

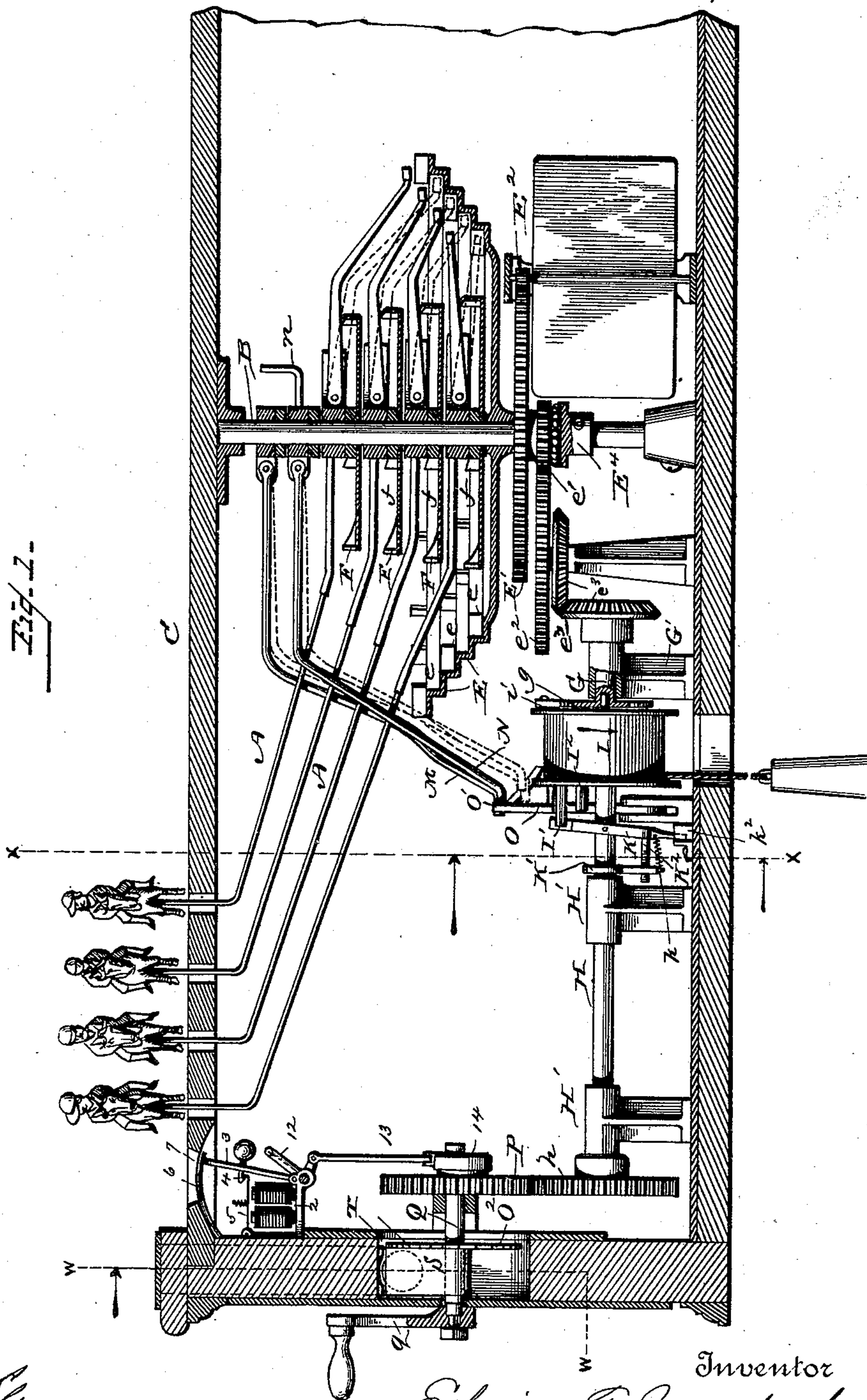
(No Model.)

5 Sheets—Sheet 1.

E. F. MURDOCK.
COIN CONTROLLED TOY.

No. 461,363.

Patented Oct. 13, 1891.



Witnesses
Wm. L. Stearns.
Alfred Stewart.

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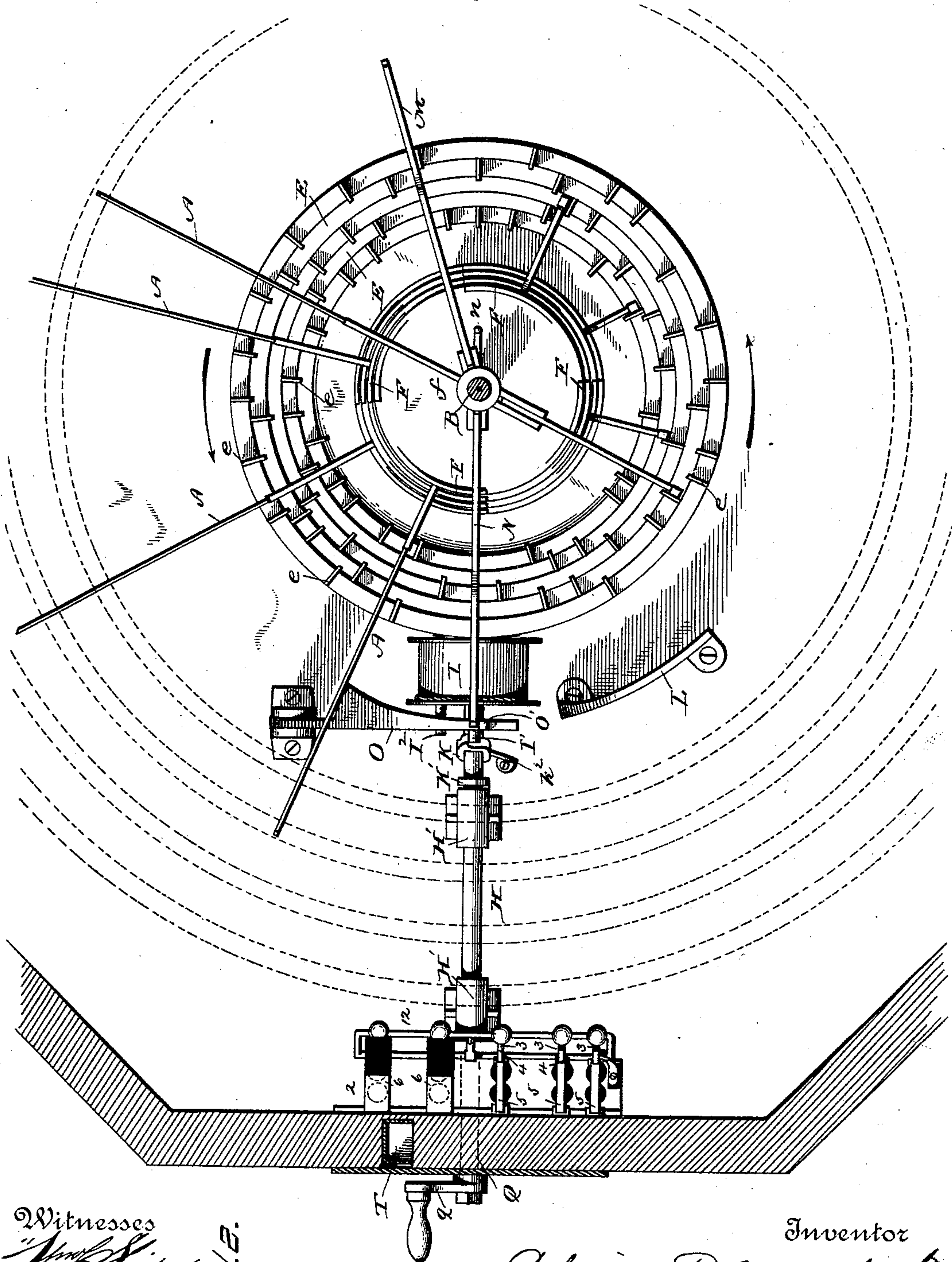
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Fig. 2.

