

No. 780,824.

PATENTED JAN. 24, 1905.

J. C. SLATER.
STOPPING AND RELEASING MECHANISM.
APPLICATION FILED MAY 29, 1903.

Fig. 1.

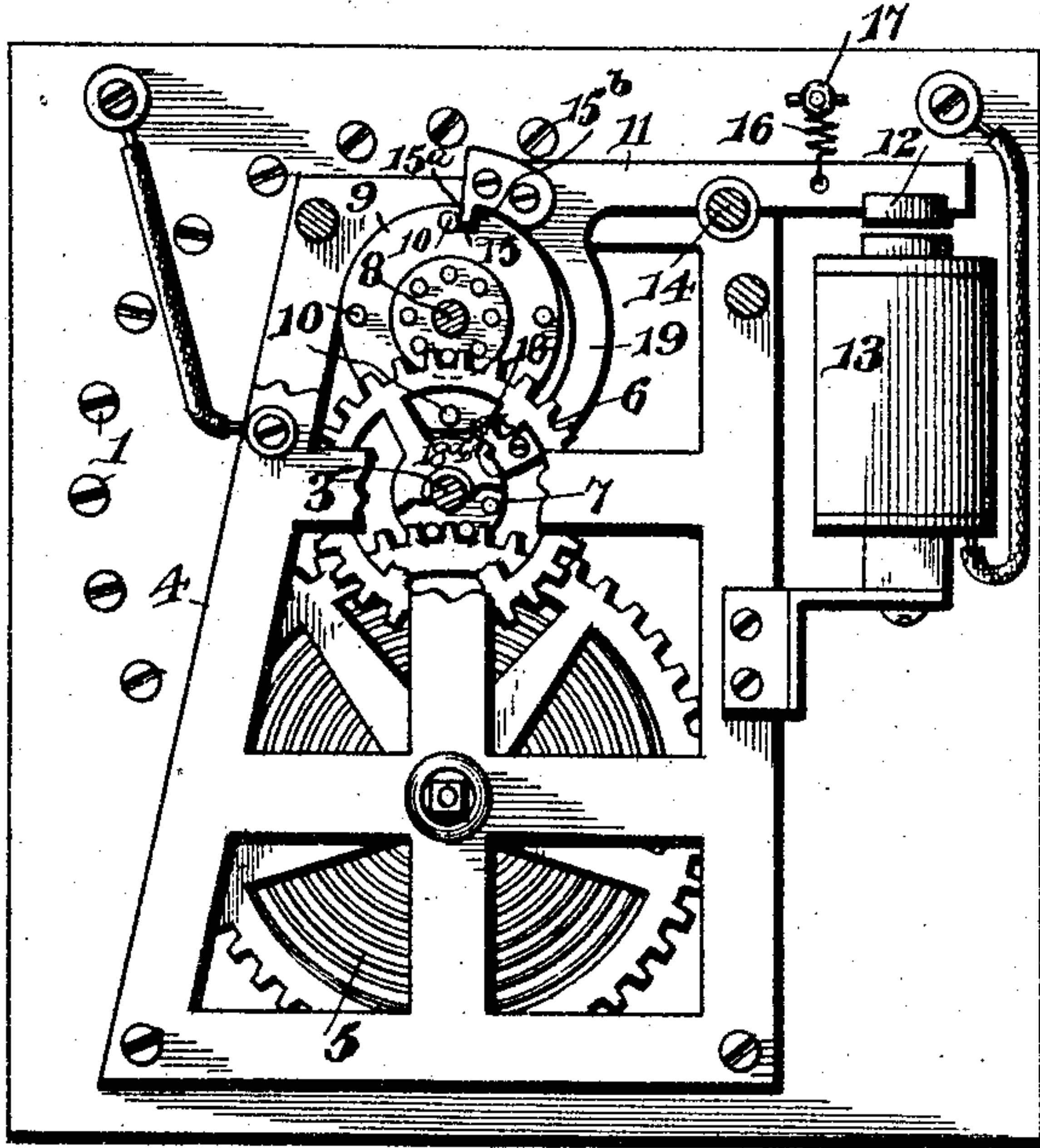


Fig. 3.

