F. M. SCHMIDT.

TRANSMITTER FOR IMPULSE DRIVEN CLOCK SYSTEMS.

APPLICATION FILED NOV. 5, 1908.

919,646.

Patented Apr. 27, 1909.

3 SHEETS—SHEET 1.

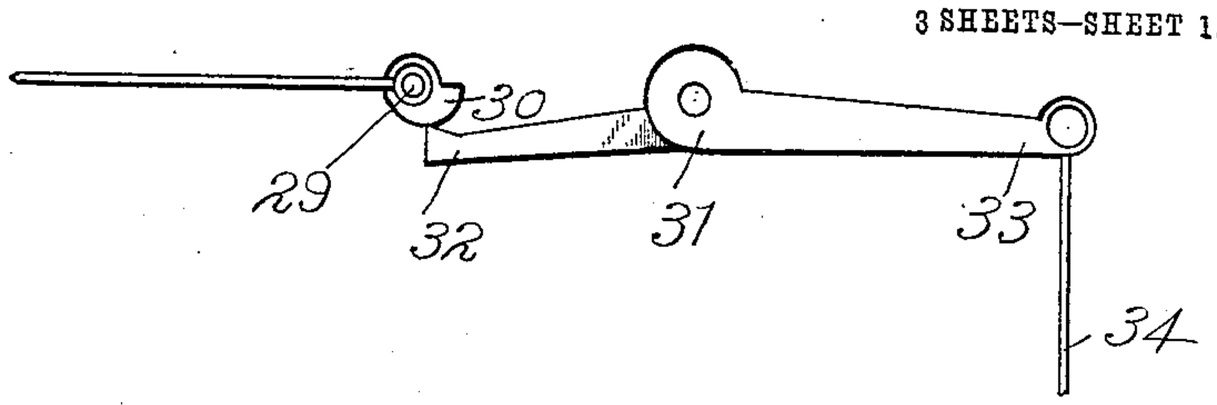
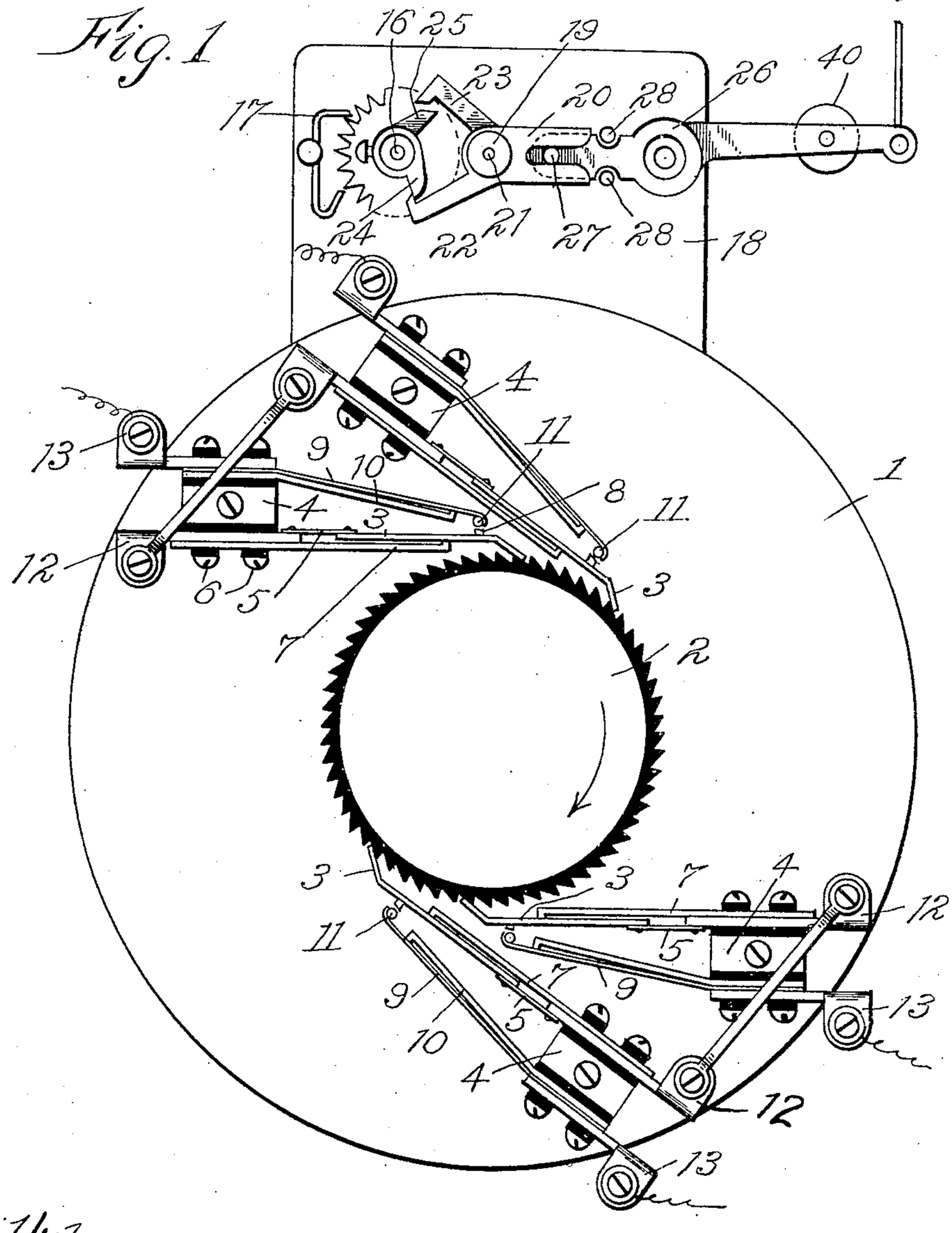


