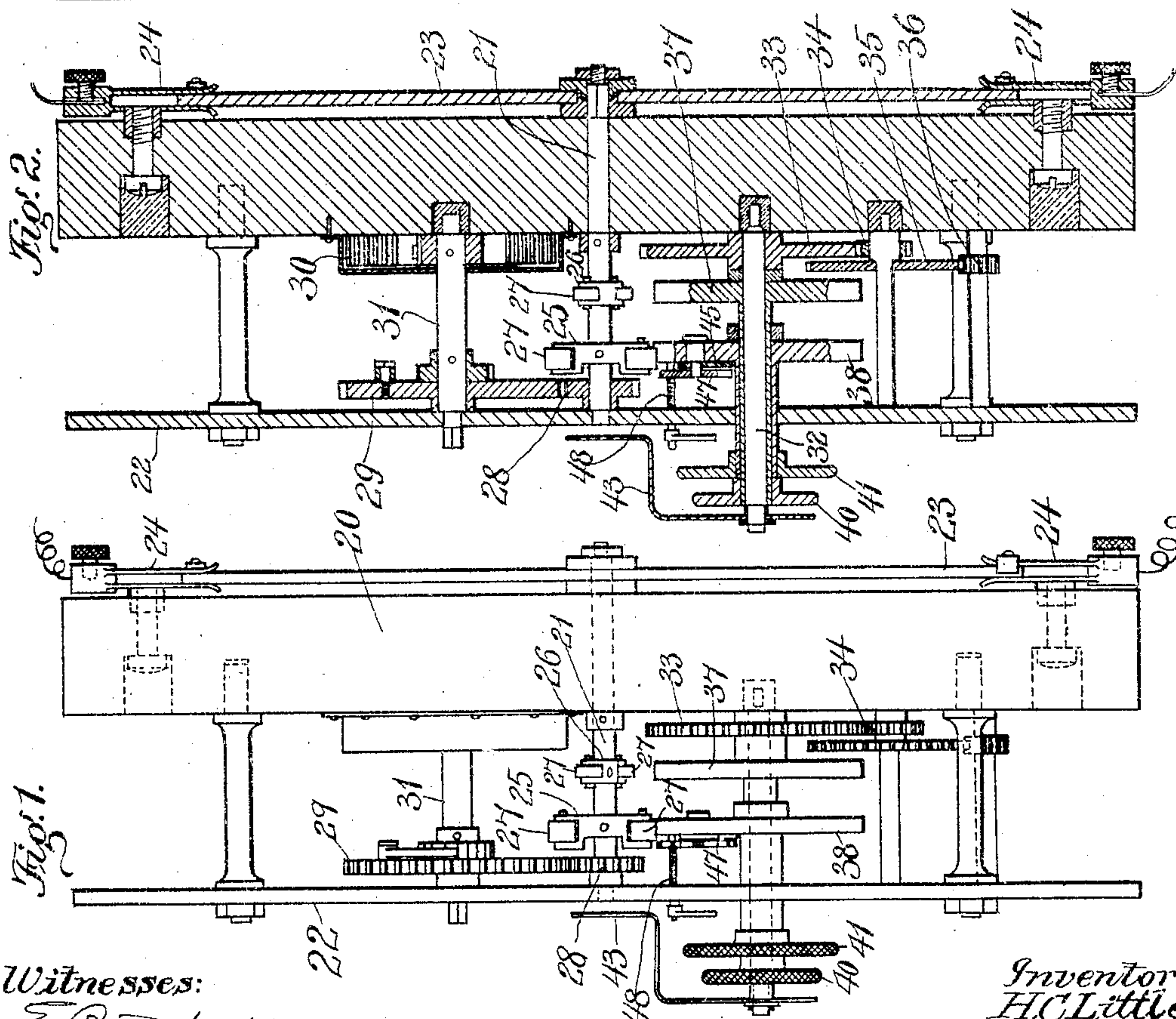
