Fig. 7 is a broken plan view of the upper side of the locking ratchet and pawl. Fig. 8 is a like view of the same with the pawl partly in horizontal section. Fig. 9 is a similar view of said parts with the pawl "tripped" or released from engagement with the ratchet-wheel. Figs. 10 and 11 are perspective views of the locking-pawl from the outer and inner sides, respectively. Fig. 12 is an enlarged side elevation, partly in section, of the parts shown in Fig. 5. Fig. 13 is a perspective view, from the outer side, of the pivotal bearing of the locking-pawl. Fig. 14 is a like view of the same from the inner side. Fig. 15 is an enlarged horizontal section of the lower portion of the turnstile opposite to that which contains the locking and releasing mechanism, such section being taken upon line $x'\ x'$ of Fig. 4. Fig. 16 is a plan view, from below, of the locking-turnstile. Fig. 17 is a like view of the ratchet-wheel and the mechanism for moving the turnstile forward to position. Fig. 18 is a side elevation of the same, and Fig. 19 is a perspective view of the cam-bar separated from the other parts.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to increase the efficiency and durability of turnstiles; and to this end such invention consists in the construction of parts and their combination in one operative organization, substantially as and for the purpose hereinafter specified.

In the carrying of my invention into practice two turnstiles are combined in one organization, and for each is provided a casing A, which has the general shape of a bottle, as shown, and at its lower open end is provided with a horizontally-projecting flange a, by means of which the casing is secured to or upon a base B. Said base has such length as to afford a sufficient passage-way between the casings or columns A and A, and also extends beyond the same, so that each projecting end will serve as a support for such other parts as it may be necessary to place thereon. Beneath the lower end of each standard the base is cut away with exception of strip b, which extends transversely across the center, and upon its upper side is provided with a recess b', that is adapted to receive and contain a block b^2, of hardened steel, composition, or other suitable material to form a step or bearing. The upper end of the standard A forms a stepped bearing a', and within the same is journaled a shaft or spindle C, that from thence extends downward and at its lower end is provided with a steel bearing c, which rests upon the step b^2 and forms a pivotal support upon which the spindle may be rotated. To the upper end of said spindle is secured a head D, that is provided with two series of radial openings d and d, one of which is located at its upper end and the other series at its lower end, while the openings of each series are arranged in four pairs that are placed at equidistant points around said head.

Within each pair of openings d and d are secured the ends e and e of a U-shaped arm E, which arm is formed from a metal rod, and at its outer bent end has about twice the width of its inner end. The upper series of arms E and E extend radially outward and slightly upward, while the lower series of said arms have a radial and downward line, so that at their outer ends the corresponding arms of said series are separated vertically by a space which is about four times as great as the space which separates their inner ends. The outer ends of each pair of arms E and E

are connected together by means of a rod e', which extends between and has its ends attached thereto.

In practice I prefer to form each arm of two pieces, the ends of which are threaded and combined by means of an ordinary T-coupling e^2, while the ends of the connecting-rod e' are in like manner threaded and screwed into the central threaded opening of said coupling. As constructed said arms possess the greatest strength obtainable from the quantity of metal employed and are light both in weight and appearance.

Near each end, upon the lower side of the base B, there is provided a lug b^4, through which passes horizontally a threaded pin H, that has its inner projecting portion somewhat reduced in diameter, so as to form at such point a bearing h, while at its inner end said pin is pointed, as shown in Fig. 12. The pins H and H are exactly in axial line with each other, and upon their said bearings is journaled a shaft G, that is provided within each end with a bushed socket g for the reception of said bearing. The entire weight of said shaft is sustained by the said bearings; but in order to provide for an unusual strain, which might throw it out of line, two supplemental bearings b^3 and b^3, having the usual construction of a journal-box, are formed upon the lower sides of the bearing-strips b and b. When said shaft occupies its normal position, it does not touch said supplemental bearings; but should it be caused to spring out of line the latter would then operate to prevent injury.

The shaft G is designed to connect together the spindles C and C and to cause them to move simultaneously and in equal time in opposite directions. Such results are secured by attaching to the lower end of each spindle a bevel-gear I and securing upon each end of said shaft a bevel-pinion K, which pinions and gears mesh together, as shown in Fig. 4, and cause each movement of one spindle to be communicated to and duplicated by the opposite spindle. The relative arrangement of said spindles is such as to cause their arms to coincide and at all times occupy the same relative radial positions, by which means, as each arm is turned into and moved through the intervening passage-way, its outer end is directly opposite to the corresponding end of one of the arms of the other spindle.