Fig. 1



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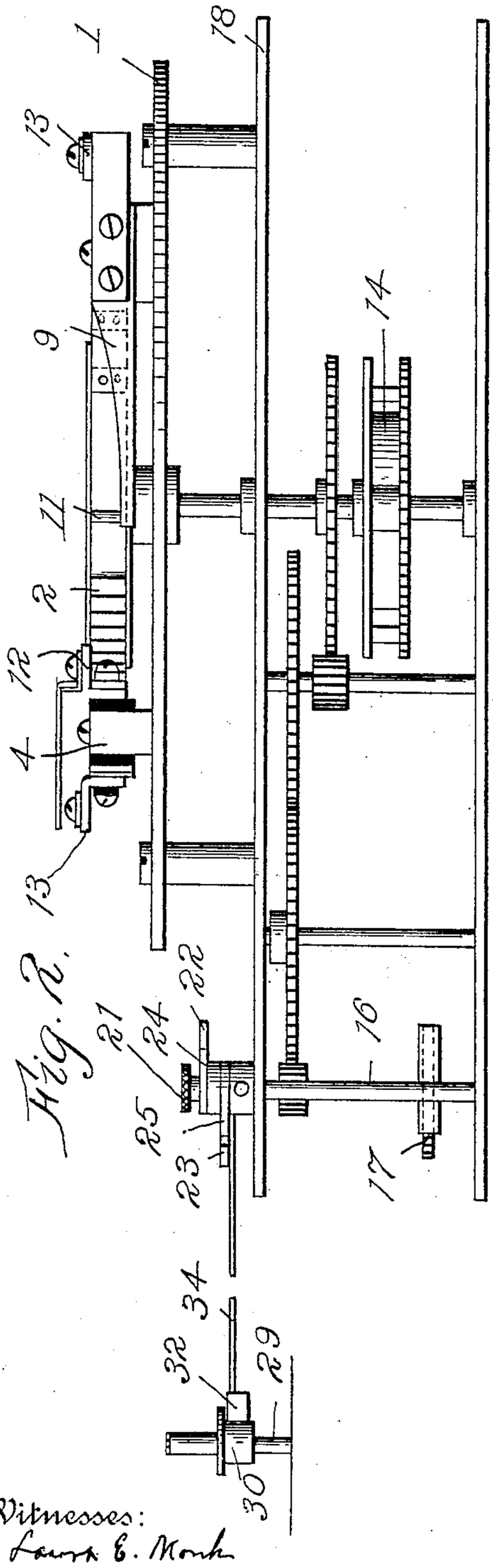

Fig. 2.