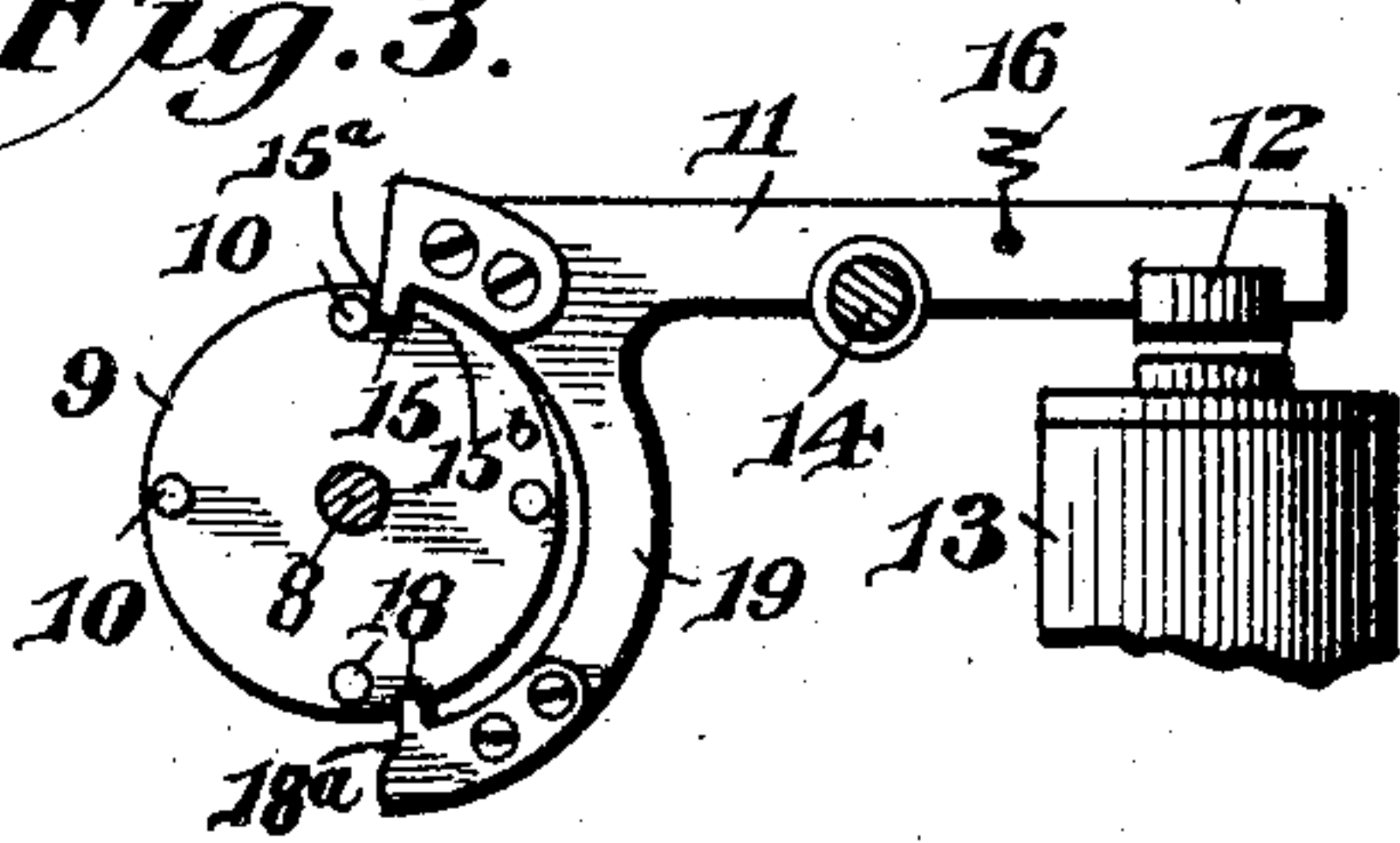


Fig. 2.