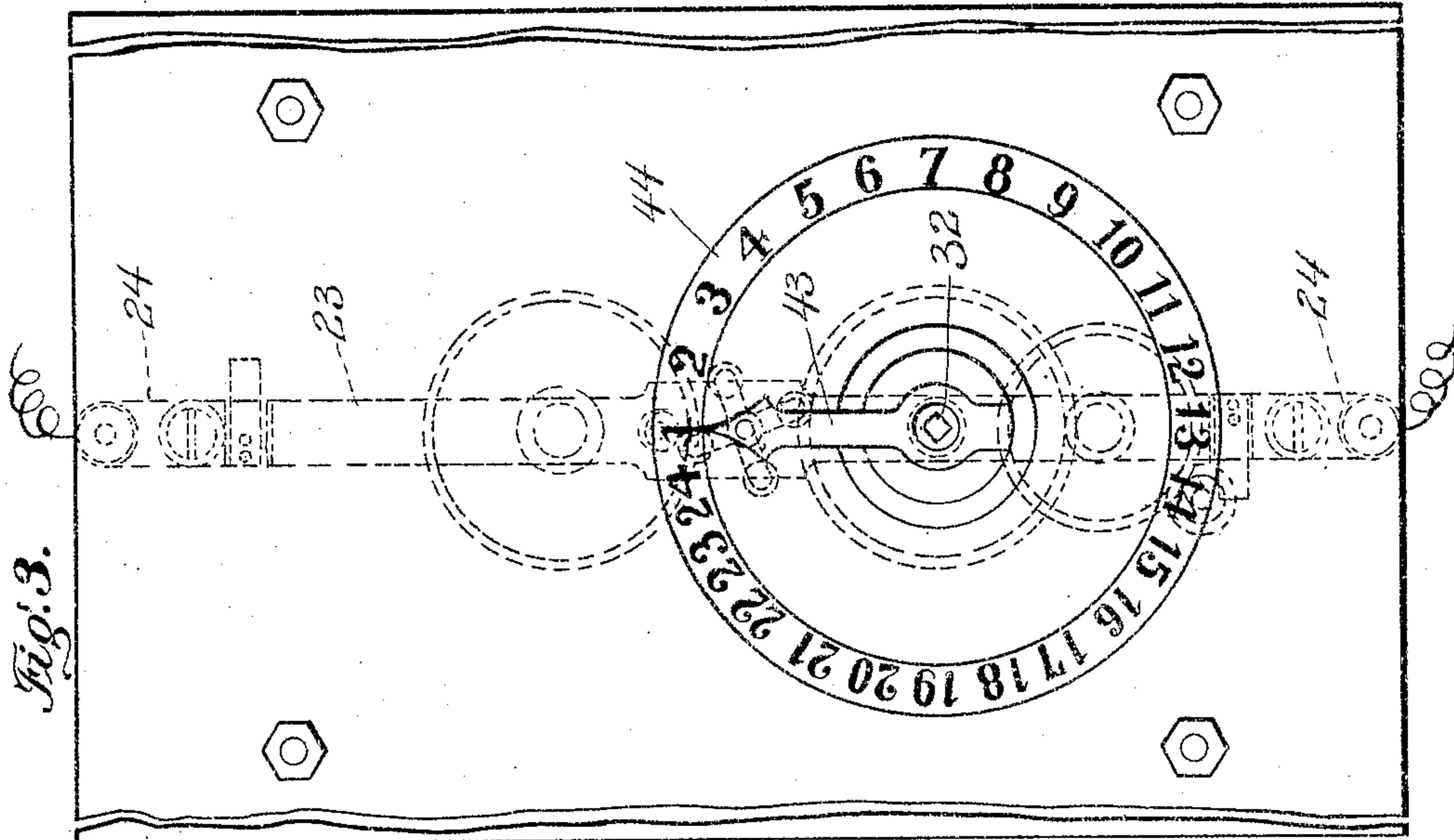