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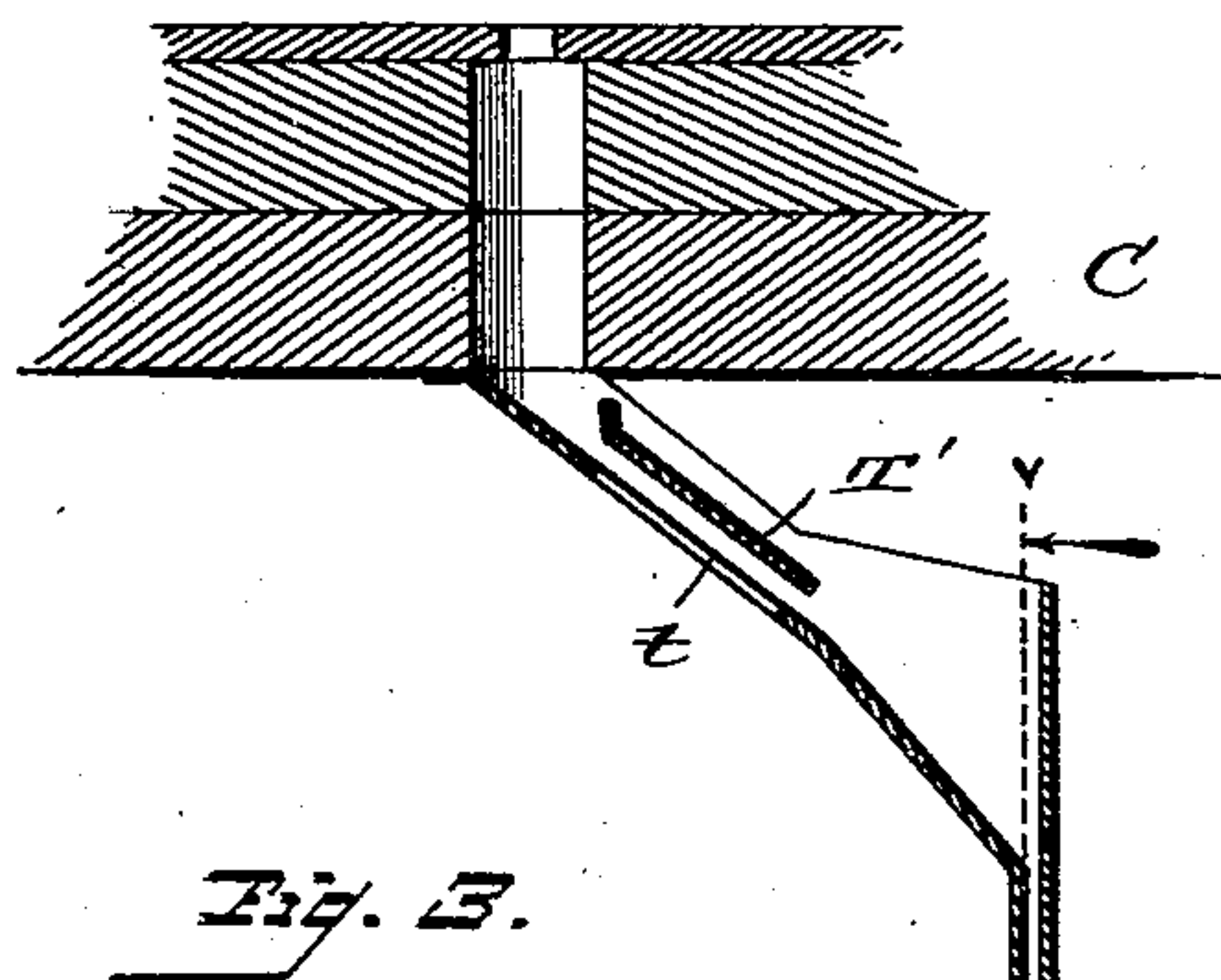


Fig. 3.

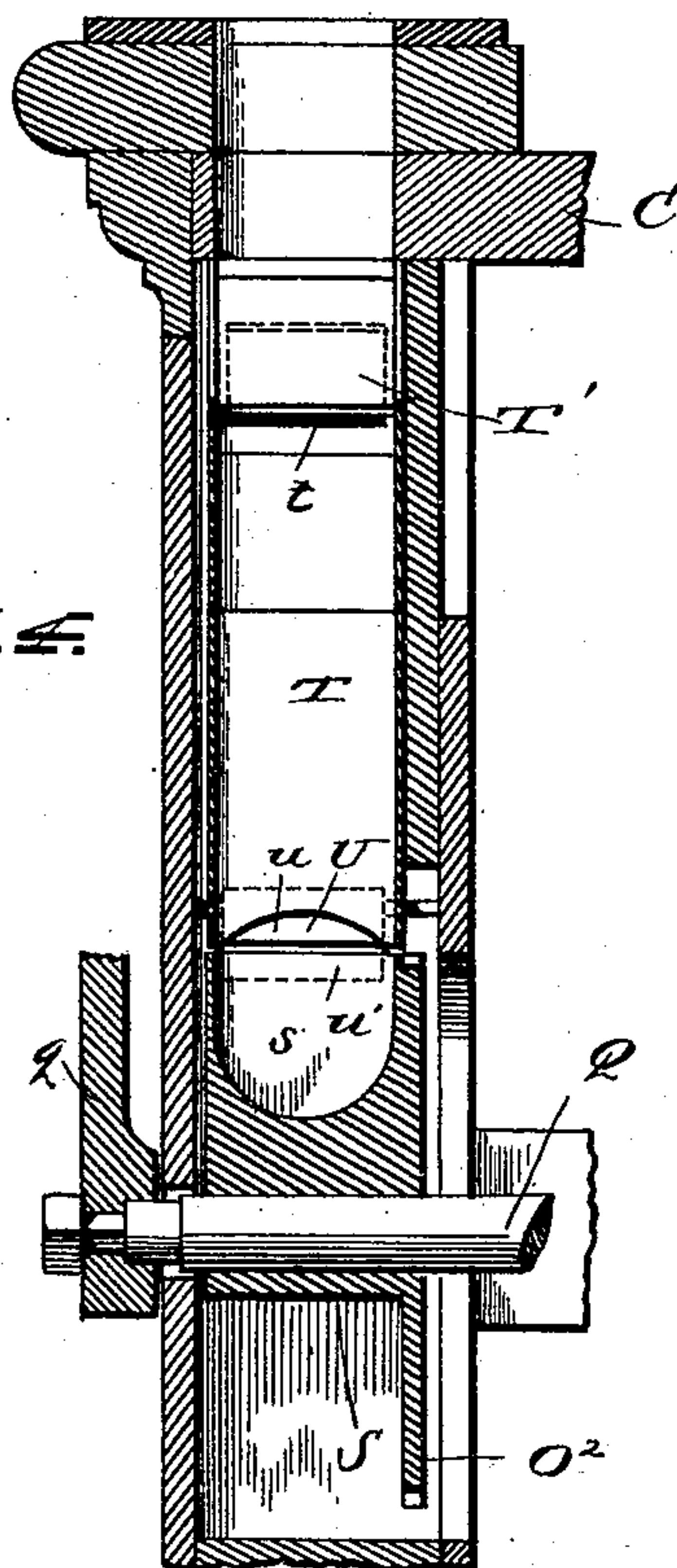


Fig. 4.

