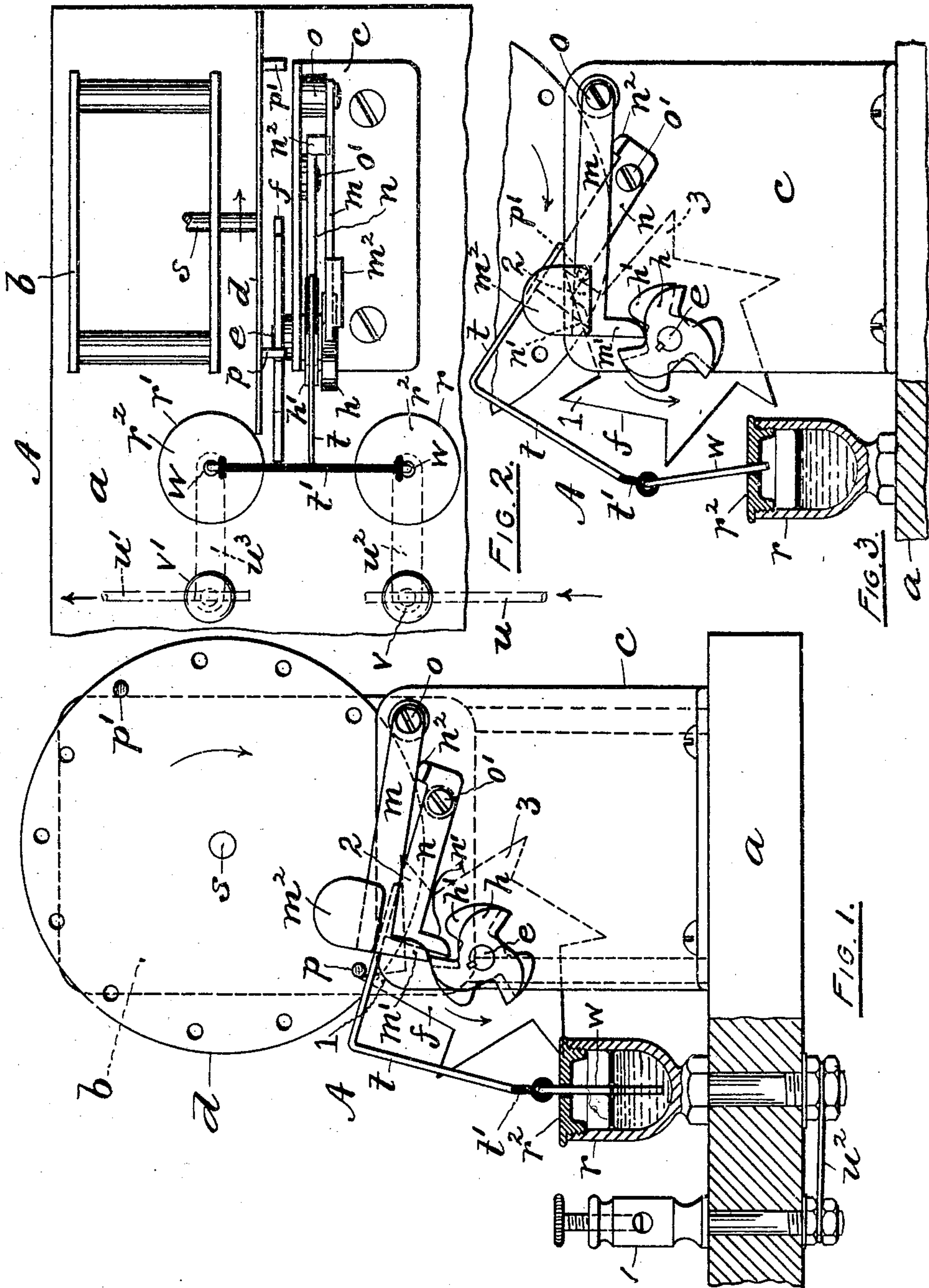


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MECHANICAL MOVEMENT.  
APPLICATION FILED DEC. 29, 1904.



WITNESSES,

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# UNITED STATES PATENT OFFICE.

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## MECHANICAL MOVEMENT.