No. 786,226.

PATENTED MAR. 28, 1905.

H. C. LITTLE.
ELECTRIC TIME SWITCH.
APPLICATION FILED AUG. 26, 1903.

3 SHEETS—SHEET 1.



Witnesses:

E. Batchelder
R. Bullock

Inventor:
H. C. Little

by Night Brown Quincy

Atty.

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3 SHEETS—SHEET 2.

Fig. 14.
24
49

Fig. 5

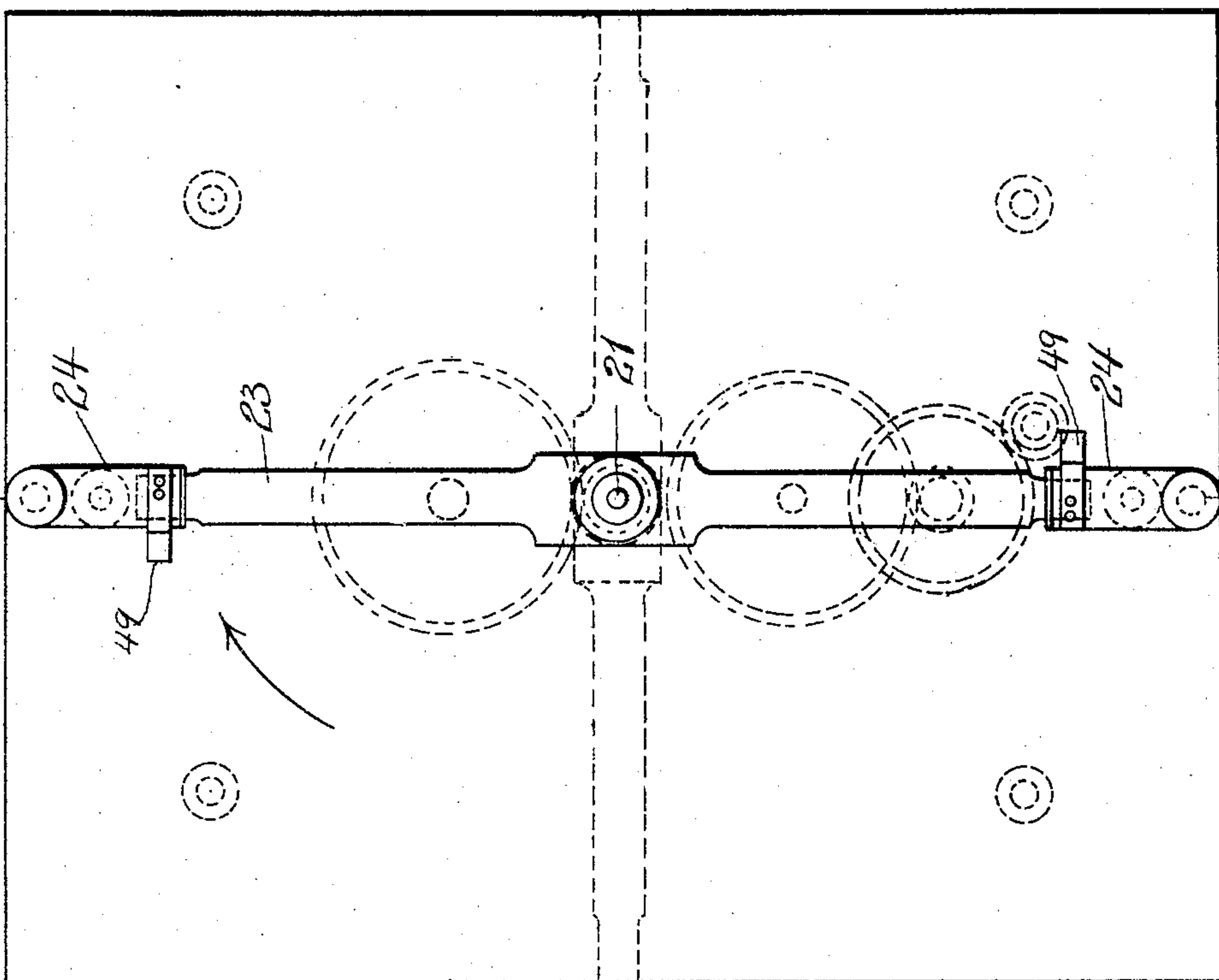
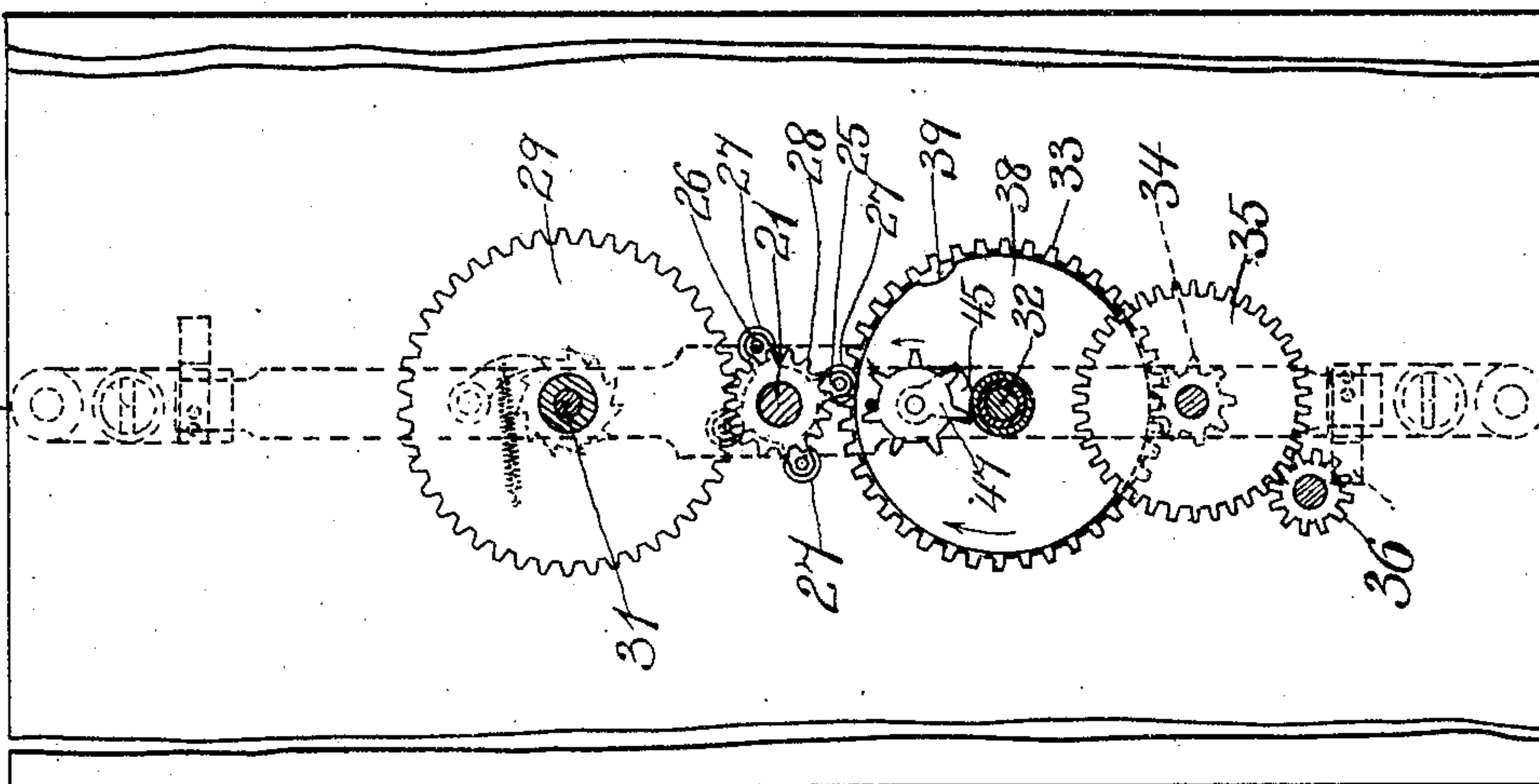