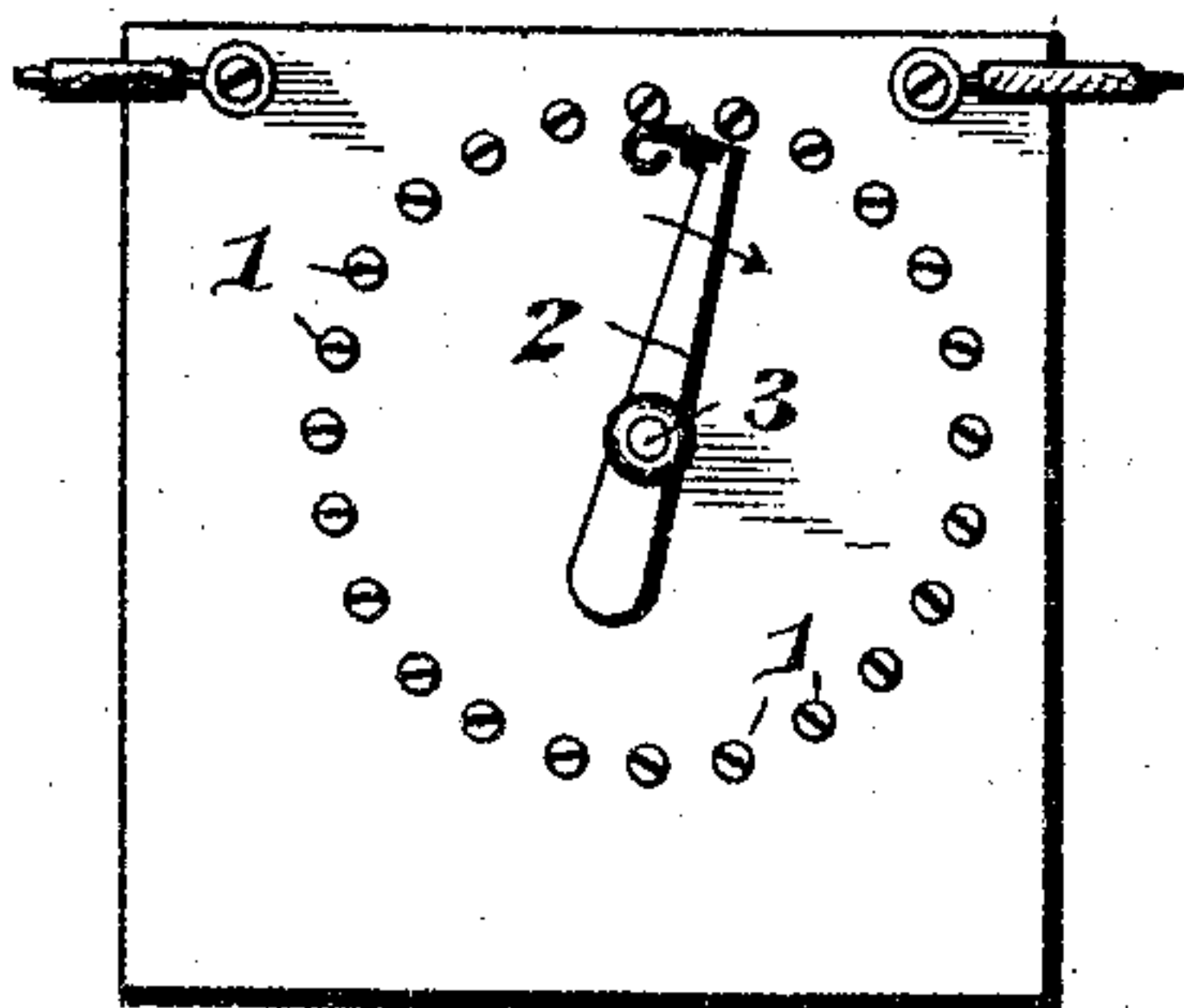


Fig. 4.

