J. H. WHEELOCK.

INTERMITTENT CURRENT CONVEYER FOR CLOSED CIRCUITS.

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1,178,432. Patented Apr. 4, 1916.

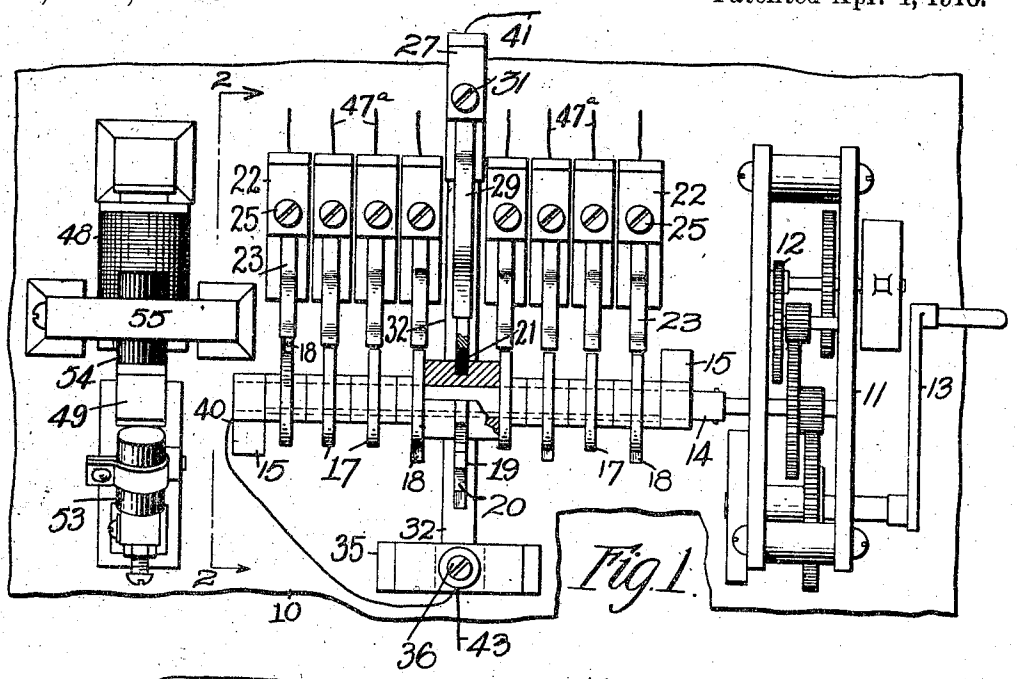


Fig. 1.

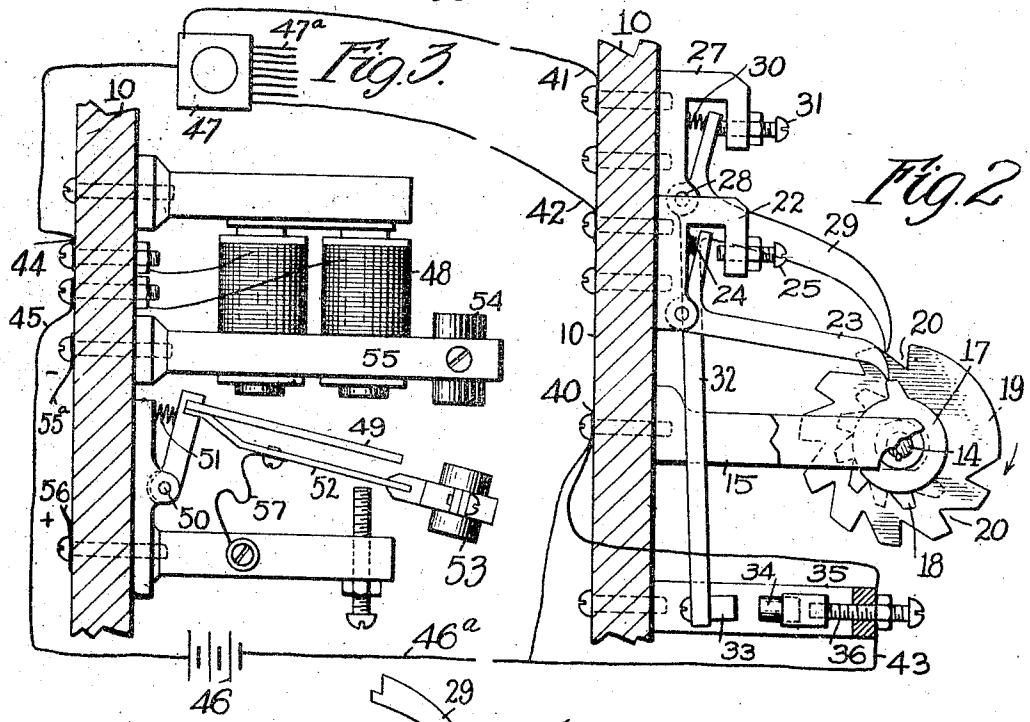


Fig. 3.