Fig. 4



Witnesses:

E. Bateman

R. Bullock

Inventor:

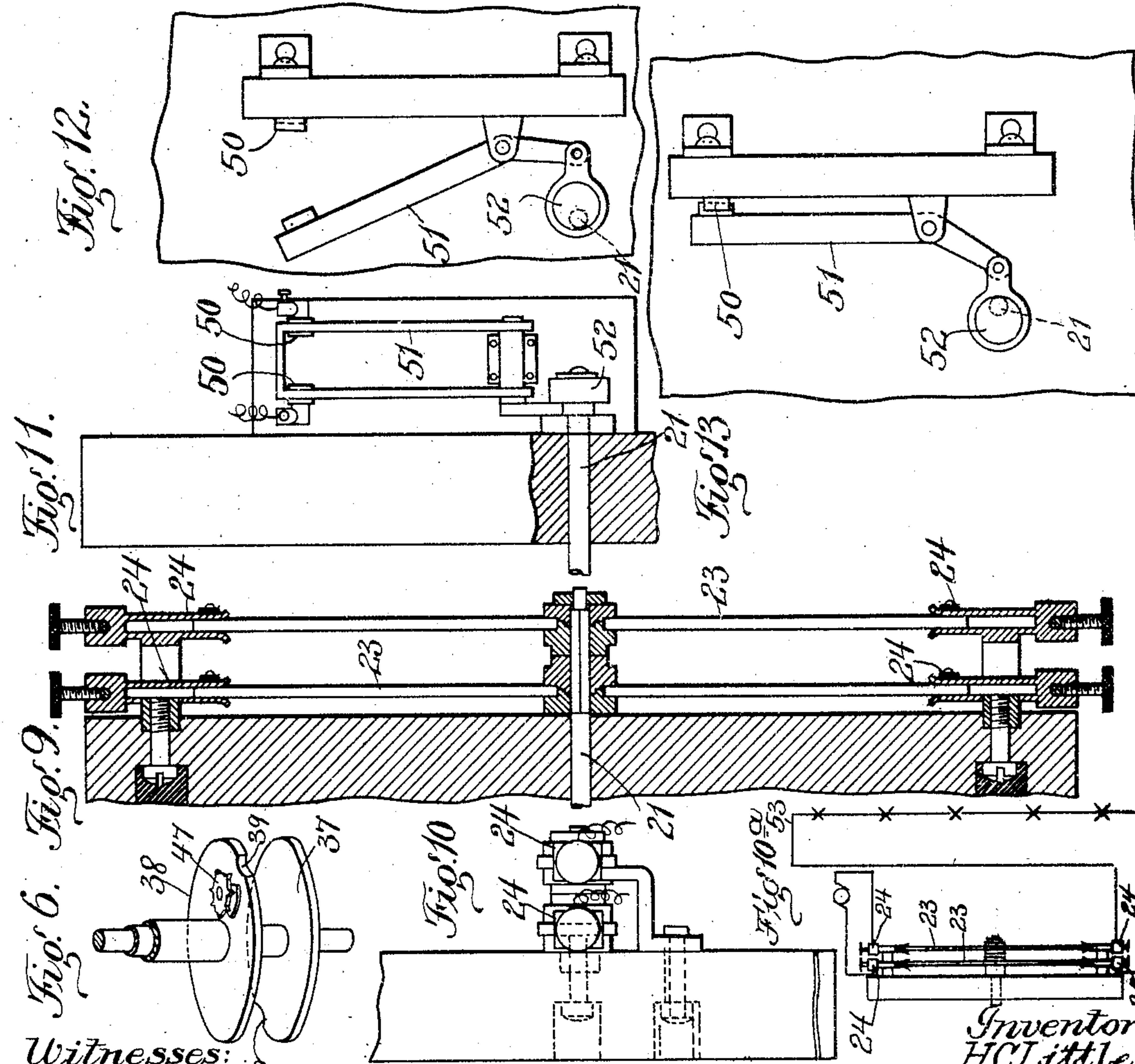
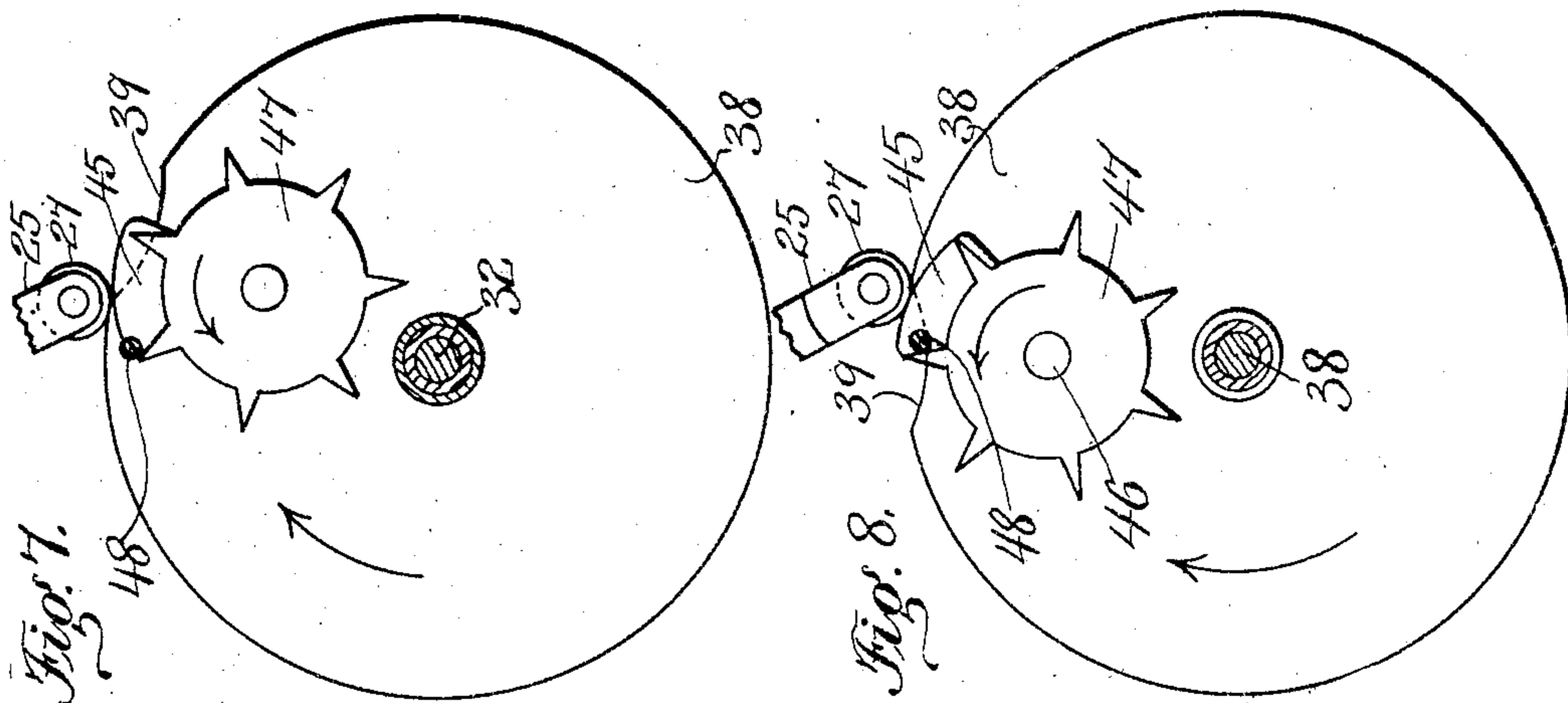
H. C. Little