No. 808,928.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, ARTHUR W. HUTCHINS, a citizen of the United States of America, and a resident of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification.

My invention relates to and consists of a device or mechanism for producing an intermittent quick-action reciprocating movement through the medium of coacting intermittent or step-by-step rotary means actuated by a continuously-revoluble member arranged to coöperate with said intermittingly-revolving means at certain prearranged times or intervals, as hereinafter set forth and claimed.

The invention above referred to is well adapted to be employed for various purposes—as, for example, in automatic intermittently-operated stamping, printing, numbering machines, automatic electric time-switches, &c. In the latter case, assuming the device to be located in an electric-lighting circuit, the switch may be quickly actuated at any prearranged times for automatically opening and closing the circuit.

In the accompanying sheet of drawings, Figure 1 is a side elevation, in partial section, illustrating my present invention or automatic intermittent quick-action mechanism, the latter being represented as utilized or arranged for actuating an electric switch, the circuit being closed. Fig. 2 is a corresponding plan view, and Fig. 3 is a partial side or end view showing the relation of the parts when the circuit is temporarily broken or open.

In carrying out my improved intermittent quick-action reciprocating mechanism A, I employ a frame or standard, as *b*, secured to a suitable base *a*, adapted to support a continuously-revoluble shaft or spindle *s*, the primary power or force for actuating the spindle being any well-known means, as a time or clock mechanism. To the outer or front end of said spindle is secured a disk *d*, arranged to carry a plurality of removable laterally-projecting short pins *p p'*, arranged in holes formed near the rim of the disk. The other members of the device A are, as drawn, mounted on a standard *c*, also secured to said base and located in front of the frame *b*. A short horizontal shaft *e* is

mounted to revolve in the said member *c*. To the rear end of the shaft, as drawn, is secured a six-toothed star-wheel *f*, a pair of three-arm cam-wheels *h h'* being secured to the front end. The last-named wheels are employed as lifting-cams, the rear end of each arm being undercut, so as to produce an abrupt drop for the respective swinging pawls or levers *m* and *n* coacting therewith. The rear wheel *h'* is axially set or positioned so that its cam-arms operate slightly in advance of those of the front wheel *h*.

The front pawl *m* is pivoted at *o* to the standard *c*, its outer or free end having an extension *m'* on its under side adapted to be in continuous contact with the periphery of the intermittingly-revoluble front wheel *h*. If desired, a weight *m<sup>2</sup>* may be employed to increase the frictional engagement of the parts. The rear pawl *n*, adapted to engage with the corresponding cam-wheel *h'* and with said pawl *m*, is pivoted at *o'* to frame *c*, the pivotal point, as drawn, being located slightly below and to the left of the other pawl's pivot. The free end of pawl *n* has an extension *n'* on its under side, being substantially like that of the other pawl, arranged to rest upon the periphery of cam *h'*, as just stated. The opposite or rear end of pawl *n* extends beyond the pivot and terminates in a lateral projection *n<sup>2</sup>*, contacting with the under side of the fellow pawl *m*, as clearly shown.

The relative arrangement of the pawls to each other and to the cams is such that the principal swinging element or suitable member, as *t*, from which the intermittent reciprocating movement is transmitted and utilized, secured to and moving in unison with the rear pawl, is actuated as follows: Assuming the advance pin *p* of the slowly but continuously revolving disk *d* to have engaged, say, tooth 1 of the star-wheel *f*, and thereby rotated the latter one-sixth of a revolution, the pawl *n* and its member *t* being in the stationary depressed or dropped position and held in check by the then elevated pawl *m*, substantially as indicated in Fig 1, the wheel *f* and both pawls remain stationary until the next pin *p'* of the moving disk will have engaged the succeeding tooth 2 of the wheel. A very short angular movement of the latter will then impart a like movement to the cams, at which instant the weighted front pawl *m* drops to its limit, thereby at the same