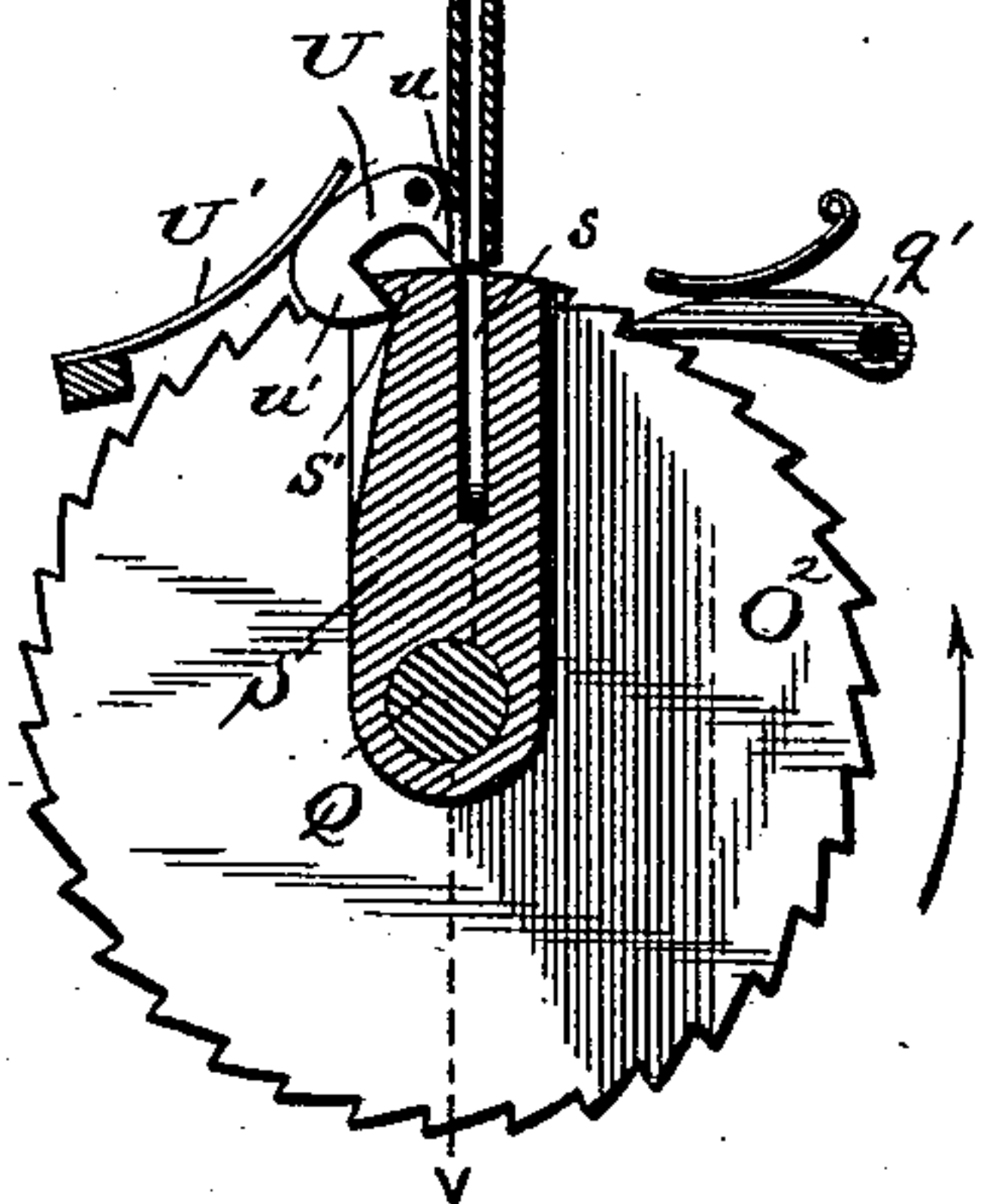


Fig. 5.

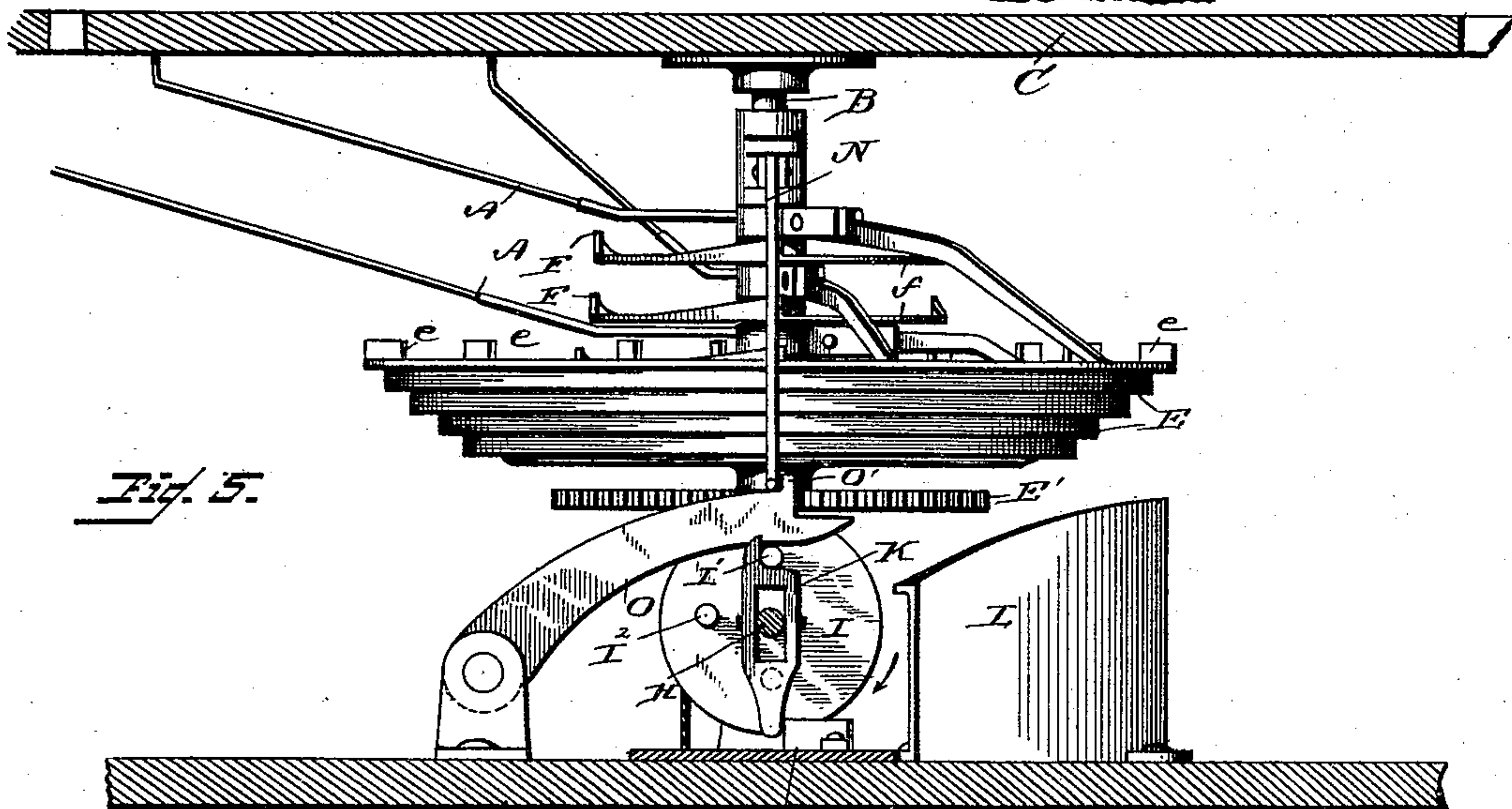


Fig. 6.

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Fig. 6.