Fig. 2

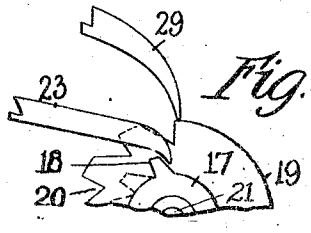


Fig. 4.

Witness
C. F. Wesson.

Inventor.
J. H. Wheelock
by attorneys
Southgate & Southgate

UNITED STATES PATENT OFFICE.

JOHN H. WHEELOCK, OF WORCESTER, MASSACHUSETTS.

INTERMITTENT-CURRENT CONVEYER FOR CLOSED CIRCUITS.

1,178,432. Specification of Letters Patent. Patented Apr. 4, 1916.

Application filed November 3, 1915. Serial No. 59,466.

To all whom it may concern:

Be it known that I, JOHN H. WHEELOCK, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Intermittent-Current Conveyer for Closed Circuits, of which the following is a specification.

In an application filed May 27, 1914, Serial No. 841,401, I have shown a construction especially adapted for open circuit work, in which the arcing at the moving contact points is prevented. I have now discovered that the principle is adapted to closed circuits and this invention relates to the application of that principle in that way.

Further objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings in which—

Figure 1 is an elevation of a device constructed in accordance with this invention; Fig. 2 is a sectional view on the line 2—2 of Fig. 1; Fig. 3 is a sectional view on a plane parallel with the line 2—2 and located at the left, Figs. 2 and 3 being connected by lines to indicate the wiring diagrammatically, and Fig. 4 is a fragmentary view showing another position of the parts.

The invention is shown as comprising a mechanism all arranged on a single insulating plate 10. This plate supports a frame 11 provided with clock-work 12 adapted to be operated by a crank 13 or equivalent device to turn the main shaft 14. This furnishes the motive power for the apparatus. This shaft 14 is mounted in bearings on brackets 15 carried by the plate and it is provided with a series of metallic disks 17 constituting current conveying members, each having a tooth 18 thereon arranged in different series to provide a variety in the way of opening and closing the circuits. It is also provided with a master cam 19 having notches 20 in its edge arranged in regular order. The disks 17 are metallically connected with the shaft 14 on which they are fixed. The cam 19 is insulated from the shaft by an insulating washer 21.

On the plate are a series of brackets 22, one opposite each of the disks 17. On each of these brackets is pivoted a contact finger 23 pressed by a spring 24 toward its disk 17 but held slightly out of contact with its circular part by an adjusting screw 25. Each tooth 18 and its finger 23 together constitute a pair of contacts for completing a branch circuit.

A single bracket 27 is provided having a pivot 28 thereon on which is pivotally mounted a lever or operating finger 29 operated by the cam 19. This is held toward the disk by a spring 30 but kept away from intimate contact with it by an adjusting screw 31 when its end is in any notch. Fixed with respect to this lever 29 is an arm 32 which has a contact 33 on the end. This is adapted to engage a stationary contact 34 carried by a bracket 35 fixed to the plate 10 and adapted to be adjusted by a screw 36.

The teeth and notches are so located that as the shaft turns, first a tooth 18 engages its finger 23, as shown in Fig. 4, then the end of the lever 29 drops off into the corresponding notch 20 and the terminal 33 moves away from the terminal 34 which breaks the circuits. The lever 29 then rides up out of the notch 20 as shown in Fig. 4 and the circuit is made again at 33—34 and later the tooth 18 passes beyond the finger 23 while the current is flowing.

One of the brackets 15 is provided with a terminal 40, the bracket 27 is provided with a terminal 41, each of the brackets 22 is provided with an individual terminal 42, and the bracket 35 is provided with a terminal 43. Also located on the plate is a terminal 44 and a terminal 45 which is connected through a battery 46 by a wire 46^a with the terminal 43. The terminal 40 is directly connected with the wire 46^a. The terminal 44 is connected with a selector 47 which can be of any desired kind and is connected by a wire with the terminal 41. The selector is provided with a plurality of wires 47^a each connected with one of the terminals 42.

The two terminals 44 and 45 are connected with an electro-magnet 48 also mounted on the plate 10. This magnet is provided with an armature 49 adapted to swing about a pivot 50 and normally pressed away from the cores of the magnet by a spring 51. The armature is provided with a spring 52 having a carbon terminal 53 thereon adapted to engage a similar carbon terminal 54 fixedly mounted on a bracket 55 on the plate. This bracket is provided with a high tension terminal 55^a and

the carbon terminal 53 is connected with the other high tension terminal 56 by a wire 57.