time, through the medium of lug  $n^2$  of pawl  $n$ , quickly swinging the latter and its member  $t$  upwardly to its limit, the corresponding position of the parts then being substantially as represented in Fig. 3. The continued movement of the pin  $p'$  while in contact with said tooth 2 advances the wheel an angular distance of sixty degrees, thereby, too, at the same time placing the succeeding tooth 3 in position, the pawl  $n$  meanwhile remaining practically stationary in its elevated position by reason of its engagement with the periphery of the rear cam  $h'$ . The advancing pin  $p$  next engages said positioned tooth 3 of the star-wheel and revolves the latter another angular distance of sixty degrees. Just before the termination of the last-named movement, however, the pawl  $n$  will have dropped from cam  $h'$ , thereby quickly depressing the member  $t$ , the pawl  $m$  meanwhile having been elevated to its limit, the corresponding position and relation of the parts then being substantially as represented in Fig. 1 and as first above stated. Thus it will be seen that the actual movements of the element  $t$  both up and down are effected automatically and quickly at comparatively long intervals apart whenever the slowly but intermittently acting cams  $h$   $h'$  and coacting pawl members  $m$   $n$  are properly positioned by the pins  $p$   $p'$  of the continuously slowly revolving disk or dial  $d$ .

In the drawings the device is represented as being employed for automatically opening and closing an electric circuit, the apparatus practically constituting an electric time-switch. The poles  $v$   $v'$  of the conductors  $u$   $u'$  are connected with mercury-cups  $r$   $r'$  by means of the respective conductors  $u^2$   $u^3$  in a well-known manner. A bent movable conductor  $w$  passes freely through the two covers  $r^2$  of said cups, its exterior portion forming a horizontal bar mounted in a supporting member  $t'$ , of non-conducting or insulating material, secured to the lower end of said intermittently-reciprocating element  $t$ , in turn secured to the swinging rear pawl  $n$ . Fig. 1 shows the conductor  $w$  in the depressed position and forming an electrical contact with the mercury contained in both cups corresponding to a closed circuit, and Fig. 3 represents the position of the parts corresponding to an open electric circuit.

I claim as my invention and desire to secure by United States Letters Patent—

1. In a device or mechanism of the class described, the combination with a revoluble star-wheel and lifting-cams and means for simultaneously actuating said wheel and cams intermittently, of a pair of self-dropping coacting pawls having their normal movements controlled by said cams, and having one of the pawls arranged to be tilted upwardly by

the action of the fellow pawl when the latter is depressed, as in dropping from its cam.

2. In a device or mechanism of the class described, the combination with a revoluble star-wheel, a pair of lifting-cams concurrently movable with said star-wheel and a continuously-movable disk or member provided with means for operating the wheel and cams in an intermittent manner, of a pair of self-dropping pawls normally actuated by and in substantially continuous engagement with said cams and with each other, one of the pawls when released from its cam acting to quickly elevate the other pawl, and a member or element secured to the last-named pawl whereby intermittent reciprocating movements are imparted to said member.

3. In a device or mechanism of the class described, the combination of a revoluble lifting-cam, a self-dropping or primary pawl in substantially continuous engagement therewith, a revoluble second cam, a secondary pawl adapted to engage the last-named cam and also in engagement with the primary pawl, a member connected with the secondary pawl by means of which member the movements of the latter pawl are utilized, and means for simultaneously imparting an intermittent rotary movement to the cams.

4. In a device or mechanism of the class described, a primary self-dropping swinging pawl  $m$ , a revoluble cam for elevating said pawl, a secondary self-dropping movement-transmitting pawl  $n$  arranged with respect to and in engagement with pawl  $m$  whereby the action of the latter in falling automatically elevates the other pawl, a revoluble check-cam for holding the last-named pawl in position while the primary pawl itself is moving upwardly, and means for simultaneously imparting an intermittent rotary movement to both the said pawl-lifting cams.

5. In a device or mechanism of the class described, the combination with a revoluble star-wheel and lifting-cams mounted and arranged to work in unison, of a continuously-revoluble disk provided with pins located in the path of the teeth of said star-wheel for engaging the latter and rotating it and said cams together in an intermittent manner, a pair of coacting self-dropping swinging pawls in engagement with and having their movements controlled by said cams, and having one of the pawls provided with a member or element through which the movements of the pawl are utilized, substantially as described.

Signed at Providence, Rhode Island, this 27th day of December, 1904.

ARTHUR W. HUTCHINS.

Witnesses:

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