by Wright Brown Dimby

Attys.

H. C. LITTLE.
ELECTRIC TIME SWITCH.
APPLICATION FILED AUG. 26, 1903.

3 SHEETS—SHEET 3.



Witnesses:
E. Baehden
Q. Bullock

Inventor:
H. C. Little
By Night Brown & Quincy
Attys.

UNITED STATES PATENT OFFICE.

HENRY C. LITTLE, OF BOSTON, MASSACHUSETTS.

ELECTRIC TIME-SWITCH.

SPECIFICATION forming part of Letters Patent No. 786,226, dated March 28, 1905.

Application filed August 26, 1903. Serial No. 170,887.

To all whom it may concern:

Be it known that I, HENRY C. LITTLE, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Electric Switch-Controlling Apparatus, of which the following is a specification.

This invention relates to an apparatus for controlling a circuit or series of circuits, such as an electric street or house lighting circuit, a gas-lighting system, the illuminating-circuits of an automatically-operated sign, &c.; and it has for its object to provide improved means for opening and closing such circuit or circuits at predetermined intervals, so that the sign, lamps, or other apparatus may be run for a certain number of hours during the day or night and stopped for a certain number of hours without the need of supervision or attention.

A further object, in addition to the foregoing, is to vary the intervals between the cycles of operation of the apparatus at predetermined times—as, for instance, at the end of the week, when it may be desired to cause the apparatus to cease operation over Sunday and then renew its operation on Monday and continue automatically during the business days of the week.

The invention further relates to the construction of the switch in an apparatus of the kind described.

The invention consists in certain novel features of construction and arrangement hereinafter described and claimed.

Of the accompanying drawings, Figure 1 represents a side elevation of a switch-controlling apparatus constructed according to my invention. Fig. 2 represents a vertical section thereof. Fig. 3 represents a front elevation. Fig. 4 represents a front elevation of parts behind the front plate of the mechanism. Fig. 5 represents a rear elevation. Fig. 6 represents a detail perspective view of the two notched plates. Fig. 7 represents a front elevation of one of said plates, showing the filler device. Fig. 8 represents a view of the foregoing in a different position. Fig. 9 represents a vertical section showing a

double-pole rotary switch for breaking a circuit simultaneously at two points. Fig. 10 represents a reverse plan view of said switch. Fig. 10^a represents a diagrammatic view showing the manner of connecting said switch in circuit. Fig. 11 represents a side elevation showing an oscillating form of double-pole switch. Fig. 12 represents a rear elevation thereof with the switch open. Fig. 13 represents a rear elevation with the switch closed. Fig. 14 represents a detail section of one of the knife-switch members, showing a device for preventing rebound.