It is intended that the movements of the turnstiles shall be in one direction only and shall be so completely under the control of an attendant that no one can turn the same until they have been purposely released, and that after the passage of each person the further movements of said turnstiles will be automatically arrested unless the attendant holds the locking mechanism out of engagement. To effect such result the following-described mechanism is employed, viz: Secured upon each spindle C, immediately above the bevel-gear I, is a ratchet-wheel L, which is engaged by a spring-pressed pawl M, that is pivoted upon a contiguous portion of the standard A. Said ratchet-wheel has its teeth l so formed as to permit of the rotation of the spindles in the desired direction only and to prevent movement in an opposite direction. Secured to and projecting downward from equidistant points upon the lower side of each ratchet-wheel L are four studs l' and l', upon each of which is journaled a roller l^2. Said rollers bear a certain relation to the arms of the turnstile, and when occupying their normal positions, as shown in Fig. 1, the two rollers upon the inner side occupy the position with relation to the line of the base which is seen in Fig. 17. Fitted loosely upon and adapted to slide lengthwise of the shaft G, adjacent to the inner end of each of its journal-bearings, is a sleeve N, which at its outer end is provided with an arm n, that projects upward and carries upon its upper end a horizontal bar n', that is arranged in a line having a right angle to the line of said shaft. Said bar has such length as to enable it to extend across the two contiguous roller-studs l' and l', and upon its side adjacent thereto has two bearing or cam faces n^2 and n^3, which are both parallel with the inner side of said bar, but occupy different positions transversely with relation to the same. Said faces are connected by an inclined intermediate face n^4 and bear the relation to each other and to the adjacent parts shown in Fig. 17. The periphery of the sleeve N is threaded, and upon the same are fitted two nuts n^5 and n^5, that are adapted to be moved lengthwise of and then locked in position upon said sleeve, for which last-named purpose one of said nuts is used as a jam or lock nut. A spring O, coiled around said sleeves and the intervening shaft and extending between and having its ends in engagement with the inner nuts n^5 and n^5, operates to press each sleeve outward and hold its cam-bar n' firmly against the adjacent roller-studs l' and l'. The spring O, acting through the cam-bar n', operates to hold the turnstiles with a yielding pressure in their normal positions, with two arms extending across and closing the passage between, but offers no material resistance to the movement of said turnstiles in the forward direction, during which operation the rearmost roller-stud l' passes from the higher face n^2 to the lower face n^3 over the inclined connecting-face n^4. After said turnstiles have been turned slightly more than one-eighth of a revolution, and before a passage is afforded for the smallest person, said spring-pressed cam-bars have their inclined faces in engagement with the rear rollers and operate to move said turnstiles the remainder of one-fourth of a revolution, and thus prevent them from stopping short from lack of momentum should the passenger be small. By the adjustment of the nuts n^5 and n^5 the operative strength of the spring may be varied at will, so as to increase or lessen the force and

rapidity with which the turnstiles are moved to place.

The turnstiles are locked in place against forward movement and their motion automatically arrested after the passage of each person by means of the following-described mechanism: Secured upon one of the spindles C, preferably between the gear-wheel I and ratchet-wheel L, is a ratchet-wheel P, which has but four teeth p and p, and has such teeth arranged in a direction opposite to the teeth l and l of said ratchet-wheel L. At a point within the casing or standard A adjacent to said ratchet-wheel P is pivoted a pawl Q, which at its front end has a hooked projection q, that is adapted to engage with one of the teeth p and p, and thus operate to prevent forward rotation of said ratchet-wheel and its spindle. The pawl Q is held in engagement with the ratchet-wheel P by means of a spring q', and is released from such engagement by a bell-crank lever R, which is pivoted upon the casing A and has one of its arms r entered in an aperture in the front end of said pawl and its other arm r' extended horizontally outward, as shown in Fig. 4. Said arm r' is connected with a treadle S to enable the said pawl Q to be released by the foot of an attendant, and also with a push-rod T, that extends up through a table or desk in convenient position to be pressed by the hand of such attendant, either device enabling the attendant at will to withdraw said locking-pawl, so as to permit of the rotation of the turnstile and the passage of persons between the same.

In order that the locking-pawl Q may be prevented from being re-engaged with the ratchet-wheel P after having been released therefrom and before a person has passed between the turnstiles, the front end at the inner side of said pawl is provided with a longitudinal groove q^2, within which is pivoted a tripping-pawl q^3. The latter has such a shape that when turned forward to the limit of its motion in such direction its outer edge coincides with the adjacent edge of the hook-shaped projection q of said pawl Q; but when turned to the rear limit of its motion said pawl q^3 projects beyond and in rear of said projection q, and, bearing upon the outer face of the contiguous tooth p, prevents contact between the latter and said pawl Q and enables the said ratchet-wheel P and its connecting mechanism to be turned forward. A spring-pressed rod q^4, engaging with the front end at the outer side of said tripping-pawl, holds the latter with a yielding pressure at the rear limit of its motion.