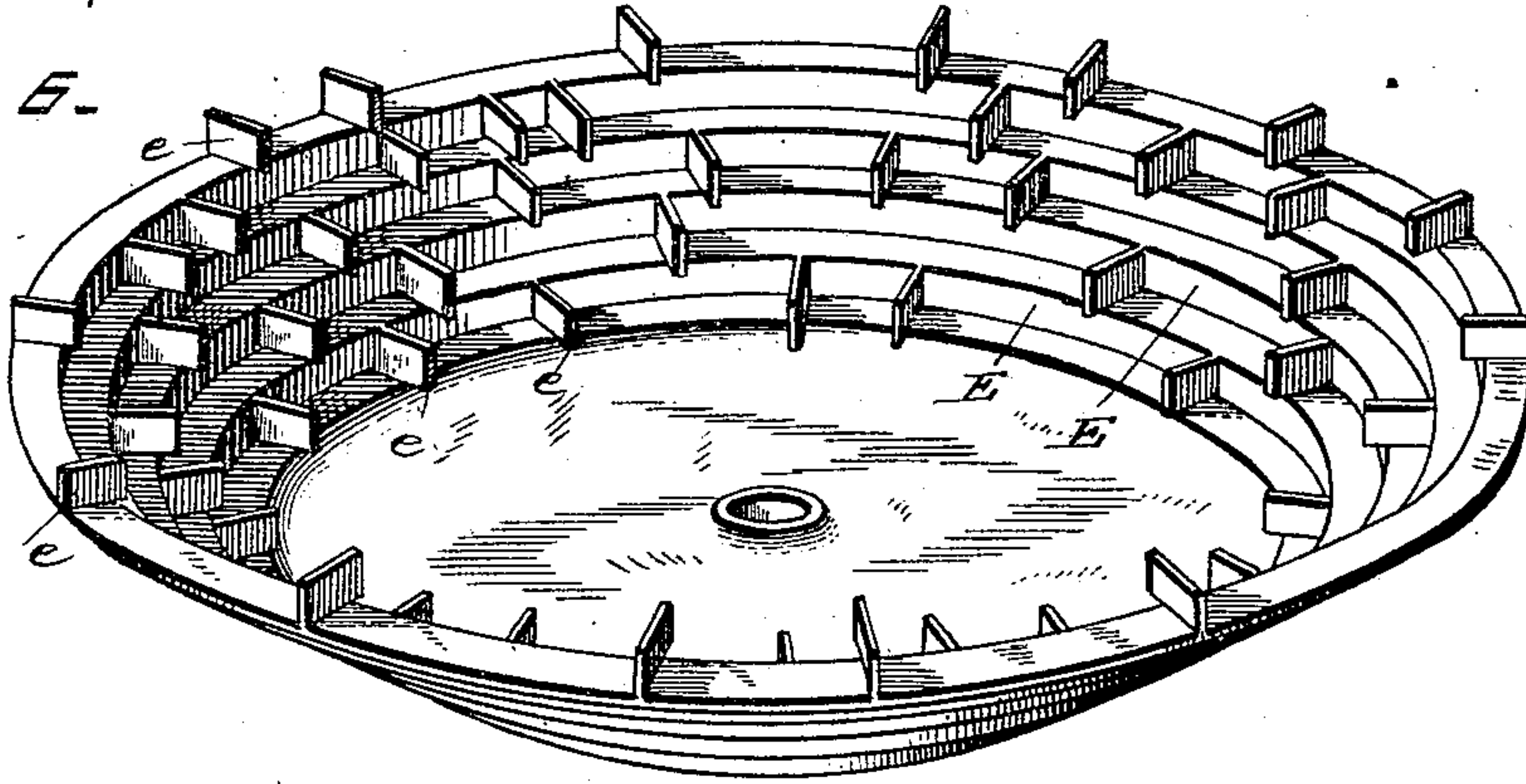


Fig. 7.

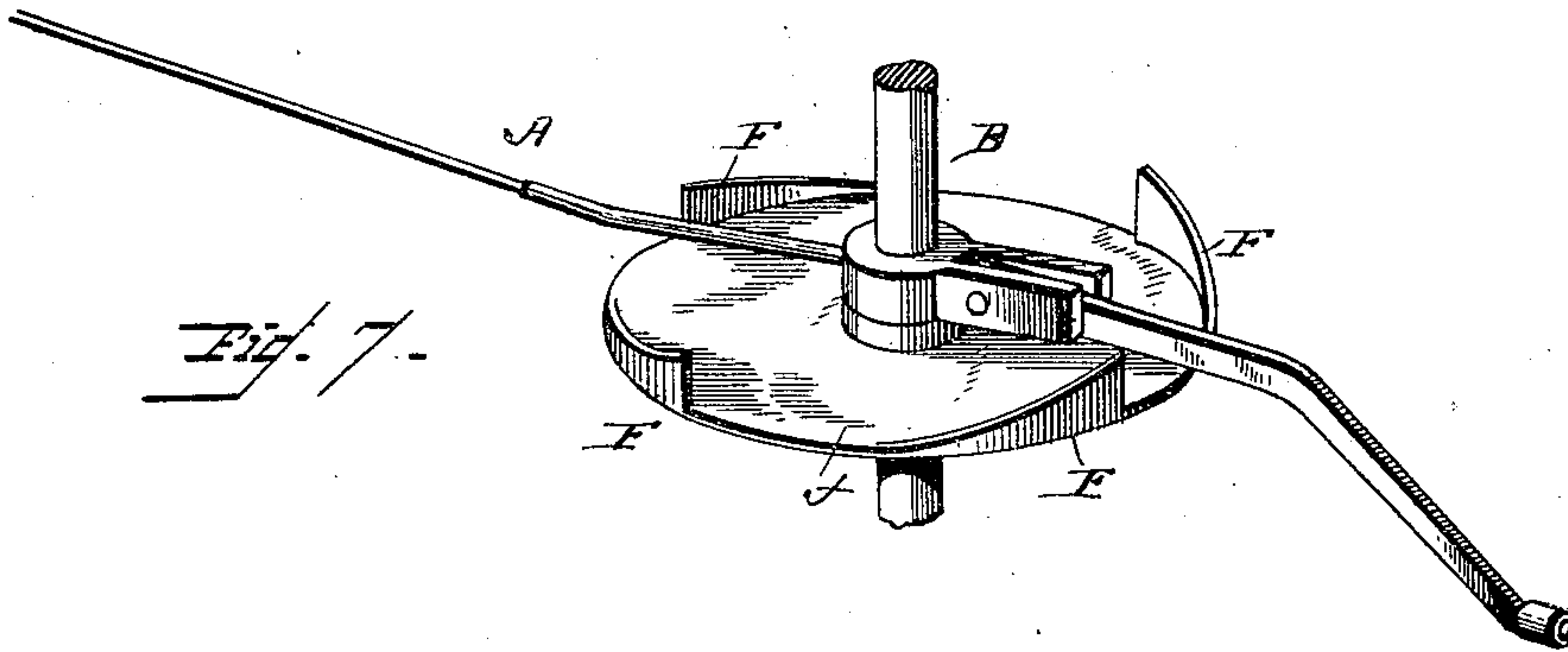
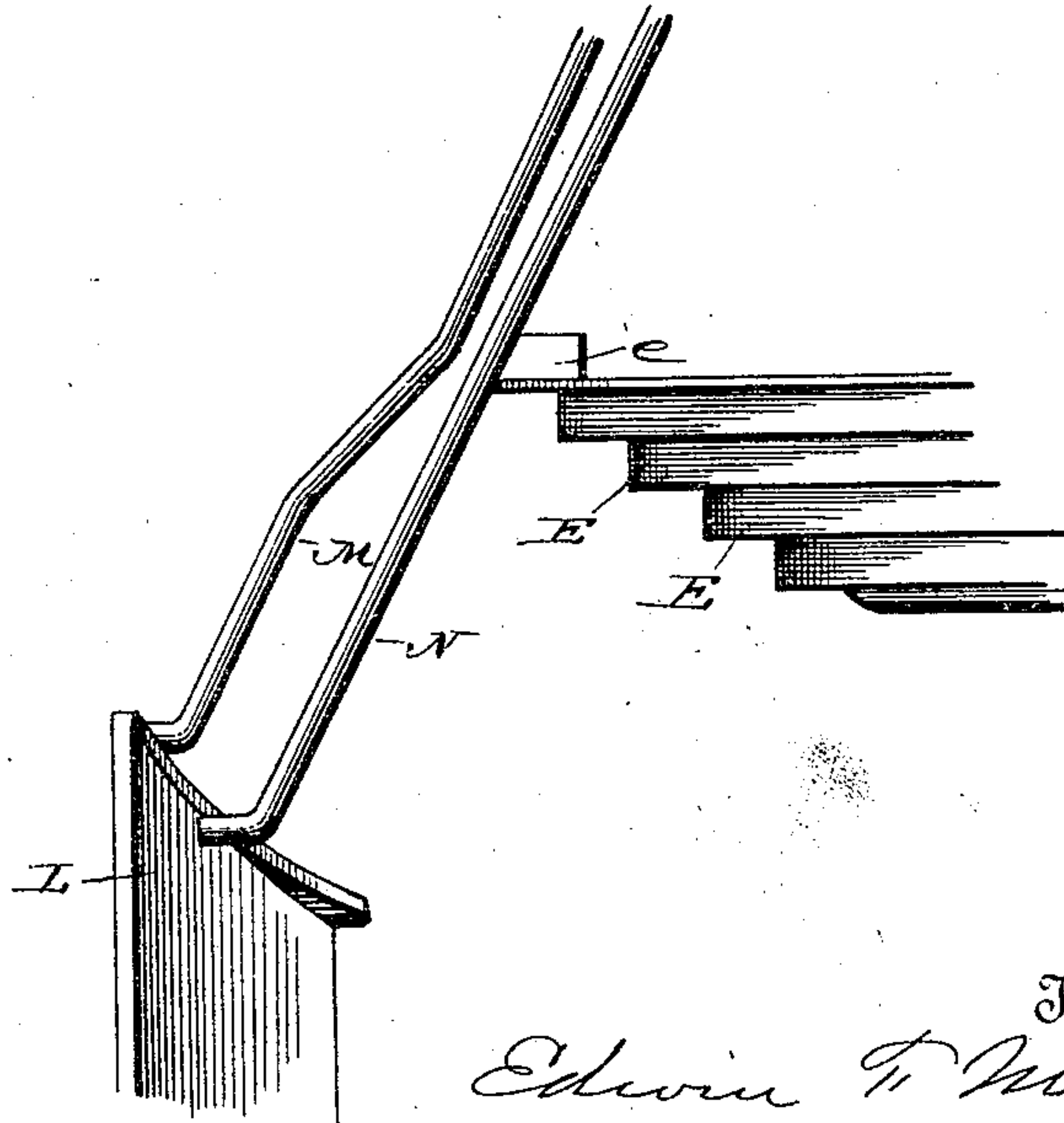


Fig. 8.