The same reference characters indicate the same parts in all the figures.

Referring first to Figs. 1 to 8, inclusive, represents an insulating-base, and 21 represents a central arbor or shaft journaled in said base and in a front plate 22. Said arbor carries on the back a conductive arm 23, constituting one member of a knife-switch of which the spring members or poles are shown at 24. On the arbor 21 are fixed at right angles to each other two arms 25 26, having rolls 27 on each end, and said arbor is rotated by an operating-train including wheels 28 29, a spring 30, and a winding-arbor 31. 32 is a controlling arbor or shaft rotated by a train composed of wheels 33 34 35 36 and suitable arbors, together with the usual spring or equivalent. (Not shown.) Frictionally mounted on the arbor 32 and rotated thereby are two rotatable members consisting of wheels or disks 37 38, each having a notch 39 in its periphery and each having a knurled adjusting-wheel 40 41 on its hub outside of the front plate 22. The arbor 32 carries a pointer 43, cooperating with a stationary index 44, bearing numerals indicating the twenty-four hours of the day. The wheel 38 carries a rotary filler 45 on a stud 46, adapted to complete the arc of the wheel opposite its notch 39, said filler being affixed to a seven-toothed star-wheel 47. 48 is a threaded stem or pin mounted on the front plate 22 and adapted to be screwed into and out of the path of the star-wheel teeth.

In the operation of the device the arbor 32 is rotated by its train once in twenty-four hours. The arms 25 26 cooperate, respec-

tively, with the notched wheels 38 37, and the arrangement is such that when the roll 27 of either arm is on the concentric part of the periphery of the corresponding wheel the arbor 21 will be prevented from rotating. When said roll enters the notch 39, however, the arbor 21 will be released and will rotate through an angle of about ninety degrees until stopped by the other arm encountering the periphery of the corresponding wheel. In this way the switch 23 24 is alternately opened and closed. By suitably adjusting the wheels 37 38 on their arbor 32, so as to bring their notches 39 at the desired angle apart, the switch 23 24 will be allowed to close during a certain number of hours and remain open during the remaining hours of the day. By inserting the pin 48 in the path of the star-wheel 47 the latter will be rotated one tooth at every rotation of the wheel 38, and the filler 45 will cover the notch 39 once in seven days. The roll 27 on arm 25 will therefore not enter the notch, and consequently the switch-arm 23 will remain stationary for twenty-four hours, the switch remaining either open or closed during this period, according to the set given to the parts.

It is obvious that the wheels 40 41 could be dispensed with and their places taken by the wheels 37 38, the latter being provided with knurled peripheries. In such a case the pointer 43 could be dispensed with. Equally obviously, also, a greater number of wheels corresponding to the wheels 37 38 than two and a correspondingly-greater number of arms 25 26 may be mounted on the arbors 32 and 21, respectively, or the wheels 37 38 may each be provided with more than one notch, whereby a greater number of changes of the circuit may be made during the period of one rotation of the arbor 32.

Fig. 14 shows a spring-catch 49, attached to one of the plates of each of the switch members 24, said catch being displaced by the arm 23 as it enters the member 24 and serving to lock said arm against rebound.

In Figs. 9 and 10 I show duplicate arms 23 on the arbor 21 cooperating with duplicate switch members 24 for breaking at two points simultaneously any suitable circuit, such as the lamp-circuit 53. (Shown in Fig. 10^a.)

In Figs. 11, 12, and 13 is shown an oscillating-arm switch embodying double-point stationary switch members 50, a pivotal switch-arm 51, and an eccentric 52 on the arbor 21, having its strap connected with said switch-arm. In this form of the invention the switch is mounted independently of the arbor 21 and is operated by independent means connected to the switch and arbor and consisting of the eccentric 52 and its strap.

Evidently other forms of switch than those here shown and other actuating connections between them and the arbor may be employed.