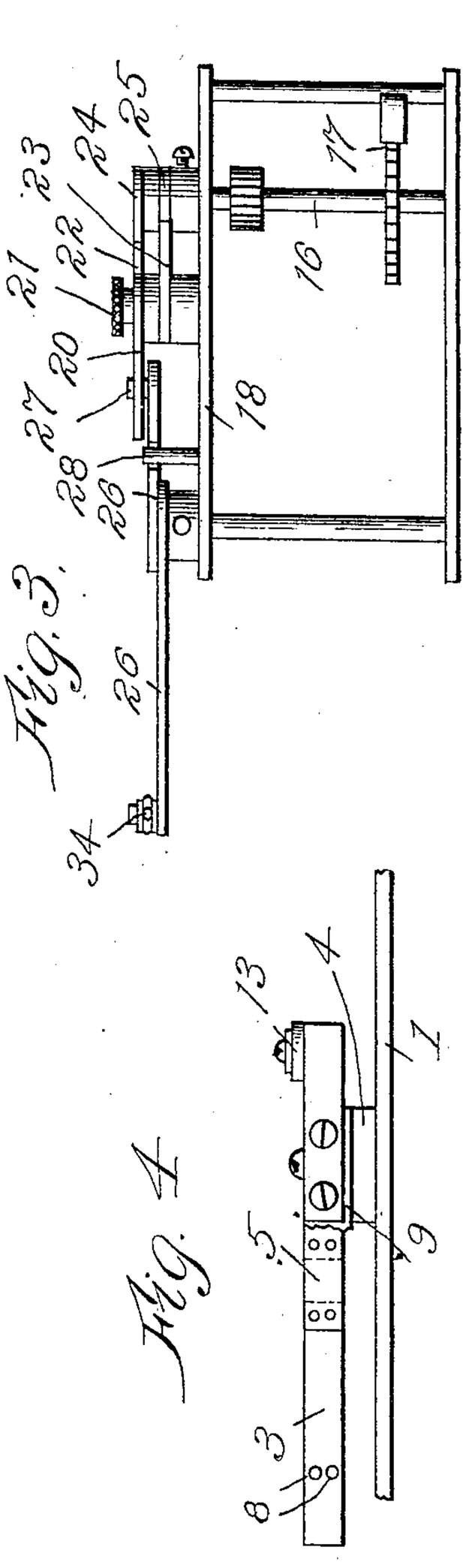

Fig. 3.

Fig. 4.

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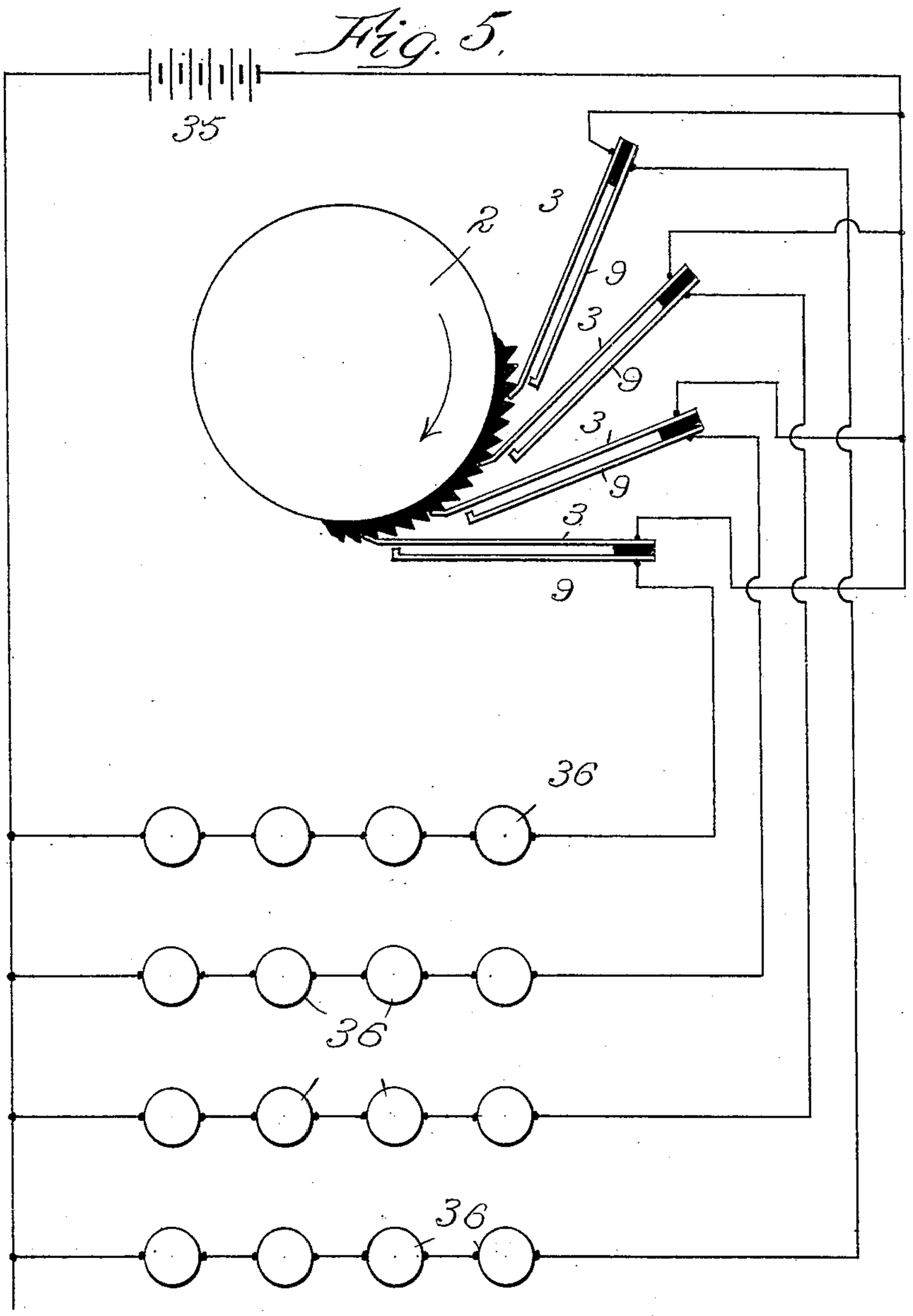
3 SHEETS—SHEET 3.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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TRANSMITTER FOR IMPULSE-DRIVEN CLOCK SYSTEMS.