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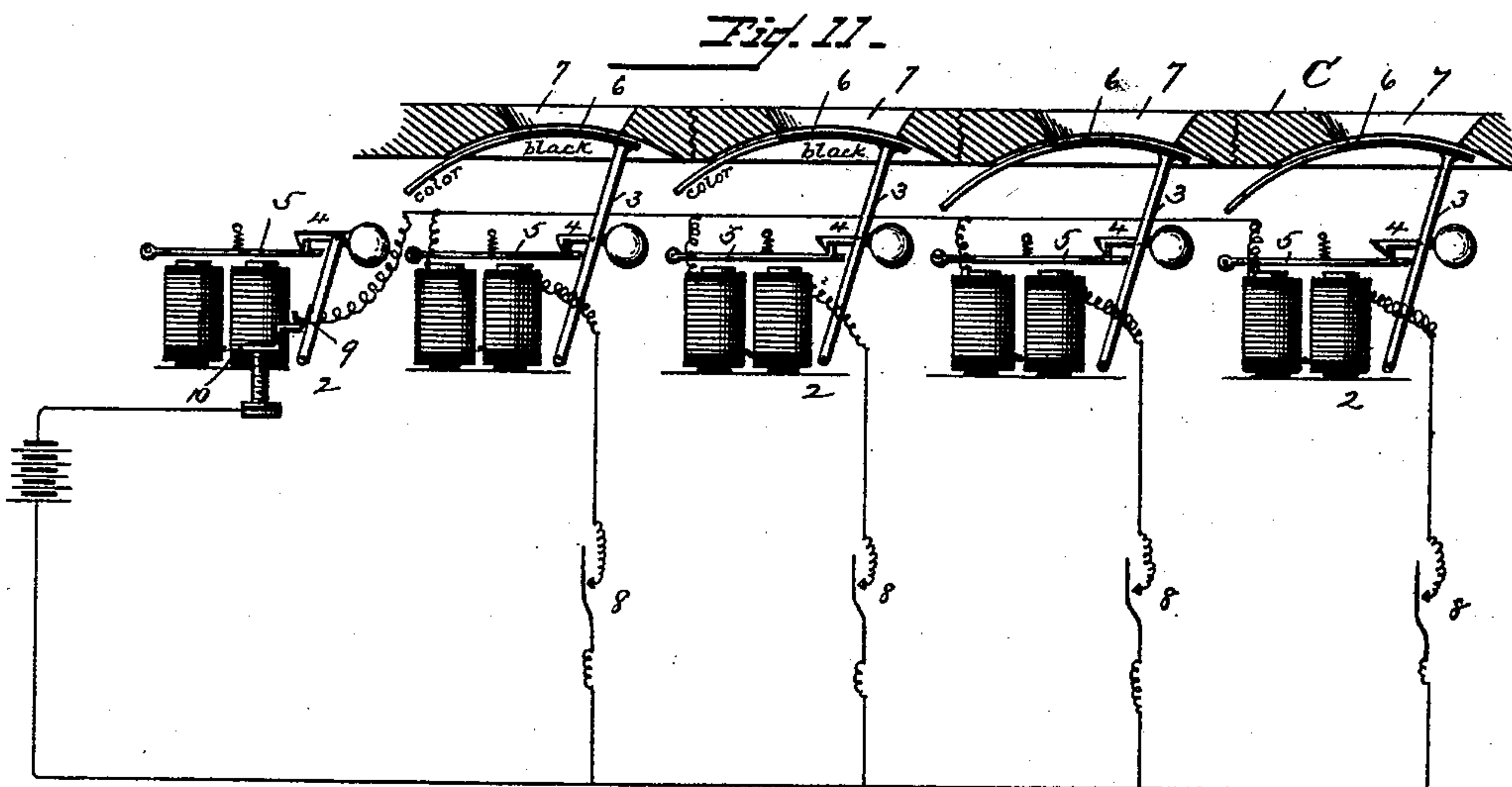
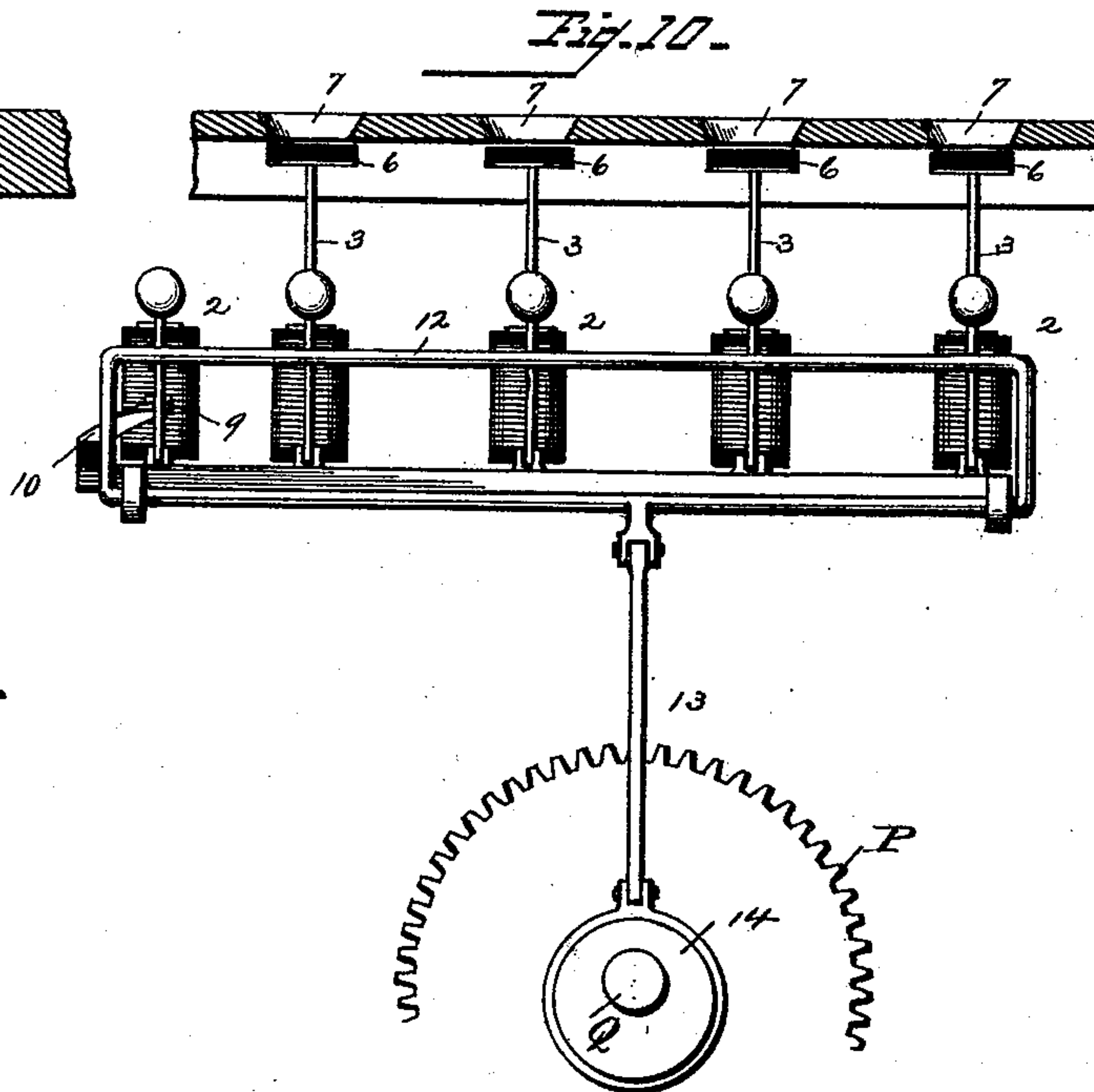
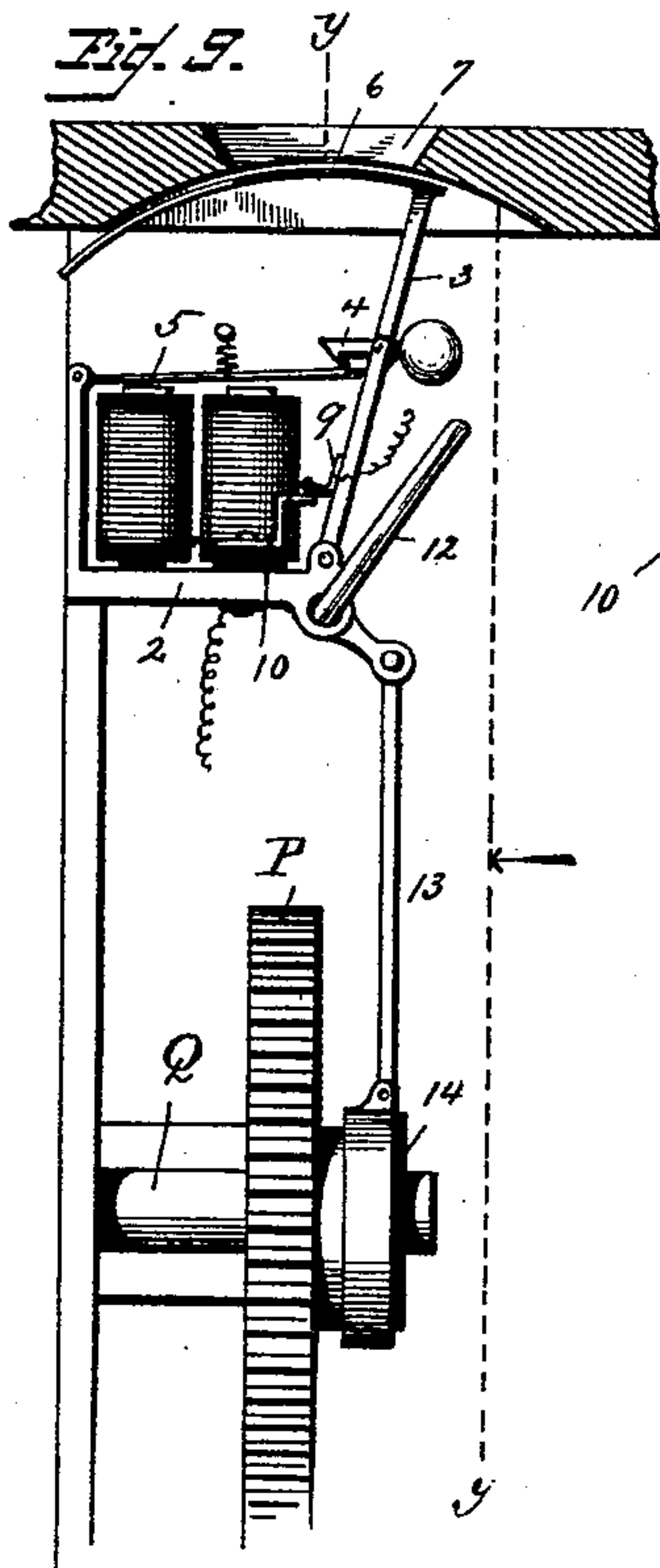
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UNITED STATES PATENT OFFICE.