In the use of the turnstiles to permit of the passage of a person it is only necessary that the attendant should move the locking-pawl to the outer limit of its motion, when by the action of the tripping-pawl it will be held in such position until the turnstiles have been turned one-fourth of a revolution, during which movement the outer end of said pawl Q, following the inclined outer face of the contiguous tooth p, will move inward again until its projection q engages with the next succeeding tooth p; but before such engagement is effected said tripping-pawl will be engaged by said tooth and turned to the forward limit of its motion, by which means it is only necessary for the attendant to unlock the turnstiles and not to afterward hold the locking mechanism out of engagement, as would be required were the tripping-pawl not employed.

In order that the shock which would be caused by the sudden arrest of motion of the turnstiles may be avoided and undue wear and breakage of parts prevented, the locking-pawl Q is not pivoted directly upon the casing A, but has its rear end forked and such part pivoted upon one end u of a bar U, the other end u' of which bar is in turn pivoted to or upon said casing, the arrangement, as shown in Fig. 6, being such that the pivotal end u' of said bar is farthest from the body of said casing and its opposite end u is near to the same, and lengthwise said bar has substantially a right angle to the line of said pawl.

Within the inner end and front side of bar U is formed a V-shaped notch u^2, which corresponds to and coincides with a like notch q^5 in the inner edge of the pawl Q, and both engage with a block of india-rubber V, that is placed between said parts and the contiguous side of the casing and is partly contained within a V-shaped recess a^2, which is formed in the latter. As arranged said rubber block or buffer furnishes a bearing for the draft of said pawl and receives the entire shock caused by the engagement of the latter with its ratchet-wheel.

It being desirable that the mechanism should be able to operate for long periods, the following-described means are employed for maintaining a supply of oil in the principal bearings and between the connecting-gearing, viz: Secured upon and rotating with each spindle C, immediately below the upper bearing a', is an annular oil-cup W, which has its upper end extended upward around the lower downward-extended end of said bearing, the latter being thus inclosed without having contact with said cup. If, now, oil is supplied to said cup, it will be held in direct contact with the lower end of said bearing, and by the rotation of said spindle will be carried upward through the entire length of the same, and the entire quantity supplied will be utilized, as no waste is possible. The gearing is kept constantly lubricated by means of a supply of oil which is contained in a cup X, that is cast with or secured upon each journal-box b^3 and surrounds and incloses the lower portion of the pinion K. The latter is thus caused to constantly take up oil and to convey the same to the gear-wheel I, whereby the teeth of said parts are kept constantly supplied with oil and all

avoidable friction avoided. From said pinion K oil is carried to the adjacent end bearing of the horizontal shaft, while the lower bearing of the spindle is in like manner supplied with oil, which is drawn into it from the gear-wheel I.

The movements of the turnstile are automatically registered by means of a registering mechanism Y, which is located in the side of the casing A, adjacent to the position of the attendant, and is connected with the spindle C by means of a bevel-pinion x, that meshes with a bevel gear-wheel Z upon said spindle. In order that the register may be readily seen and read, its dial is set at an angle of about eighty degrees, which is found to be most advantageous; but it may be varied, if desired. The dial is covered by means of a glazed frame x', which is pivoted at its upper end, so as to adapt it to be swung edgewise over or from off said dial. When in place, as shown in Fig. 1, said covering-frame is locked by means of a padlock x^2, that is passed through coinciding eyes x^3 and a^3, which are formed, respectively, upon said frame and upon the contiguous portion of the casing A.

Access to the interior of each casing A is had through an opening a^4, which is preferably formed within the inner side of the lower portion of such casing. Said opening is closed by means of a door a^5, that is hinged to one edge of the same by hinges a^6 and a^6, which are wholly upon the inside and cannot be seen from without when the door is closed. A lock a^7, secured upon the free edge at the inner side of said door, is adapted to engage with a suitable keeper when the door is closed and to lock the same in such position. Like the hinges, said lock and keeper are entirely concealed, so that the original lines of the casing are restored and maintained, and no projection appears at or around the opening a^4.

In the use of the mechanism described passage in but one direction is possible and no movement of the turnstiles can be made by which a person can pass through without such being indicated by the register, which register is entirely removed from the control of the attendant and cannot be tampered with. The movements of the turnstiles are entirely under the control of the attendant, and after having been released to permit of the passage of one person they will be automatically locked against the passage of others unless such attendant purposely holds the locking mechanism out of engagement, so that he is enabled to instantly block the passage-way should a passenger neglect or refuse to deposit his fare.

Having thus described my invention, what I claim is—

1. The combination, with a turnstile, of a backward-movement-preventing ratchet-wheel and pawl, a stopping ratchet-wheel, the teeth of which are the reverse of those of the first-named ratchet-wheel, a locking-pawl for the said stopping ratchet-wheel, and a pivoted cushioned bearing-bar, to which the said locking-pawl is pivoted, substantially as and for the purpose specified.