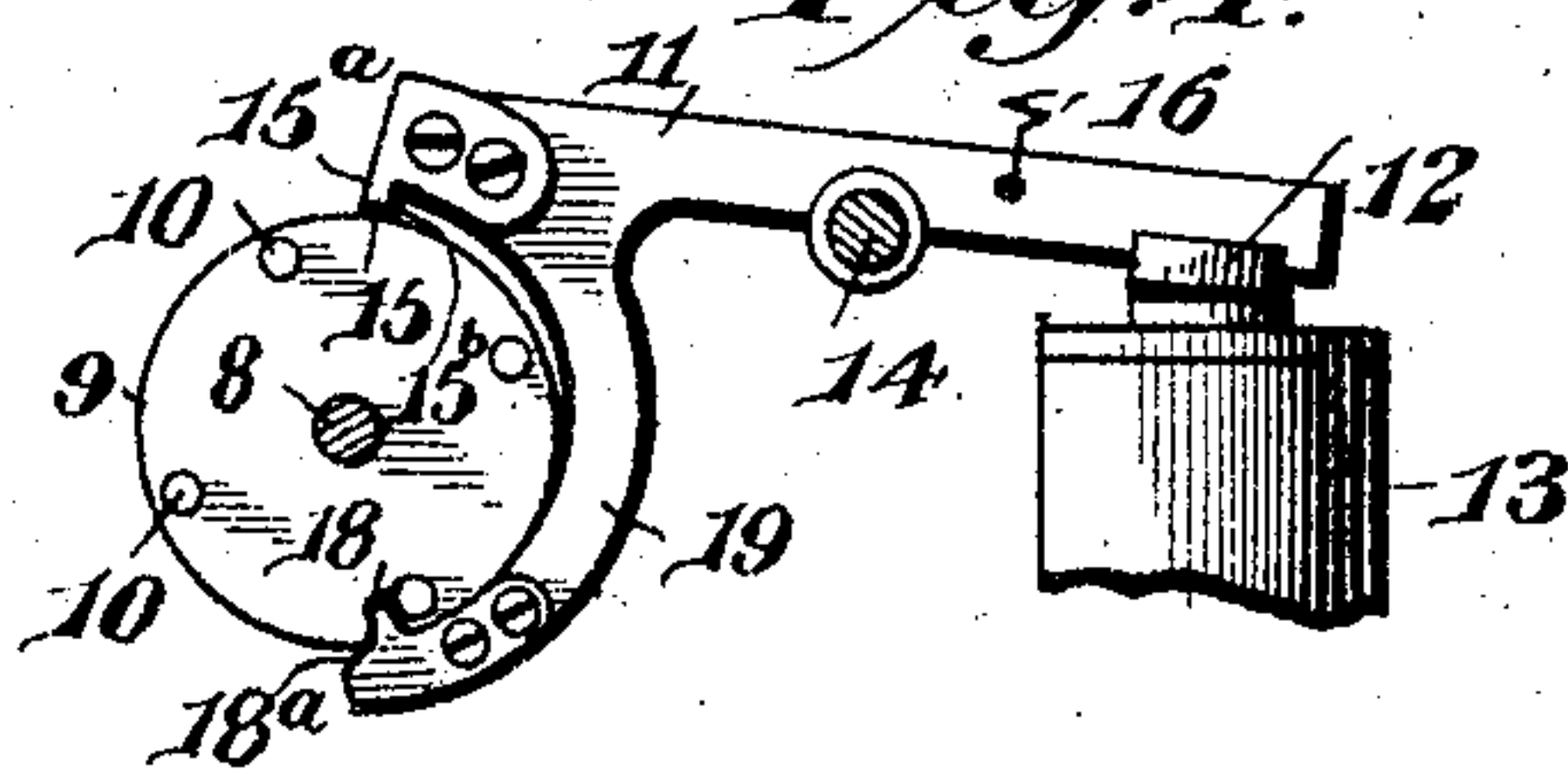
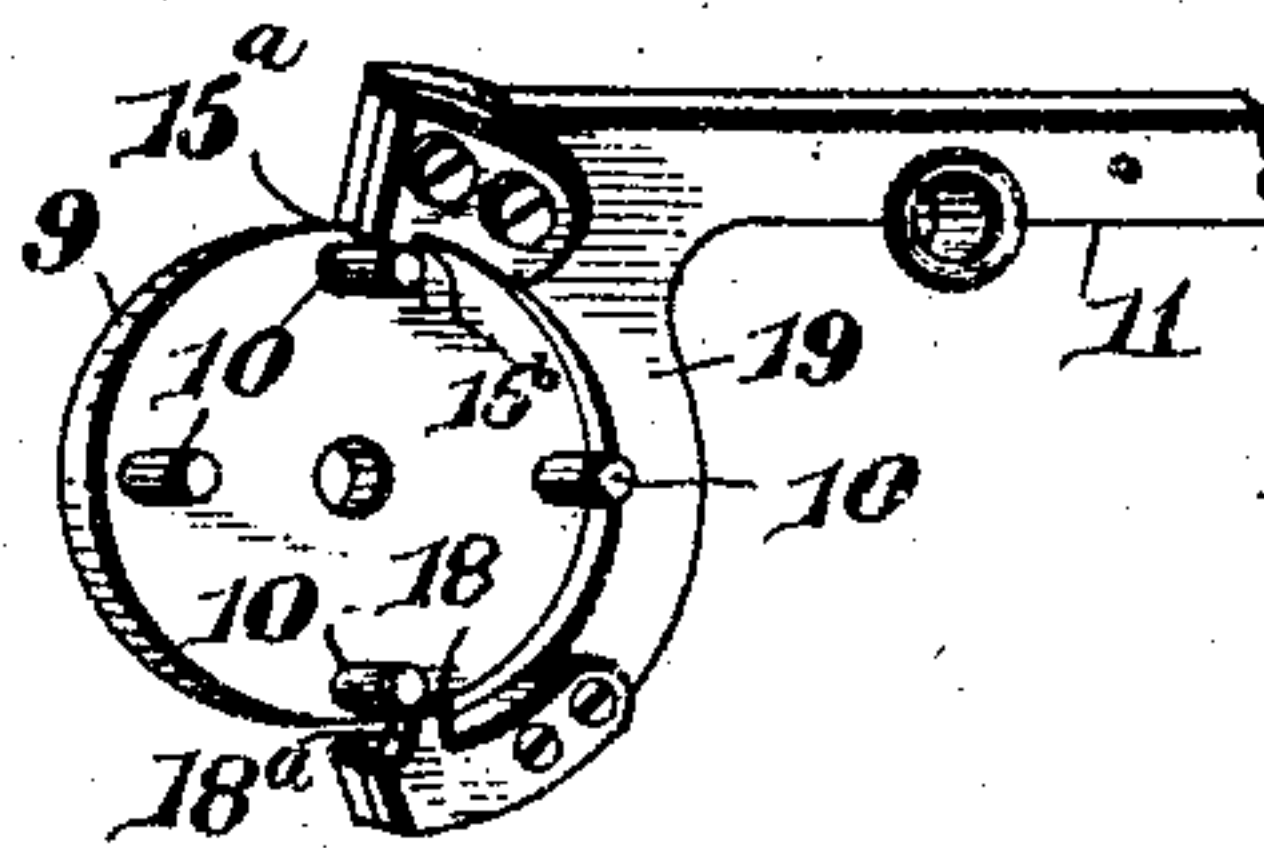