EDWIN F. MURDOCK, OF WASHINGTON, DISTRICT OF COLUMBIA.

COIN-CONTROLLED TOY.

SPECIFICATION forming part of Letters Patent No. 461,363, dated October 13, 1891.

Application filed August 9, 1890. Serial No. 361,567. (No model.)

To all whom it may concern:

Be it known that I, EDWIN F. MURDOCK, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Coin-Controlled Toys; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

The present invention relates to that class of automatic toys in which a number of figures are caused to travel through predetermined orbits or paths under the influence of an impelling or actuating mechanism in simulation to a racing contest—such, for instance, as that shown and described in my prior patent, No. 420,389, dated January 28, 1890, the object of the invention being to improve and simplify the mechanical structure and operation of the parts, at the same time rendering it practically impossible to determine before the termination of the contest which figure will win, a further object being to provide a mechanism for rewinding the motor before each contest, which mechanism is rendered operative through the interposition of a coin of predetermined value, thereby dispensing with the services of an attendant or expensive motor mechanism.

With the above objects in view the invention may be said to consist in certain novel details of construction and combinations and arrangements of parts, and further in an improved mechanism adapted to be operated through the interposition of a coin, all as will be hereinafter more fully described, and pointed out particularly in the claims at the end of this specification.

Referring to the accompanying drawings, illustrating the present embodiment of the invention, Figure 1 is a vertical section showing part of the operating mechanism in elevation, one side of the track-plate being broken away and the operating-arms shown down in dotted lines. Fig. 2 is a top plan view with the track-plate shown in dotted lines. Fig. 3 is a sectional view through the releasing mechanism on the line *w w*, Fig. 1. Fig. 4 is a section on the line *v v*, Fig. 3. Fig. 5 is a

section on the line *x x*, Fig. 1. Fig. 6 is a detail perspective of the main actuating disk or wheel. Fig. 7 is a similar view of one of the carrying-arms and its pivoted actuating-arm and releasing-cams. Fig. 8 is a detail section showing the retarding-cam and starting and stopping arms. Fig. 9 is an enlarged detail section of the color-displaying mechanism. Fig. 10 is a section on the line *y y*, Fig. 9, showing the color-displaying mechanism in elevation. Fig. 11 is a diagrammatic view showing the circuits of the color-displaying mechanism.

Like letters of reference indicate the same parts in all of the figures.

Considered as a whole the present apparatus comprises a number of instrumentalities which accomplish the results enumerated in my prior patent above referred to—that is to say, first, there are figures or other objects representing the contestants; second, guiding or carrying mechanism, whereby the path of each figure is determined; third, a motor or driving mechanism; fourth, an intermittent impelling or actuating mechanism between the motor-train and each of the figures; fifth, a starting and arresting mechanism for inaugurating the movement of the figures and arresting them at or near the termination of the course, in addition to which a mechanism for rewinding the motor through the medium of an interposed coin is provided with means for releasing the motor automatically when so wound to impel the figures around the course, and, finally, a mechanism for indicating which of the contestants has won.

As the present apparatus is designed to represent a horse-race, the figures shown are miniature horses, each mounted on the upturned end of a carrying-arm A journaled independently on a central shaft or upright B secured firmly in the base of the casing. These arms A constitute the carrying and guiding mechanism and project through suitable slots in the track-plate C, which conform to the orbit described by the ends of the arms—in the illustration a true circle with the upright B as a center.

Below the arms A and preferably journaled on the same shaft is the actuating disk or wheel, adapted to be rotated by means to be

presently described, and consisting, essentially, of a central hub and web with a series of rims or annular steps E around its periphery, each having a number of irregularly-spaced projections or lugs e thereon, the inner ends of which project out over the next lower step, as shown. The carrying and guiding arms A each extend rearwardly, so as to engage said projections, such extensions being preferably pivoted, so as to drop readily by reason of their own weight, and for convenience in the specification will be called "actuating-arms." The outer end of each actuating-arm rests on one of the steps of the actuating-wheel, and consequently lie in the path of the projections on that step, so that as the wheel is rotated the figures will be rotated in unison therewith; but in order now to introduce the element of chance and cause the figures to assume different positions on the track with relation to each other cams are provided for elevating the actuating-arms at intervals, permitting the wheel and projections to travel past the same, the positions of the figures when the re-engagement with the wheel occurs being determined by the position of the next succeeding projection with which the arms engage. The releasing cams or inclines F just referred to are preferably formed on the peripheries of disks or webs f, mounted fixedly on the central upright, the central hubs in effect constituting the bearings for the hubs of the carrying-arms, and are spaced around the path of the arms in any order preferred. They are divided into two groups as to height, one group being of such height as that the arms are lifted just high enough to pass out of the path of the projections on one step and into the path of the overhanging ends of the projections on the next high step, and are called "releasing-cams," the other group being of a sufficient height to lift the arms entirely out of the path of all the projections, and are called "stopping-cams," because they in conjunction with other mechanism to be presently described cause the disengagement of the arms and arrest of the figures at the stopping-point.

Beneath the actuating-wheel and connected thereto are two gear-wheels E' e', the former of large diameter and in gear with a pinion E² on a governor-shaft, and the latter in gear with the wheel e² gearing through bevel-gears e³ with the shaft G, mounted in a bearing G' on the base.

Extending out in line with shaft G is the main shaft H, which is preferably mounted in bearings H' and also has a stud bearing in the end of shaft G, preventing any danger of the same getting out of line. On the shaft, and adapted to be wound thereby, is the prime mover or motor, in the present instance consisting of a drum or spool I, journaled loosely on the shaft, and a cord and weight for causing the rotation of the drum in one direction. The end of the shaft G nearest the drum is provided with a ratchet-wheel g, with which

a pawl i on the side of the drum engages, thereby connecting the drum and shaft rigidly when moving in one direction, but permitting the free and independent rotation of either one in the opposite direction.