2. The combination, with a turnstile, of a stopping ratchet-wheel, a locking-pawl therefor, a pivoted bearing-bar on which said locking-pawl is pivoted, and the elastic cushioning-block interposed between a fixed bearing and the contiguous ends of the said pawl and bar, substantially as and for the purpose set forth.

3. The combination, with a turnstile, of a stopping ratchet-wheel, a locking-pawl therefor, a bearing-bar on which said locking-pawl is pivoted, the bearing-bar being pivoted at one end and notched at its other end, and the cushioning-block seated in the notched end and engaging with a contiguous fixed bearing, substantially as and for the purpose shown.

4. The combination, with two turnstiles arranged on opposite sides of a passage-way, of a connecting-shaft for said turnstiles journaled on axial end bearings and intermediate supplemental journal-boxes which operate only when said shaft is sprung out of line, substantially as and for the purpose shown and described.

5. The combination, with a turnstile-head, of radial arms, each of which is composed of two U-shaped sections approximately horizontal, but diverging from each other, and a vertical bar connecting said sections at their outer ends, substantially as and for the purpose specified.

6. The combination, with a turnstile-head, of a series of radial arms, each of which is composed of two U-shaped sections and each section of two parts coupled together at their outer ends and secured within said head at their inner ends, substantially as and for the purpose set forth.

7. The combination of two turnstiles on opposite sides of a passage-way, a shaft and gearing positively connecting said turnstiles, so that they will rotate simultaneously in opposite directions, and backward-movement-preventing ratchets and pawls on the shafts of the said turnstiles, a stopping ratchet-wheel, a locking-pawl therefor, a disengaging device for said locking-pawl, and spring-pressed arms to automatically complete the partial rotary forward movements of the turnstiles after such movements have been commenced, substantially as and for the purpose shown and described.

8. The combination, with a turnstile-shaft and its backward-movement-preventing ratchet-wheel and pawl, of a stopping ratchet-wheel, the teeth of which are the reverse of those of the first-named ratchet-wheel, and a locking-pawl for said stopping ratchet-wheel, provided with a spring-actuated tripping pawl or latch adapted to be pressed within the outline of the stopping-shoulder

of the said locking-pawl, but normally projecting beyond the same to hold said locking-pawl out of engagement from a tooth of the stopping ratchet-wheel when once released, substantially as and for the purpose specified.

9. The combination, with a turnstile, of a stopping ratchet-wheel, a locking-pawl therefor, a bell-crank lever pivoted to the casing and having one arm in engagement with said pawl, and a treadle and push-rod connected to the other arm of said lever, through the medium of either of which the locking-pawl may be disengaged from the stopping ratchet-wheel, substantially as and for the purpose specified.

10. The combination, with a turnstile-shaft, of a stopping ratchet-wheel mounted thereon, a locking-pawl adapted for engagement with said wheel, and a spring-actuated tripping pawl or latch pivoted within a groove formed in the end of the locking-pawl and adapted to be pressed within the outline of the stopping-shoulder of said pawl, but which normally projects beyond the same to hold said pawl out of engagement from a tooth of the stopping ratchet-wheel when once released, substantially as and for the purpose set forth.

11. The combination, with two turnstiles arranged on opposite sides of a passage-way and provided with equidistant roller-studs corresponding in number to the arms of the turnstiles, of a shaft and gearing connecting said turnstiles and two spring-pressed collars on said shaft provided with arms having cam-faces to bear against two of said roller-studs simultaneously and to automatically complete a partial rotation of the turnstiles after such partial rotation has been commenced, substantially as and for the purpose shown and described.

12. The combination, with two turnstiles arranged on opposite sides of a passage-way and provided with equidistant roller-studs corresponding in number to the arms of the turnstiles, of a shaft and gearing connecting said turnstiles, two sleeves or collars on said shaft provided with arms having cam-faces to bear against two of said roller-studs simultaneously, and a spring surrounding said shaft and extending between and bearing against said collars, so as to automatically effect the completion of the partial rotation of the turnstiles after such partial rotation has been commenced, substantially as and for the purpose shown.

13. As an improvement in turnstiles, the combination, with the arm-carrying shaft provided with roller-studs corresponding in number to the arms on said shaft, of a sliding spring-pressed sleeve or collar provided with cam-faces to bear against said roller-studs, whereby the completion of the partial rotation of the turnstile may be automatically effected after such partial rotation has been commenced, substantially as and for the purpose specified.

In testimony that I claim the foregoing I have hereunto set my hand this 21st day of January, 1888.

JAMES BRADY.

Witnesses:
JNO. E. GAVIN,
ARTHUR C. FRASER.