

J. M. COMER.

AUTOMATIC SWITCH.

APPLICATION FILED APR. 27, 1905.

2 SHEETS—SHEET 1.

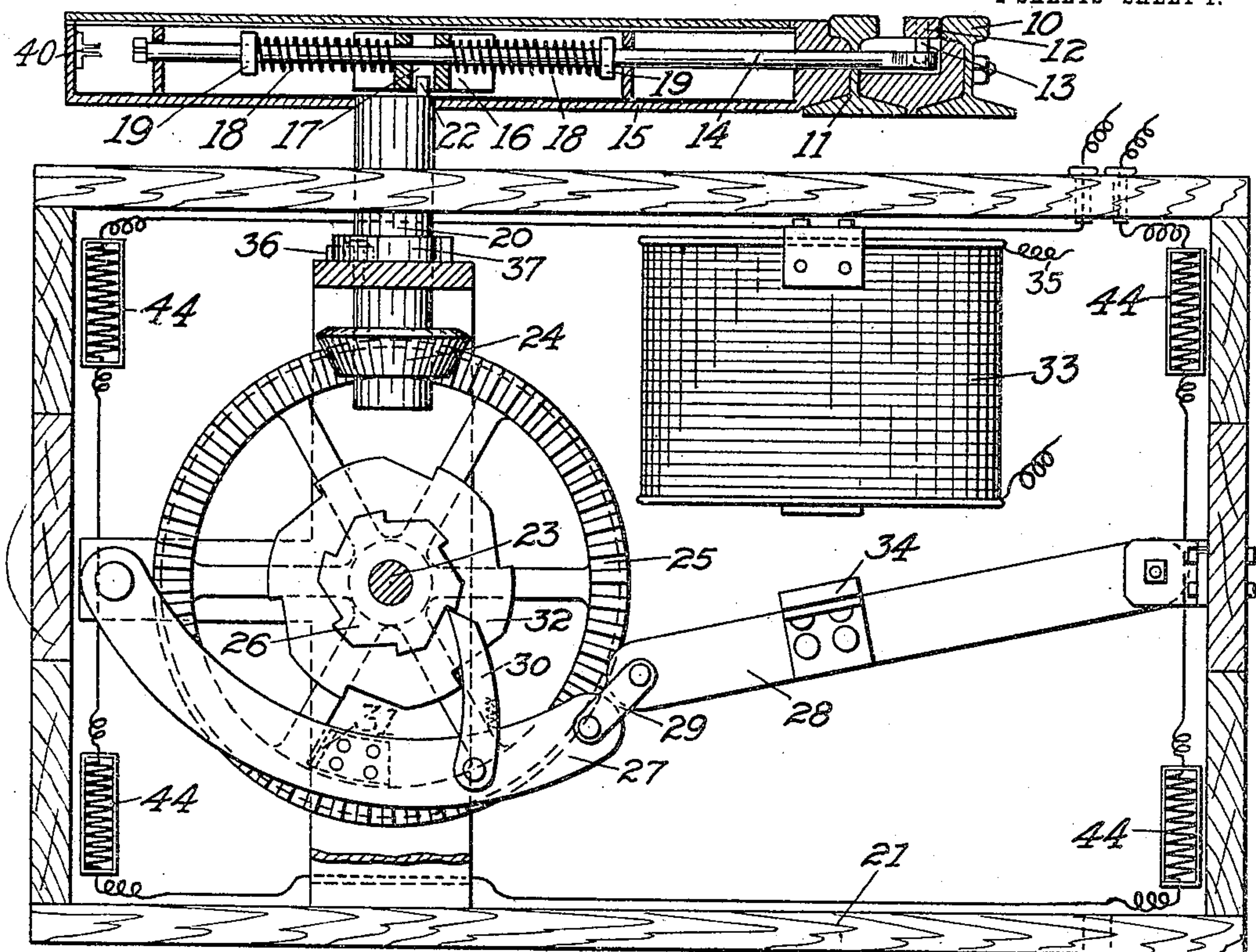


Fig. 1

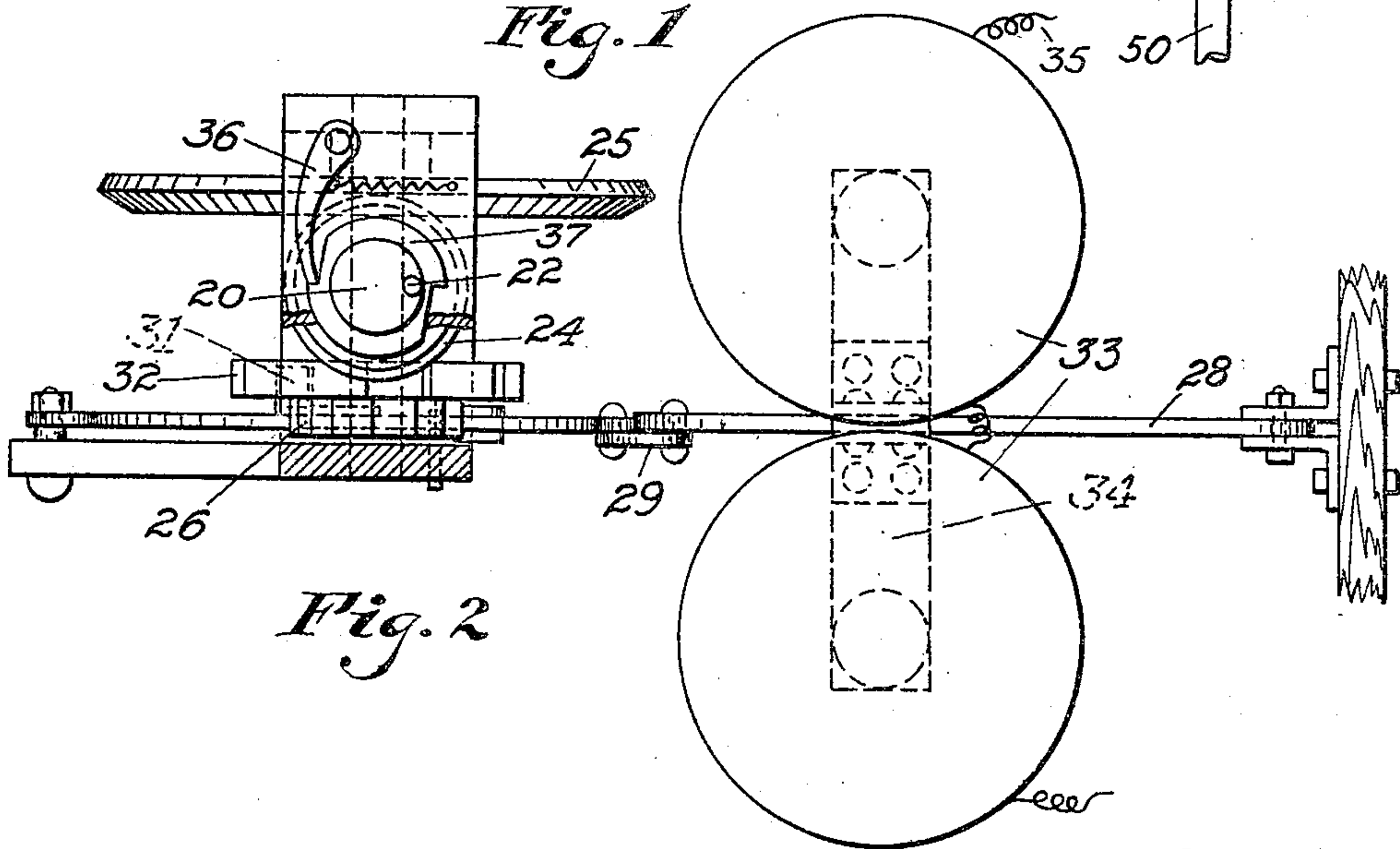


Fig. 2

Witnesses

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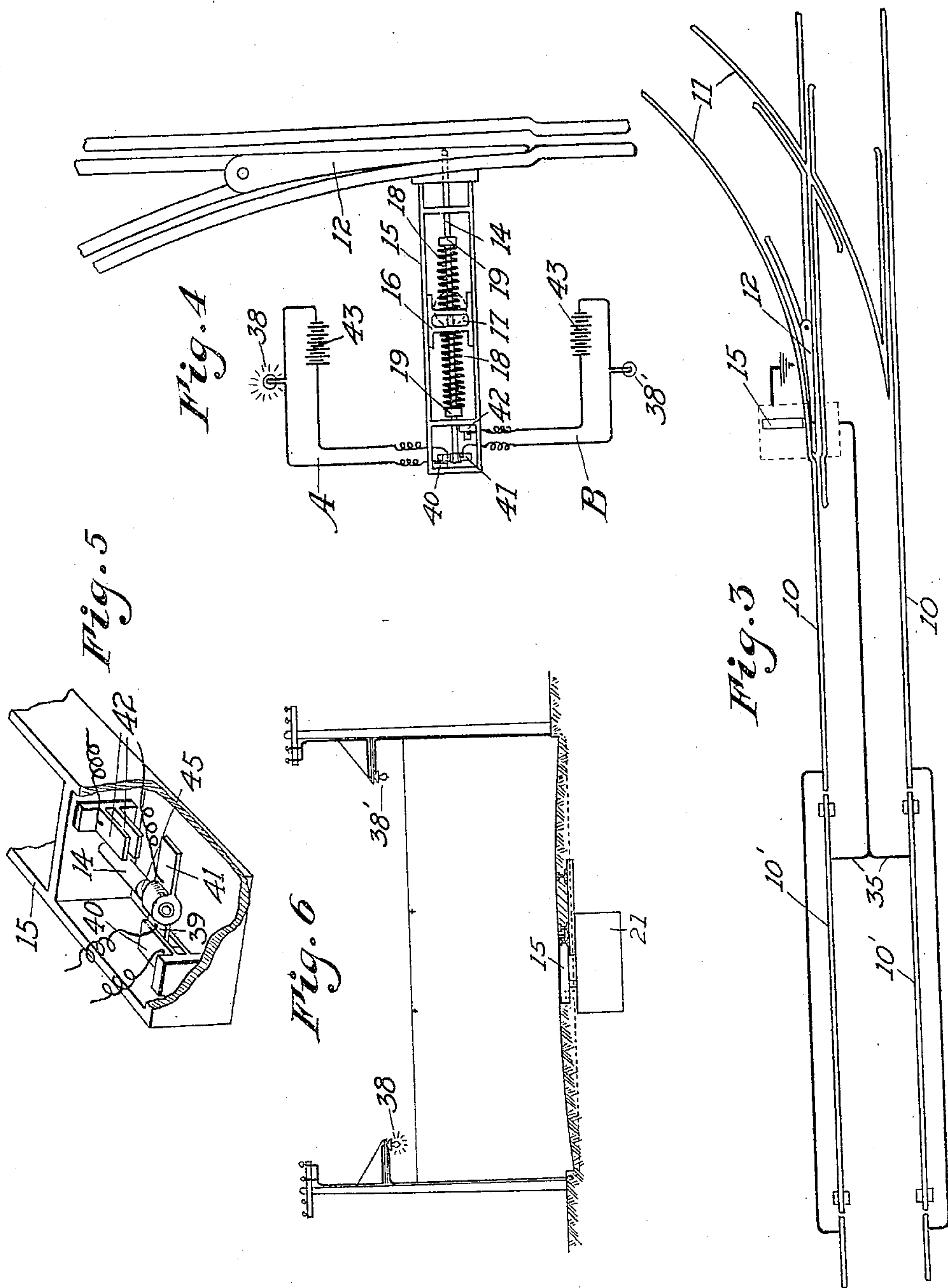
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No. 808,231.

PATENTED DEC. 26, 1905.

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UNITED STATES PATENT OFFICE.

JOSEPH M. COMER, OF SEATTLE, WASHINGTON, ASSIGNOR TO THE COMER
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TION OF WASHINGTON.

AUTOMATIC SWITCH.

No. 808,231.

Specification of Letters Patent.

Patented Dec. 26, 1905.

Application filed April 27, 1905. Serial No. 257,779.

To all whom it may concern:

Be it known that I, JOSEPH M. COMER, a
citizen of the United States of America, and
a resident of the city of Seattle, in the county
of King and State of Washington, have in-
vented certain new and useful Improvements
in Automatic Switches, of which the following
is a specification.

My invention relates to certain new and
useful improvements in switches, having
more particular reference to electrically-con-
trolled mechanism for throwing the switch
point or tongue; and the primary object there-
of is to improve and simplify such mechan-
isms.

With the above and other objects in view,
as set forth in the following description, the
invention consists of the parts, arrangement,
and combinations of parts hereinafter re-
ferred to and defined in the appended claims.