Also other devices than switches for controlling electric circuits may be operated and controlled by the mechanism hereinbefore described, as the said mechanism may equally well be connected to open and shut off the supply of gas in a gas-lighting system, to operate changing advertising devices of various descriptions, and to perform other work of similar character where periodical variations are required. I do not, therefore, wish to limit the claims for my invention to cover merely a device for operating switches for electric circuits, but desire to claim also the mechanism described, broadly, as capable of use in any desired relation and not with reference to any particular use to which it may be adapted.

I claim—

1. The combination of a rotary shaft, motor mechanism for operating the same, timing mechanism, and cooperating escape devices connected respectively with the timing mechanism and the shaft, one of said devices being a member having a concentric portion and a notch, the other device being a revoluble dog held by said concentric portion and permitted to revolve by said notch.

2. The combination in a controlling apparatus of a rotating shaft, motor mechanism for rotating the same, escape devices mounted on said shaft, cooperating rotating escape devices adapted to arrest and release the first said escape devices, and timing mechanism controlling said cooperating devices.

3. In a controller, the combination of a rotary shaft adapted to operate changing devices, motor mechanism for rotating said shaft, escape-arms mounted on said shaft, cooperating rotatable notched disks arranged to alternately arrest and release said arms, mechanism for rotating said disks at a uniform, predetermined speed, and provisions whereby the relative adjustment of the disks may be varied.

4. In a switch-controlling apparatus, a circuit-controlling movable switch member, motor mechanism for operating the same, timing mechanism, and cooperating escape devices connected respectively with the timing mechanism and the switch member, one of said devices being a wheel having a concentric portion and a notch, the other device being a completely-revolving dog held by said concentric portion and permitted to revolve by said notch.

5. In a switch-controlling apparatus, a pair of completely-revolving dogs, a pair of wheels having concentric portions and notches controlling said dogs, said wheels being relatively adjustable rotatively, circuit-controlling means controlled by said dogs, and timing mechanism controlling said wheels.

6. In a switch-controlling apparatus, a completely-rotating shaft, motor mechanism for rotating the same, a switch member actuated

by said shaft, escape devices mounted on said shaft, coöperating completely-rotating escape devices adapted to arrest and release the first-said escape devices, and timing mechanism
5 controlling said coöperating devices.

7. In a switch-controlling apparatus, a completely-revolving switch member, a constantly-impelling motor for revolving said member, timing mechanism for intermittently
10 releasing said member, a stationary switch member, and an automatic catch to retain said revolving member against rebound after contact with said stationary member.

8. In a switch-controlling apparatus, a pair
15 of wheels each having detent-arresting and detent-releasing means, a pair of detents controlled by said wheels, a switch member connected with said detents, and means for rotating said wheels and detents always in one
20 direction.

9. In a switch-controlling apparatus, a shaft, a switch connected for operation by said shaft, motive mechanism for rotating the shaft to open and close the switch, mechanical escape
25 devices comprising a plurality of members, one of which is carried by the shaft, adapted to secure the periodical operation of said switch by its motive mechanism, and timing mechanism controlling the action of said es-
30 cape devices.

10. In a switch-controlling apparatus, a switch, motive mechanism for opening and closing the same, mechanical escape devices adapted to secure the periodical operation of
35 said switch by its motive mechanism, timing mechanism controlling the action of said es-

cape devices, and mechanism carried by the escape devices and automatically acting at predetermined intervals to prevent said operation of the switch.

11. In a switch-controlling apparatus, a switch member, a controller-wheel for permitting intermittent actuation of said member, said wheel having a concentric portion and a notch, a filler for the notch of said
40 wheel, means for actuating said filler at predetermined intervals, and a completely-revolving escape member coöperating with said wheel and connected with the switch member.

12. In a switch-controlling apparatus, a rotary switch member, means for rotating the same, a completely-revolving detent connected with said member, a notched wheel for arresting and releasing said detent, a rotary
50 filler for the notch of said wheel mounted to revolve with the wheel, and a stationary trip for rotating said filler.

13. In a switch-controlling apparatus, a completely-revolving dog, a switch controlled thereby, a wheel having a concentric portion
60 to arrest said dog and a notch to release the same, a filler for said notch to prevent the release of the dog, and automatic means for operatively positioning said filler at predetermined intervals.

In testimony whereof I have affixed my signature in presence of two witnesses.

HENRY C. LITTLE.

Witnesses:

C. F. BROWN,
E. BATCHELDER.