Fig. 5.



James C. Slater, Inventor

By

E. J. Figgess

Attorney

Witnesses
Jas. E. McLathran
Rouis E. Juhn

UNITED STATES PATENT OFFICE.

JAMES CHAS. SLATER, OF ST. LOUIS, MISSOURI.

STOPPING AND RELEASING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 780,824, dated January 24, 1905.

Application filed May 29, 1903. Serial No. 159,351.

To all whom it may concern:

Be it known that I, JAMES CHAS. SLATER, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented a new and useful Stopping and Releasing Mechanism, of which the following is a specification.

This invention relates to a novel stopping and releasing mechanism comprising a wheel and a lever coöperating therewith to permit the step-by-step advance of the wheel under the impulse of operating mechanism of suitable character.

While the device is applicable for use in any relation requiring uniform intermittent movement of a rotary element, it is designed with special reference to its use as the controlling means of a selector-switch constituting an element of an automatic telephone system—such, for instance, as that described in Letters Patent No. 632,759, issued to me September 12, 1899. In systems of this character the telephones are each provided with an indicating apparatus suitably wired to a selector-switch having a series of contact-points corresponding to the several subscribers' telephones. Each selector-switch is arranged for actuation by an electromechanical switch-operating mechanism, which moves the switch-arm into engagement with any desired contact. The operating mechanism of the selector-switch is controlled by stopping and releasing mechanism operated by electromagnetic means including a circuit-breaker associated with the indicating apparatus of a telephone.

The greatest difficulty which has heretofore been encountered in the perfection of an automatic system has been to secure the proper action of the selector-switch-controlling mechanism so as to maintain perfect synchronism, the usual forms of such mechanism being more or less liable to race or lock or to reverse under various conditions.

The object of the present invention, therefore, is to produce a device which will be peculiarly adapted for the control of a selector-switch and which by reason of the novel construction and arrangement of its parts will be absolutely incapable of racing, locking, or

reversing, thereby insuring that perfect synchronism in all its parts so essential to insure the correctness of the call desired.

To the accomplishment of this general object and others subordinate thereto the invention resides in the construction and arrangement to be hereinafter described, illustrated in the accompanying drawings, and defined in the appended claims.

In said drawings, Figure 1 is a rear elevation of a selector-switch apparatus, illustrating its operating mechanism controlled by my novel stopping and releasing mechanism. Fig. 2 is a front elevation of the switch. Figs. 3 and 4 are elevations of the device, showing the lever in different positions; and Fig. 5 is a detail perspective view of the lever.