On the opposite side of the drum is a projection or pin I', with which a pawl K on the shaft H is adapted to engage to lock the shaft and drum together for the purpose of rewinding the motor, during which operation it will be understood that the ratchet i moves freely over the wheel g, so that the actuating-wheel is not moved. The pawl K, as shown clearly in Fig. 5, is simply pinned to the shaft H, and is therefore free to swing in the plane of the shaft. Now in order to hold the same with the upper end in position to engage the projection I', a stop K' is secured on the shaft with a set-screw K² in the end to regulate the extent of movement, and a spring k is employed to draw the lower end of the pawl against the screw, whereby when the shaft is turned in the direction indicated by the arrow the drum will be turned in unison therewith, but when the shaft has made a complete revolution and the motor is rewound the pawl is thrown out of engagement with the projection by means of a cam k² on the base, which strikes the lower end of the pawl and moves the same inward against the tension of the spring k, but permits the spring to draw the pawl back again as soon as the drum is released.

As thus far described, it will be seen that when the shaft H is rotated the pawl engages the drum, winds the motor, and at a predetermined moment the pawl is tripped, the motor released, and the actuating-wheel rotated in a direction to move the figures through their orbits, either one or more times around the track, depending upon the relative sizes of the gears e' e², as will be at once understood; but in the position of rest, or at the starting-point, the actuating-arms all rest on their stopping-cams and out of engagement with the actuating-wheel. Hence a means must be provided for inaugurating the movement of the figures and throwing the actuating-arms into engagement with the actuating-wheel. This mechanism, in connection with the stopping-cams, is called the "starting and stopping mechanism" and in the preferred form is made as follows: Above the carrying-arms and journaled on the same upright are the starting or stopping arms M N, both extending out horizontally a short distance and then bending down, one in front of and the other behind the carrying-arms, and when in the lowest position being in line at some portion of their length with the upper corners of the projections on the upper step of the actuating-wheel, and therefore as the wheel rotates the starting and stopping arms are carried with it and the supporting-arms moved forward. The stopping-arm N remains in engagement with the projection and therefore necessarily travels in advance

of the carrying-arms; but as the latter are constantly dropping back, it does not interfere with the operation. The starting-arm M, on the other hand, being somewhat longer, as shown, engages and rides up on the cam L, coming to a standstill and remaining until the arm N has completed a large part of its revolution, preferably somewhat more than one-half, when the projection *n* on the rear end strikes the arm M and throws it off of the cam, permitting it to re-engage one of the projections, by which it is carried around to the stopping-point, sweeping the carrying-arms up against the stopping-arm and becoming itself released as it rides up the cam O. The arms M and N are both stopped at the proper point for the race to end by means of the movable cam O, pivoted to the base and so positioned as that the arms ride up on the same when elevated and are thereby moved out of the path of the projections on the actuating-wheel, a stop O' being provided on the end of the cam, against which the arms are positively arrested, the stopping-arm first, then the carrying-arms against the stopping-arms, and finally the starting-arms. The cam O is controlled by the motor being elevated by the pin I' when the motor is at rest; but as soon as the motor starts to move the pin is moved away from under the cam and the arms are dropped onto the actuating-wheel, as before mentioned. To insure the elevation of the cam before the stopping-arm has come around, a pin I² is provided in advance of the pin I', which elevates the cam before the motor itself has reached the stopping-point.

For the purpose of rotating the shaft H a gear-wheel *h* is mounted thereon, which meshes with a gear-wheel P on a shaft Q, extending outside of the casing and provided with a crank-handle *q*, as shown, the means for preventing and controlling the rotation of the shaft being as follows: On the shaft Q is a wheel or disk O², having ratchet-teeth, with which a pawl *q'* engages to prevent rotation in one direction, and a solid projection or portion S, having a pocket or receptacle *s* for a single coin (nickel) therein, which pocket normally registers with the lower end of a chute T, into the upper end of which the coin is introduced. At the lower end of the chute is pivoted a steel locking and releasing pawl U, having two points *u u'*, the upper one *u* lying just above the periphery of the solid disk containing the coin-pocket, forming really one wall of the chute at the extreme bottom, and the latter projecting down into a recess in the disk and adapted to engage a lip or overhanging portion *s'* and lock the shaft against forward movement, the pawl being retained in this position by a counterweight or spring U'. The coin-pocket is of such depth that a coin of the proper diameter to operate the mechanism will just project above the same and come in contact with the projection *u*, whereby it will be seen that if

the crank-handle is turned when such a coin is in place the coin will engage the projection *u*, throw the lower projection *u'* up out of the path of the lip on the wheel and permit the shaft to be rotated one revolution, the coin being dropped out when the pocket is at the bottom and the pawl again returned to position for arresting the movement of the wheel. The chute T may be made of just the proper size to gage the coins and prevent the entrance of any which are too large, and in order to prevent the entrance of any which are too small an opening *t* is formed in the under side of the inclined part of the chute, and on the sides of this opening are formed two narrow guides sufficiently wide to support coins of the proper diameter, but permit those of smaller diameter to pass through the opening and hence out of the chute. The chute at this point of its length is, it will be seen, an open one, and in order to prevent coins of the proper diameter from tilting up so as to be in danger of getting caught or passing through the opening a plate T' is placed directly over the opening, leaving just space enough for the coin to pass through.

It only remains now to describe the annunciator for indicating which of the horses wins, some such means being found very desirable, particularly where two or more of the contestants come in very close together.

The preferred form of annunciator is operated through the medium of electro-magnets, and is as follows: A series of electro-magnets 2 are mounted on a suitable base or frame attached to the plate, one magnet for each horse and one additional magnet for breaking the circuit and preventing the operation of but one annunciator-magnet, unless more than one be actuated simultaneously. At the side of each of the magnets is pivoted an arm 3, each having an extending hook or catch 4, which engages a co-operating catch on the armatures 5 of the magnets, and each, save the circuit-breaking arm, is provided with a curved tablet 6, each colored to correspond to the horse it represents and adapted to be displayed through an opening 7 in the track-plate when released from engagement with the armature. Each of the carrying-arms, when it reaches the stopping-point, moves a fine spring-contact point, such as 8, and completes the circuit through its particular magnet, releasing its color-tablet and thereby indicating which horse comes in first, and in order to prevent the operation of the tablets of succeeding horses the circuit is broken by the first impulse. This will be better understood by referring to Figs. 10 and 11, in which it will be seen that the arm of the circuit-breaking magnet is provided with a contact 9, which, when the arm is up, engages the stationary contact 10, and through these contacts the main circuit passes, thence around the circuit-breaking magnet, there being divided into a number of branches, one of which passes through each tablet-magnet and to the

contact operated by its particular horse. The branches, being thus brought together, pass to battery and back to the circuit-breaking magnet. The operation is apparent, for when any horse completes the circuit through its branch its tablet-magnet is energized and simultaneously the circuit-breaking magnet is energized and the circuit broken, absolutely preventing the operation of any of the other tablets.

For the purpose of resetting the tablets and circuit-breaking arm a rod 12 is operated by an upright 13, moved in a direction to elevate the bar and push the arms to place by a cam 14 on the shaft Q. Hence the tablets are set before each race, but are left exposed between the races.

To decrease friction on the upright B, or between the bearing on the same and the wheels E' e', a collar E⁴ is secured rigidly on the shaft and has in its upper face a groove which registers with a corresponding groove in the hub of the wheels, and in those grooves are placed hardened balls, thereby forming an anti-friction bearing and one not likely to permit the wheels to tilt to one side or the other.

Having thus described my invention, what I claim as new is—

1. In an apparatus such as described, the combination, with the series of arms pivoted on a common center and the motor, of the actuating-wheel driven by the motor pivoted on a center coincident with that of the arms and adapted to engage therewith, and cam-surfaces for releasing said arms at predetermined intervals.

2. In an apparatus such as described, the combination, with the pivoted carrying-arms and motor, of the actuating-wheel driven by the motor and having projections thereon, and actuating-arms on the carrying arms engaging said projections, substantially as described.

3. In an apparatus such as described, the combination, with the carrying-arms mounted on a common center and the motor, of the actuating-wheel driven by the motor pivoted on a center coincident with that of the arms and having projections thereon, and the actuating-arms on the carrying-arms engaging said projections, substantially as described.

4. In an apparatus such as described, the combination, with the arms mounted on a common center with the motor, of the actuating-wheel driven by the motor pivoted on a center coincident with that of the arms and adapted to engage therewith, of the disks or supports interposed between the arms, and the cams on said disks for releasing the arms from the actuating-wheel at intervals, substantially as described.