In the accompanying drawings, in which
like characters of reference indicate like parts
throughout the several views, Figure 1 is a
vertical transverse section of a portion of the
track-bed, taken at the switch and shows my
improved switch-operating mechanism in
relative position with the casing thereof in
section. Fig. 2 is a plan view of the mechan-
ism, the casing therefor being removed. Fig.
3 is a plan view showing a portion of the
track and my improved switch-throwing ap-
paratus in place. Fig. 4 is a plan view, on an
enlarged scale, of the switch-point and the
mechanism immediately associated there-
with and illustrating diagrammatically the
signal-light circuits. Fig. 5 is a detail view
in perspective, showing the make-and-break
means of the signal-light circuits; and Fig. 6
is a transverse section of the road-bed and of
the switch provided with my improvements.

Reference-numeral 10 indicates the main
rails of an electric line, 11 the branch rails,
and 12 the switch-tongue, which is mounted
for pivotal movement. Secured to the un-
der face of the switch-tongue and at a suit-
able distance from its pivoted end is a pin 13,
to which is pivoted a rod 14. This rod pro-
jects through the adjacent branch rail 11 and
is slidably mounted in a housing 15, and a
cross-head 16 is loosely mounted on rod 14,
said cross-head being provided with an
elongated laterally-extending slot 17 for a
purpose hereinafter referred to.

The cross-head 16 is adapted to be oper-
ated by suitable mechanism described in the
following, and in order that the movement
imparted thereto will be transmitted to the
rod 14 I arrange on said rod coil-springs 18,
which are confined against the opposite sides
of said cross-head by adjustable nuts 19, which
have screw-threaded engagement with said
rod, so that the tension of the respective
springs can be regulated at will. By this
construction the springs yieldingly connect
said cross-head to rod 14, and should any ob-
struction, as dirt or the like, accumulate be-
tween the sides of the switch-tongue and the
adjacent rail the cross-head can be moved
against spring action irrespective of the
block of the switch-tongue. The mechan-
ism for operating the cross-head comprises a
vertically-disposed crank-shaft 20, which is
rotatably supported in a suitable box or cas-
ing 21, mounted beneath housing 15, and
this shaft is provided on its upper end with a
crank-pin 22, which engages in the slot 17 of
the cross-head, said crank-pin being arranged
at a suitable radius to move the cross-head a
suitable distance to throw the switch-tongue
each time the crank-shaft is turned one-half
of a complete revolution.

Reference-numeral 23 indicates a horizon-
tally-disposed rotatably-mounted driving-
shaft which is coupled to the crank-shaft 20
by differential gearing consisting of a bevel-
pinion 24, fixed to the crank-shaft, and a
bevel-wheel 25, meshing with said pinion and
being fixed to said drive-shaft. The drive-
shaft is operated by pawl-and-ratchet mech-
anism, including a ratchet-wheel 26, fixedly
mounted thereon, and a pair of links 27 and
28, pivoted at their outer ends to fixed means
and having their contiguous ends pivotally
connected by a link 29. Link 27 carries a
spring-pressed pawl 30, which is related to
said ratchet-wheel, and a stop or momentum
arrester 31, consisting of an angular arm
which is adapted to engage in suitable notches
in a wheel 32, fixed to the drive-shaft to
check said shaft after it has been actuated
by pawl 30.

The switch-throwing mechanism is ar-
ranged for operation by electricity, which is
applied through the medium of attracting
electromagnets 33, arranged above armature
34, mounted on the link 28. These electromag-

nets are electrically connected with the rails of the track, so that the current which drives the cars can be utilized to energize the magnets, and as now considered suitable, opposite sections 10' of the track, lying forward of the switch, are insulated, and electric-conductor wires 35 are connected to the rail-sections and to the electromagnets.

In operation, as the electric car approaches the switch from the left of Fig. 3 and it is desired to throw the switch the motorman allows the car to pass over the rail-sections 10' with the electric current turned on. The magnets are thereby energized by the current passing from the car through the rails and the wires 35 and act simultaneously to attract the armature on link 28, and thereby insure a quick and powerful action of the lever, which swings upwardly link 27 and causes pawl 30 to rotate the drive-shaft 23 through the medium of ratchet-wheel 26. This movement of the drive-shaft is communicated to crank-shaft 20 through the differential gearing, said crank-shaft being rotated one-half of a complete revolution and advancing the cross-head 16 to shift rod 14, as heretofore set forth. When the car leaves the insulated rail-sections, the electric current will be cut off from the electromagnets, and the links 27 and 28 will then fall by gravity, leaving the switch-tongue at rest until it is again operated. The crank-shaft is prevented from backward movement by spring-pressed pawl 36, which successively engages the opposite notches of ratchet-wheel 37, secured to said crank-shaft. (See Figs. 1 and 2.)