No. 919,646. Specification of Letters Patent. Patented April 27, 1909.

Application filed November 5, 1908. Serial No. 461,229.

To all whom it may concern:

Be it known that I, FREDERICK M. SCHMIDT, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Transmitters for Impulse-Driven Clock Systems, of which the following is a full and clear specification, and of which the novel features are pointed out in the annexed claims.

In synchronizing clock systems heretofore known, which control secondary clocks from a master clock by means of electrical current, the contact devices, which close the circuits leading to the different secondary clocks, are generally disposed on the master clock itself, that is to say for instance, the second or minute arbor of the master clock directly operates the contact arms or arm. The disadvantages of this arrangement are principally that owing to the small power which is naturally available, the contact springs must be very light and the contact very soft, so that in turn the contact points will remain in contact longer than and not as positive as it is necessary, and will consume an undue amount of current.

It is the principal object of my invention to produce a contact device which I shall hereinafter call transmitter, which owing to its being independent of the sensitive mechanism of the master clock, will produce powerful mechanical impulses which will rapidly close and open the contacts of the secondary circuits. By this arrangement I consume only a small portion of the current consumed in the contact devices directly mounted on the master clock above referred to. This transmitter, being operated independently of the master clock, will require only very little power from the master clock to be released at the proper time for operation, and furthermore, any number of secondary clocks may be added to the system by simply adding transmitters or changing the size of the transmitter, without being compelled to change the master clock proper which is the case in most systems heretofore known.

I have illustrated in the accompanying drawings my novel transmitter, in which—

Figure 1 is a plan view of the transmitter and its release mechanism. Fig. 2 is a side elevation of the transmitter seen from the left hand side in Fig. 1. Fig. 3 is a left hand side elevation of the structure shown in Fig. 2. Fig. 4 is a detail side view of one of the contact members, and Fig. 5 is a wiring diagram showing the transmitter and a number of secondary clocks connected to it.