Like numerals are employed to designate corresponding parts throughout the views.

The selector-switch is provided with a series of contacts 1, corresponding to the subscribers' telephones and the numbers on the dials of one of the indicating devices. These contacts are properly wired to the several other selector-switches in the manner explained in my patent aforesaid and are arranged for contact with the outer end of the selector-switch arm 2, suitably wired to its telephone. The switch-arm 2 is mounted upon a shaft 3, suitably journaled in a frame 4, secured to the board of the selector-switch. Within this frame is also mounted a spring-motor 5, geared to the shaft 3, as shown in Fig. 1 of the drawings, and tending constantly to move the switch-arm in the direction of the arrow in Fig. 2. The shaft or arbor 3 is geared, by means of a gear-wheel 6 and a pinion 7, to the shaft 8. Upon the shaft 8 is mounted the wheel 9 of the stopping and releasing mechanism. The wheel 9 is provided with laterally-extending pins 10, arranged to coöperate with a detent or lever 11, provided at its end opposite the wheel 9 with an armature 12 for the adjacent electromagnet 13, which, as explained in my patent aforesaid, is energized to attract the armature 12 and swing the lever 11 whenever the circuit through said magnet is closed by the indicating mechanism at the calling subscribers' phone. The lever 11 is disposed in a sub-

stantially horizontal position with its fulcrum 14 in line with the upper pallet 15, detachably secured to the extremity of the lever, and is arranged to be retracted by a spring 5 16, the tension of which is adjusted by a thumb-screw 17, suitably mounted, as shown. The lower pallet 18 is detachably secured to the lower extremity of an arcuate arm 19, pendent from the end of the lever 11 and having a 10 curvature sufficiently great to permit nearly one-half of the periphery of the wheel 9 to extend within the curvature and between the pallets without interfering with such movement of the wheel as is necessary for the 15 proper coöperation of the parts. As the arm 19 depends from that extremity of the lever 11 which carries the upper pallet 15, it will be seen that the pallets are located at the opposite ends of the arm. Normally the lever 20 and wheel are disposed as illustrated in Fig. 3, wherein the lever is shown as resting upon the periphery of the wheel with the upper pallet arranged to obstruct one of the pins 10, while the lower pallet 18 is depressed, so as 25 not to obstruct the pins until the lever has been oscillated to withdraw the upper pallet and to present the lower pallet in position to stop the pin next advancing. Both the front and rear faces 15^a and 15^b of the upper pallet 30 are substantially straight and flat, and since this pallet is located in line with the fulcrum 14 of the lever 11 it will be impossible for a pin of the wheel to move the lever by contact with the pallet, whether the wheel is urged 35 in its normal direction of rotation or in the reverse direction. Therefore the wheel will be positively stopped by the contact of one of its pins with either the front or the rear face of the upper pallet. The lower pallet, 40 however, does not bear the specified relation to the fulcrum of the lever, and for this reason its rear face is formed with a concavity 18^a, which receives one of the pins in the event of reverse movement of the wheel to 45 effectually prevent further reverse movement thereof.

It will be noted that the upper pallet, the fulcrum 14 of the lever, and the armature 12 50 are in substantial alinement, and it will therefore be evident that the thrust exerted upon the pallet by the adjacent pin 10 being exerted directly against the fulcrum of the lever will exert no tendency to shift the lever, and the possibility of the racing of the wheel will 55 therefore be eliminated. Furthermore, the heaviest end of the lever resting upon the wheel has the effect of a friction-brake for the latter and assists in retarding the wheel, so that the locking of the pallet and pin is 60 prevented and the prompt action of the lever thus insured. This braking effect of the lever is augmented by the force of the spring 16, and since the lever contacts with the wheel and retards the same somewhat before 65 the pin reaches the pallet the contact of the

pin with the pallet is less violent than it would otherwise be, and wear is thus reduced to a minimum.