5. In an apparatus such as described, the combination, with the arms mounted on a common center and the motor, of the actuating-wheel driven by the motor pivoted on a

center coincident with that of the arms and adapted to engage therewith, and a governor for regulating the speed of the actuating-wheel, substantially as described.

6. In an apparatus such as described, the combination, with the arms and motor, of the actuating-wheel driven by the motor and having a series of annular steps provided with projections with which the arms engage, with cam-surfaces for releasing the arms, substantially as described.

7. In an apparatus such as described, the combination, with the arms and motor, of the actuating-wheel driven by the motor and having a series of annular steps each provided with projections which overhang the next lower step, with which projections the arms engage, and cam-surfaces of such height as to lift the arms from engagement with the projections on one step into the path of the projections on the next higher step, substantially as described.

8. In an apparatus such as described, the combination, with the arms and motor, of the actuating-wheel driven by the motor and having a series of annular steps each provided with projections, which overhang the next lower step, with which projections the arms engage, and two series of cam-surfaces, one of such height as to lift the arms from engagement with one series of projections into engagement with the next higher series, and the other of such height as to lift the arms out of engagement entirely, substantially as described.

9. In an apparatus such as described, the combination, with the arms and motor for driving the same, of a winding-shaft for the motor, a pawl interposed between said shaft and motor, and a cam-surface or trip for releasing said pawl and permitting the motor to run, substantially as described.

10. In an apparatus such as described, the combination, with the arms and motor for driving the same, of a winding-shaft for the motor, a pawl pivoted on said shaft for winding the motor, a stationary cam with which said pawl engages to release the motor, and a spring for returning said pawl to operative position, substantially as described.

11. In an apparatus such as described, the combination, with the arms and motor for driving the same, of a winding-shaft for the motor, a pawl pivoted on the shaft for winding the motor, a step also on the shaft for arresting the outward movement of the pawl, a stationary cam with which said pawl engages to release the motor, and a spring for returning said pawl to operative position, substantially as described.

12. In an apparatus such as described, the combination, with the arms carrying the figures and motor therefor, of a stopping-arm crossing the paths of the carrying-arms and driven by the motor in advance of the carrying-arms, and a step for arresting the stop-

ping-arm at a predetermined point, whereby the carrying-arms are arrested by coming in contact therewith, substantially as described.

13. In an apparatus such as described, the combination, with the arms carrying the figures and motor therefor, and the stopping-cams for throwing the arms out of engagement with the motor, of the stopping-arm crossing the paths of the carrying-arms and driven by the motor in advance of the carrying-arms, and a stop for arresting the stopping-arm at a point to arrest the carrying-arms when released by the stopping-cams, substantially as described.

14. In an apparatus such as described, the combination, with the arms carrying the figures, the motor therefor, and the stopping-arm moved by the motor in advance of the said carrying-arms, of a stop for the stopping-arm moved into the path of said arm by the motor, substantially as described.

15. In an apparatus such as described, the combination, with the arms carrying the figures, the motor therefor, and the stopping-arm crossing the path of the carrying-arms and moved by the motor in advance of the said carrying-arms, of stopping-cams for throwing the carrying-arms out of engagement at one point in their revolution, and a stop moved by the motor into the path of the stopping-arm to arrest the same at a point coincident with the stopping-cams, substantially as described.

16. In an apparatus such as described, the combination, with the carrying-arms, the actuating-wheel, and the motor, of the stopping-arm lying across the path of the carrying-arms and engaging the actuating-wheel in advance thereof, and the cam moved by the motor into position to disengage the stopping-arm from the actuating-wheel, substantially as described.

17. In an apparatus such as described, the combination, with the carrying-arms, the actuating-wheel, and the motor, of the stopping-arm lying across the path of the carrying-arms and engaging the actuating-wheel in advance thereof, the cam moved by the motor into position to disengage the stopping-arm from or permit the same to engage the actuating-wheel, and a stop on said cam for positively arresting the arm when the cam is elevated, substantially as described.

18. In an apparatus such as described, the combination, with the carrying-arms and motor, of a starting-arm crossing the path of and driven by the motor in rear of the carrying-arms, and a cam for disengaging said starting-arm from the motor after having given the carrying-arms an initial impetus, substantially as described.

19. In an apparatus such as described, the combination, with the carrying-arms and motor, of a starting-arm crossing the path of and driven by the motor in rear of the carrying-arms, a cam for holding the starting-arm normally out of engagement with the motor,

moved by the motor to release the arm and permit the arm to engage and give the carrying-arms an initial impetus, and a cam for disengaging the starting-arm after such impetus has been given, substantially as described.

20. In an apparatus such as described, the combination, with the carrying-arms and motor, of a stopping-arm and a starting-arm lying across the path of the carrying-arms, one in front and the other in the rear of the same and adapted to be driven by the motor, and a cam for holding said starting and stopping arms normally out of engagement, moved by the motor to permit the said arms to engage with the motor, substantially as described.

21. In an apparatus such as described, the combination, with the carrying-arms and motor, of a stopping-arm and a starting-arm lying across the path of the carrying-arms, one in front and the other in rear of the same and adapted to be driven by the motor, a cam for holding said starting and stopping arms normally out of engagement, moved by the motor to permit the said arms to engage with the motor, a second cam engaging the starting-arm to arrest the same after the initial impetus has been given, and a projection for sweeping said arm off of the cam and into engagement with the motor again, substantially as described.

22. In an apparatus such as described, the combination, with the carrying-arms and motor, of a stopping-arm and a starting-arm lying across the path of the carrying-arms, one in the front and the other in rear of the same and adapted to be driven by the motor, a cam for holding said starting and stopping arms normally out of engagement, moved by the motor to permit the said arms to engage with the motor, a second cam carrying the starting-arm to arrest the same after the initial impetus has been given, and a projection on the stopping-arm for sweeping the starting-arm off the cam and into engagement with the motor again, substantially as described.

23. In an apparatus of the character specified, the combination, with the figures and motor for driving the same in simulation to a racing contest, of a winding-shaft for said motor, a coin-pocket moving in unison with said shaft, a chute leading to said pocket, and a latch for preventing the rotation of the shaft lying in the path of a coin within the pocket and adapted to be released thereby, substantially as described.

24. In an apparatus such as described, the combination, with the figures and motor for driving the same in simulation to a racing contest, of a winding-shaft for said motor, a coin-pocket moving in unison with said shaft, a chute leading to the said pocket, a latch for preventing the rotation of the shaft, having a projection lying in the path of a coin within the pocket and adapted to be struck thereby to release the latch, a counter-weight for holding said latch in engagement, and a

pawl for preventing the backward rotation of the shaft, substantially as described.

25. In a coin-operated device for an apparatus of the character specified, the combination, with the shaft having the coin-pocket thereon, the chute leading to said pocket, and the crank-handle, of the latch for preventing the forward rotation of the shaft, having a projection extending into the path of a coin in the pocket, whereby the latch is released by the forward movement of the shaft when a coin is present, and a pawl for preventing the backward rotation of the shaft, substantially as described.

26. In an apparatus of the character specified, the combination, with the figures and a motor for driving the same in simulation to a racing contest, of an annunciator having display-tablets for each figure, whereby the winner may be designated, substantially as described.

27. In an apparatus of the character specified, the combination, with the figures and a motor for driving the same in simulation to a racing contest, of an annunciator having display-tablets for each figure, electro-magnets for each tablet, contacts in the paths of the figures and adapted to be operated thereby to energize the tablet-operating magnets, substantially as described.

28. In an apparatus of the character specified, the combination, with the figures and a motor for driving the same in simulation to a racing contest, of an annunciator having display-tablets for each figure, electro-magnets for each tablet, contacts in the path of the figures and adapted to be operated thereby to energize the tablet-operating magnets and a cut-out-operating magnet, said tablet-operating magnets and contacts being arranged in branches of the circuit passing through the cut-out magnet, whereby but the tablet indicating only the first figure will be operated, substantially as described.

29. In an apparatus such as described, the combination, with the figures mounted on carrying-arms, of a motor for driving said figures and an intermitting actuating mechanism intermediate the figures and motor, said actuating mechanism including a series of actuating-arms, one for each figure, a body moving with the motor and having a series of projections with which said arms engage, and cam-surfaces or deflectors operating to effect the release of the actuating arms at intervals, substantially as described.

EDWIN F. MURDOCK.

Witnesses:

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