For night-service I provide electric lamps, which act as signals to inform the motorman of the position of the switch-tongue, these lamps (indicated at 38 and 38') being mounted in any desired manner at opposite sides of the track, and one or the other is always burning, this depending on the position of the switch-tongue. Thus, if the switch-tongue is in the position shown in the drawings circuit A is closed and the lamp 38 is consequently burning. This circuit is closed by the circuit-closer or knife 39, secured to rod 14 and movable between contacts 40. Another knife 41 is also secured to rod 14 and operates in a similar manner with respect to a pair of contacts 42 of a circuit B, in which the lamp 38' is arranged. In these circuits A and B, I arrange batteries, (indicated at 43.) It will be obvious, however, that the electric current can be supplied in other ways without departing from the spirit of my invention.

To prevent the switch-throwing mechanism from freezing, I arrange therein a plurality of electric heaters 44, to which electricity is preferably supplied from the overhead trolley-wire.

The housing 15 and casing 21 can be formed of any desirable material, and the particular

form and arrangement of the knives or circuit-closers 39 and 41 and the contacts 40 and 42 can be readily varied when found desirable. The circuit-closers are, however, insulated from the rod 14, the same fitting on a sleeve 45 of insulating material, and said contacts are insulated from the housing 15, as shown.

The casing 21 is preferably mounted in a pit having walls of cement or the like, and a suitable drain-pipe 50 is adapted to convey any water from said casing, as is obvious.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States of America, is—

1. In a switch-operating device of the nature indicated, the combination with the swingingly-mounted switch-tongue, a rod pivotally connected to said switch-tongue, a cross-head slidable on said rod and having a yielding connection therewith said cross-head having a slot, and means for reciprocating said cross-head including a shaft having a crank-pin engaging in the slot of said cross-head.

2. In a switch-operating device of the nature indicated, the combination with the swingingly-mounted switch-tongue, of means for swinging said switch-tongue including a pair of meshing gears, a ratchet-wheel movable in unison therewith, a pawl adapted to successively engage the teeth of said ratchet-wheel means for operating the pawl comprising a pair of links pivoted together at their contiguous ends and having their outer ends pivoted to fixed means, an armature on one of said links, and electromagnetic means for attracting the armature upwardly.

3. In a switch-operating mechanism of the nature indicated, the combination with the swingingly-mounted switch-tongue, a crank-shaft operatively connected thereto for swinging the same, a gear on said shaft, a second shaft, a gear on the said second shaft meshing with said first gear, ratchet and notched wheels secured to the last-named shaft, a swinging means carrying a pawl for engagement with said ratchet-wheel, a stop secured to said means for engagement in the notches of said notched wheel, and means for swinging said means.

4. In a switch-operating device of the nature indicated, the combination with the swingingly-mounted switch-tongue, a housing, a rod connected to said switch-tongue and being mounted in said housing for bodily-sliding movement, independent electric circuits having lamps therein and provided with contacts arranged in said housing, and circuit make-and-break means secured to said rod for engagement with the contacts of said circuits.

5. In a switch-operating device of the nature indicated, the combination with the

swingingly-mounted switch-tongue, of means
for swinging said switch-tongue including a
pair of meshing gears, a ratchet-wheel mov-
able in unison therewith, a pawl, means for
5 operating the pawl so as to intermittently
operate the ratchet-wheel, said means com-
prising a pair of links pivotally connected to-
gether at their contiguous ends having their
outer ends pivoted to fixed means, an arma-
10 ture secured to one of said links, and means
to elevate said links consisting in its entirety
of electromagnetic means arranged above
said armature for attracting the same.

6. In a switch-operating mechanism of the
15 nature indicated, the combination with the
swingingly-mounted switch-tongue, a crank-
shaft operatively connected thereto for
swinging the same, a gear on said shaft, a sec-

ond shaft, a gear on the second shaft mesh-
ing with said first gear, ratchet and notched 20
wheels secured to the last-named shaft, a
swinging means comprising a pair of links
pivotally connected together at their contigu-
ous ends and having their outer ends pivoted
to fixed means, a pawl carried by said swing- 25
ing means for engagement with said ratchet-
wheel, a stop secured to said swinging means
for engagement in the notches of said notched
wheel, and means for operating said swing-
ing means. 30

Signed at Seattle, Washington, this 13th
day of April, 1905.

JOSEPH M. COMER.

Witnesses:

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STEPHEN A. BROOKS.