The operation of the device is as follows:—Normally the lever 29 is in contact with the cam 19, the terminals 33—34 are in contact, and the current is flowing from the battery 46 through 43, 34, 33, 27, 41, 47, 44, 48 and 45. Upon turning the shaft 14, one finger 23 will come into contact with the tooth 18, of the corresponding disk 17, and later the lever 29 will drop off into the corresponding notch 20. The current will continue to flow however from 46ª to 40, 15, 17, 18, 23, 22, 42, 47ª, etc., until the finger 23 drops off its tooth. But by that time the main current will be reëstablished from the battery through first named contacts and connections by the lever 29 coming out of its notch. It is to be observed that the lever 29 never conducts a current but acts to cause the contacts 33—34 to separate only after the branch current is flowing through a finger 23 and the several fingers 23 break their contact only after the main circuit is again established. Consequently, no arc is made at these fingers upon the closing of the circuit and the usual difficulties due to the arcing at these points are entirely avoided. Moreover, the current is broken at the terminals 33 and 34 while a finger 23 is still in contact with its tooth so that the arcing there is entirely avoided. In this way a closed circuit system can be employed without injurious arcing. It is to be noted that all the disks 17 are metallically in contact with the main shaft so they can be firmly and positively fixed thereto and no insulation troubles can arise.

The circuit established through the contacts 53 and 54 can of course be connected up to accomplish any desired result and no particular application of this circuit is shown herein, as the particular application thereof does not constitute a part of this invention. Ordinarily it is a high tension current in comparison with that in the battery circuit.

Although I have illustrated and described only a single embodiment of the invention, I am aware of the fact that many modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited to all the details or the special application of the invention shown and described, but

What I do claim is:—

1. In a current conveyer for a closed circuit system, the combination with a main line having a pair of contacts therein, and means for normally keeping said contacts closed and for opening them periodically, of a series of branch circuits connected with said main line, means for closing and opening said branch circuits individually during the operation of said main contact closing and opening means and timed relatively thereto to prevent the opening of any completely closed branch circuit except when the line is closed at said contacts.

2. In a current conveyer for a closed circuit system, the combination with a main line having a pair of contacts therein, and means for normally keeping said contacts closed and for opening them periodically, of a series of branch circuits connected with said main line, means for closing and opening said branch circuits individually during the operation of said main contact closing and opening means and timed relatively thereto to prevent the closing of any open branch circuit except when the line is closed at said contacts.

3. In a current conveyer for a closed circuit system, the combination with a main line having a pair of contacts therein, and means for normally keeping said contacts closed and for opening them periodically, of a series of branch circuits connected with said main line, means for closing and opening said branch circuits individually during the operation of said main contact closing and opening means and timed relatively thereto prevent both the closing and opening of any branch circuit except when said contacts are closed.

4. In a current conveying device for closed circuits, the combination with a plurality of movable electrical current carrying members, movable fingers adapted to contact therewith, and separate branch circuits, one connected with each of said fingers, of a main pair of contacts connected parallel with all of said branch circuits, and means whereby said main contacts will be normally closed and will be separated after one of said fingers is brought into contact with its current carrying member and the finger will break its contact therewith after the main contacts are again closed.

5. In an electrical connecting device for closed circuits, the combination with an electrical circuit, and a plurality of branch circuits connected therewith, of a plurality of pairs of contact members, one pair being located in each branch circuit for opening and closing it, a pair of terminals connected with the main electrical circuit, means for connecting said branch circuits with the main circuit parallel with said pair of terminals, whereby a current can flow through any branch circuit when said terminals are separated, and means whereby said terminals are normally kept together and are separated after any of said pairs of contact members in the branch circuits are brought into contact with each other to complete that branch circuit.

6. In an electrical connecting device for closed circuits, the combination with an electrical circuit, and a plurality of branch circuits connected therewith, of a plurality of pairs of contact members, one pair being located in each branch circuit, a pair of terminals in series with the main electrical circuit, means for connecting all of said branch circuits with the main circuit parallel with said pair of terminals, whereby a current can flow through each branch circuit when said terminals are separated, and means whereby said terminals are normally kept together and are separated after any of said pairs of contact members in the branch circuits are brought into contact with each other to complete that branch circuit and are brought together again while the branch circuit contact members are still in contact with each other.

7. In an electrical connecting device for closed circuits, the combination with an electrical circuit, and a plurality of branch circuits connected therewith, of a plurality of pairs of contact members, one pair being located in each branch circuit, a pair of terminals in series with the main electrical circuit and with said branch circuits, means for connecting said branch circuits with the main circuit parallel with said pair of terminals, whereby a current can flow through each branch circuit when said terminals are separated, and means whereby said terminals are normally kept together but are periodically separated and are brought together again while the branch circuit contact members are in contact with each other.

In testimony whereof I have hereunto set my hand.

JOHN H. WHEELOCK.