Referring to Fig. 1, 1 represents the top plate of the transmitter underneath of which a train operating the transmitter may be disposed. This train may be of any suitable kind known in the art adapted to rotate the ratchet wheel 2 which is concentrically mounted with and above the top plate. The teeth of ratchet wheel 2, as is shown in Fig. 1, consist of insulating material and against these teeth bear a number of substantially tangentially disposed contact arms 3. Each of these arms is supported by a block 4 with a leaf spring 5 interposed between the contact end of the arm and the portion which is fastened to block 4 by means of screws 6. Moreover the arm 3 is insulated from the block 4 and rests in its inoperative position against stop 7 which is fastened together with arm 3 to block 4. Near the end of arm 3 are provided two contact points 8 which are more clearly shown in the side elevation of arm 3 in Fig. 4. On the opposite side of each block 4 is correspondingly disposed, and insulated therefrom, contact spring 9 likewise resting on the stop member 10 in its inoperative position, and provided at its end with a contact pin 11, shown in side elevation Fig. 2. The corresponding arms of each block are disposed so that in their inoperative position, contact pin 11 will stand opposite contact points 8 of arm 3 at a suitable distance. If now ratchet wheel 2 is revolved in the direction indicated by the arrow it will be seen that arm 3 will be lifted by the tooth with which it is in engagement, so that its point 8 and pin 11 will contact and close the circuit to which arms 3 and 9 are connected by their terminals 12 and 13. After the point of the tooth has passed the end of arm 3 the latter will fall back into the notch formed by this tooth and the following and the contact between points 8 and 11 will be again interrupted. By suitably choosing the time during which one tooth passes 8 and 11 may be reduced to a minimum. I have shown in Fig. 1 four of such contact devices arranged in staggered relation to each other. It will be also noted that, owing to the distance be-

tween the supporting points of arms 3 and 9, contact points 8 will have a wiping motion upon contacting with pin 11, so that thereby the contact surface of both contact elements are permanently kept clean.

I have illustrated in Fig. 2, as an example, a clock train which may be used for operating ratchet wheel 2 without limiting myself to this particular form. In this figure 14 represents the spring for operating the train, which may be substituted by any other suitable means well known in the art, such as for instance, electrical means as used in self-winding clocks or the like. The train as illustrated in Fig. 2 is normally arrested by the escapement which I will now describe. As is shown in Fig. 1, shaft 16 of the escapement 17 extends upward through a plate 18 on which is mounted the anchor escapement 19. This mechanism comprises a slotted member 20 fastened to rocking shaft 21 and bearing the pallet 22 of the escapement. The other pallet 23 also fastened to rocking shaft 21 is disposed below the member 20. Pallet 22 coöperates with stop 24 and pallet 23 with stop 25, both of which are fixed to shaft 16 of the escapement 17. On plate 18 is further disposed rocking lever 26 one end of which is provided with a pin 27 disposed in the slot of anchor member 20. Furthermore the side of rocking lever 26 bearing pin 27 is disposed between two stops 28 for limiting its rocking motion. It will now be seen that if lever 26 is rocked at the other end, the anchor escapement will operate in well known manner, thereby during one full period of rocking permitting the shaft 16 to perform one whole revolution. The gearing of the clock train illustrated in Fig. 2 is chosen so that when shaft 16 performs one revolution, toothed wheel 2 is advanced one tooth in the direction indicated by the arrow in Fig. 1, and thus the contact points of the contact levers in engagement with the teeth have made contact once at each revolution of shaft 16. The free end of lever 26 may be connected to any suitable portion of the master clock adapted to rock it at the time desired.

I have shown as an example diagrammatically in Fig. 1 how rocking lever 26 may be operated. In this figure 29 represents the second arbor of the master clock on which is also mounted a snail cam 30. At a suitable point of the master clock is further pivoted rocking lever 31, one arm 32 of which is suitably shaped at its end and in engagement with snail cam 30 and the other end 33 of which is connected to the free end of rocking lever 26 of the anchor escapement, for instance by rod 34. Thus it will be seen that at every revolution of the second arbor 29, rocking lever 31 will perform one full up and down stroke and thus operate the transmitter escapement. Instead of transmitting an impulse every minute other suitable cams may be used on the second arbor in order to produce two or more impulses per minute. I have shown in Fig. 1 the escapement mechanism and a snail cam and the lever connected therewith in such a relative position that the snail cam has just depressed the end 32 of lever 31 almost to its maximum which has caused pallet 23 to release its stop 25, which was previously resting against the outer face of pallet 23, so that stop 24 has come into engagement with its pallet 22. In this position the elements of the mechanism remain until the top of snail cam 30 has reached the end 32 of lever 31, whereupon end 32 will be released and rock upward, end 33, rod 34 and the free end of lever 26 with its additional adjustable weight 40 being of sufficient weight to cause end 32 to remain in engagement with snail cam 30. By the upward motion of end 32 pallet 22 will release its stop 24 and shaft 16 will complete its revolution, whereupon stop 25 will again be engaged by its pallet 23, which upon the release of stop 24 has been moved back into the path of stop 25.