Briefly, the operation of the stopping and releasing mechanism when employed in an 70 automatic telephone system is as follows: The calling subscriber sets the indicating apparatus in a manner to permit the circuit-breaker associated therewith to successively close a circuit through the magnet 13 a number of 75 times corresponding to the number of the contact of the selector-switch which he desires to be engaged by the switch-arm. Upon the closing of the circuit the magnet 13, included therein, is energized and attracts the 80 armature 12 to swing the lever 11 against the resistance opposed to such movement by the spring 16. This movement of the lever withdraws the upper pallet 15 from the engaged pin of the wheel 9 and moves the lower pal- 85 let to an elevated position (see Fig. 4) for engagement with another pin when the wheel has completed a predetermined increment of movement. Upon the opening of the circuit the magnet 13 is deenergized and the lever 90 is returned to its normal position by the spring 16. This movement of the lever serves to withdraw the lower pallet from the pin lately arrested by it and presents the lever in contact with the periphery of the wheel 95 and the upper pallet in the path of another pin. As the lever contacts with the wheel the latter is retarded somewhat, and the next succeeding pin 11 will therefore move into engagement with the pallet, and the wheel 100 will be arrested without unnecessary shock. At the completion of these two increments of movement of the wheel 9 the switch-arm controlled thereby will have moved the dis- 105 tance between two contacts of the selector-switch, and it will thus be obvious that by making and breaking the circuit to successively energize and deenergize the magnet 7 the calling subscriber may cause the switch- 110 arm to move to any desired contact of the selector-switch for the purpose of placing him in communication with any other of the several subscribers.

It is thought that from the foregoing description the construction and operation of 115 my stopping and releasing mechanism, as well as its particular applicability to automatic telephone systems, will be clearly comprehended; but while the present embodiment of the invention is believed at this time to be 120 preferable I desire to reserve the right to effect such changes, modifications, and variations of the illustrated structure as may be embraced within the scope of the protection prayed and to utilize the device in any rela- 125 tion to which it may be adapted.

What I claim is—

1. A device of the character described including a wheel having a smooth periphery and a series of lateral projections, a lever mov- 130

able into engagement with the periphery of the wheel to constitute a brake therefor and having pallets disposed to alternately engage the projections to stop the wheel, and means for moving the wheel when released.

2. A device of the character described including a wheel having a smooth periphery and a series of lateral projections, a lever provided at one end with an arcuate arm spanning a portion of the periphery of the wheel, and movable into and out of engagement therewith, pallets located at the opposite ends of said arm for alternate engagement with the projections on the wheel to stop the same, and means for rotating the wheel when the latter is released.

3. A device of the character described including a wheel having a series of lateral projections, a lever provided at one end with a depending arcuate arm spanning a portion of the periphery of the wheel and movable into and out of engagement therewith, opposed pallets located at opposite ends of the arm for alternate engagement with the projections to stop the wheel, as the escapement-lever is oscillated, and means for rotating the wheel when the latter is released.

4. A device of the character described including a wheel having a smooth periphery and a series of lateral projections, a lever provided at one end with an arcuate arm connected at its upper extremity to the end of the lever and movable into engagement with the periphery of the wheel to constitute a brake therefor, opposed pallets located at opposite ends of the arcuate arm and alternately presentable in the path of the projections to stop the wheel by the movement of the lever in opposite directions, and means for moving the wheel when released by the lever.

5. A device of the character described including a wheel having a series of lateral projections, a straight lever having a wheel-arresting pallet at one end, an armature at its opposite end, and a fulcrum located intermediate of its ends, the pallet, fulcrum and ar-

mature being in alinement, an arm depending from the lever and provided with a second wheel-arresting pallet, an electromagnet operatively related to the armature, and means for moving the wheel when released.

6. A device of the character described including a wheel having a series of lateral projections, a lever provided with a pair of wheel-arresting pallets alternately presentable in the paths of the projections by the movement of the lever, the rear face of one of said pallets being formed with a concavity arranged to receive one of the projections of the wheel, and means for rotating the wheel when released.

7. A device of the character described including a wheel having a smooth periphery and a series of lateral projections, a lever formed at one end with an arcuate arm movable into and out of engagement with the periphery of the wheel, a pair of opposed wheel-arresting pallets carried by the opposite ends of the arcuate arm and offset to one side thereof to engage the projections on the wheel as the lever is oscillated, and means for rotating the wheel when released.

8. A device of the class described, including an escapement-wheel having a smooth periphery and a series of lateral projections, a straight lever fulcrumed intermediate of its ends, an armature at one end of the lever, a dependent arcuate arm located at the opposite end of the lever and normally bearing against the periphery of the wheel, a pair of opposed pallets laterally offset from the opposite ends of the arcuate arm to engage the projections on the wheel and arrest the latter, and an electromagnet in operative relation with the armature.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JAMES CHAS. SLATER.

Witnesses:

J. H. A. GARMAN,
WM. STEPHAN.