As already stated above, by controlling this whole transmitter from the master clock and by using an individual train for operating the transmitter independently of the master clock any suitable number of powerful contact impulses may be given simultaneously by the transmitter without impairing in any way the power for operating the master clock except by the slight friction caused by the bearing of lever 31 on snail cam 30, and by lifting this lever.

In the diagram shown in Fig. 5 I have illustrated a manner in which a number of secondary clocks may be connected to the contact arms of the transmitter. In this diagram 2 represents the toothed wheel, of which only a portion of the teeth are shown, and 3 and 9 represent the two contact arms of the four contact devices shown in this diagram in engagement with wheel 2. It is also obvious from the drawings that, all the contact arms operated by ratchet wheel 2 being in the same relation to the teeth of the wheel, all contact arms 3 will be raised and will fall back simultaneously and thus close and interrupt their contacts simultaneously, so that all secondary clocks in connection therewith will be operated in synchronism. The arms 3 of the contact device are connected to a common wire leading to one of the poles of battery 35, while each arm 9 of the four devices is connected to a different series of secondary clocks 36. In each series may be disposed a suitable number of secondary clocks 36 which depends upon the voltage of the battery 35. As an example I have shown here four secondary clocks in

series for each contact device. The other end of each series of secondary clocks is connected to a common wire leading to the other pole of the battery. From the diagram and from the description of the transmitter it is obvious that any number of secondary clocks may be disposed in each series and any suitable number of series may be added to the system by simply adding a new contact device for each series without otherwise changing the master clock in any manner. In order to provide for the additional contacts on the transmitter, the latter may be either made of sufficient diameter and the ratchet wheel 2 of sufficient size, so as to conveniently accommodate an additional number of contact devices or a new transmitter may be added which contains the required additional number of contact devices, and which may be also operated from rocking lever 31.

What I claim is:

1. For electrically controlling secondary clocks from a master clock, a master clock a transmitter disposed and operated independently of the master clock, having a plurality of electrical contacts and adapted to momentarily close all of said contacts simultaneously, and means mechanically controlled from the master clock for permitting said transmitter to close said contacts at and during predetermined time intervals.

2. For electrically controlling secondary clocks from a master clock, a master clock a transmitter comprising a clock movement disposed and operated independently of the master clock, and having a plurality of electrical contact devices adapted to be momentarily simultaneously closed by it, and means mechanically controlled from the master clock for permitting said movement to momentarily close said contact devices at predetermined time intervals.

3. For electrically controlling secondary clocks from a master clock, a master clock a transmitter comprising a clock movement disposed and operated independently of the master clock, and having a plurality of electrical contact devices adapted to be momentarily simultaneously closed by it, and means for normally arresting said movement and for releasing same during a predetermined period, and means mechanically operated from the master clock for controlling said releasing means to operate at predetermined time intervals, said movement momentarily closing said contact devices at each of said periods.

4. For electrically controlling secondary clocks from a master clock, a master clock a transmitter comprising a clock movement disposed and operated independently of the master clock, and having a plurality of electrical contact devices adapted to be momentarily simultaneously closed by it, and an escapement mechanism for releasing said movement during a predetermined period, and means mechanically operated from the master clock for controlling said escapement to operate at predetermined time intervals, said movement momentarily closing said contact devices at each of said periods.

5. For electrically controlling secondary clocks from a master clock, a master clock a transmitter comprising a clock movement disposed and operated independently of the master clock, and having a plurality of electrical contact devices adapted to be momentarily closed by it, and an escapement mechanism for releasing said movement during a predetermined period, and a snail cam suitably operated by said master clock, and a rocking lever permanently in engagement with said cam at one end and suitably connected with said escapement at the other end, said snail cam causing said escapement to operate at predetermined time intervals to cause said movement to momentarily close said contact devices at each of said periods.

6. A transmitter of the character described having a ratchet wheel with insulated teeth and means for intermittently operating said wheel one tooth at a time, and contact devices on said transmitter adapted to be operated by said wheel, comprising two insulated yielding contact arms having contact points at their free ends, one arm in engagement with the teeth of said wheel and adapted to be lifted thereby, the other arm resting against a suitable stop, both arms disposed relatively to each other to form a gap between their contact points in inoperative position, said arms adapted to contact each other when said ratchet wheel is operated.

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Witnesses:

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