

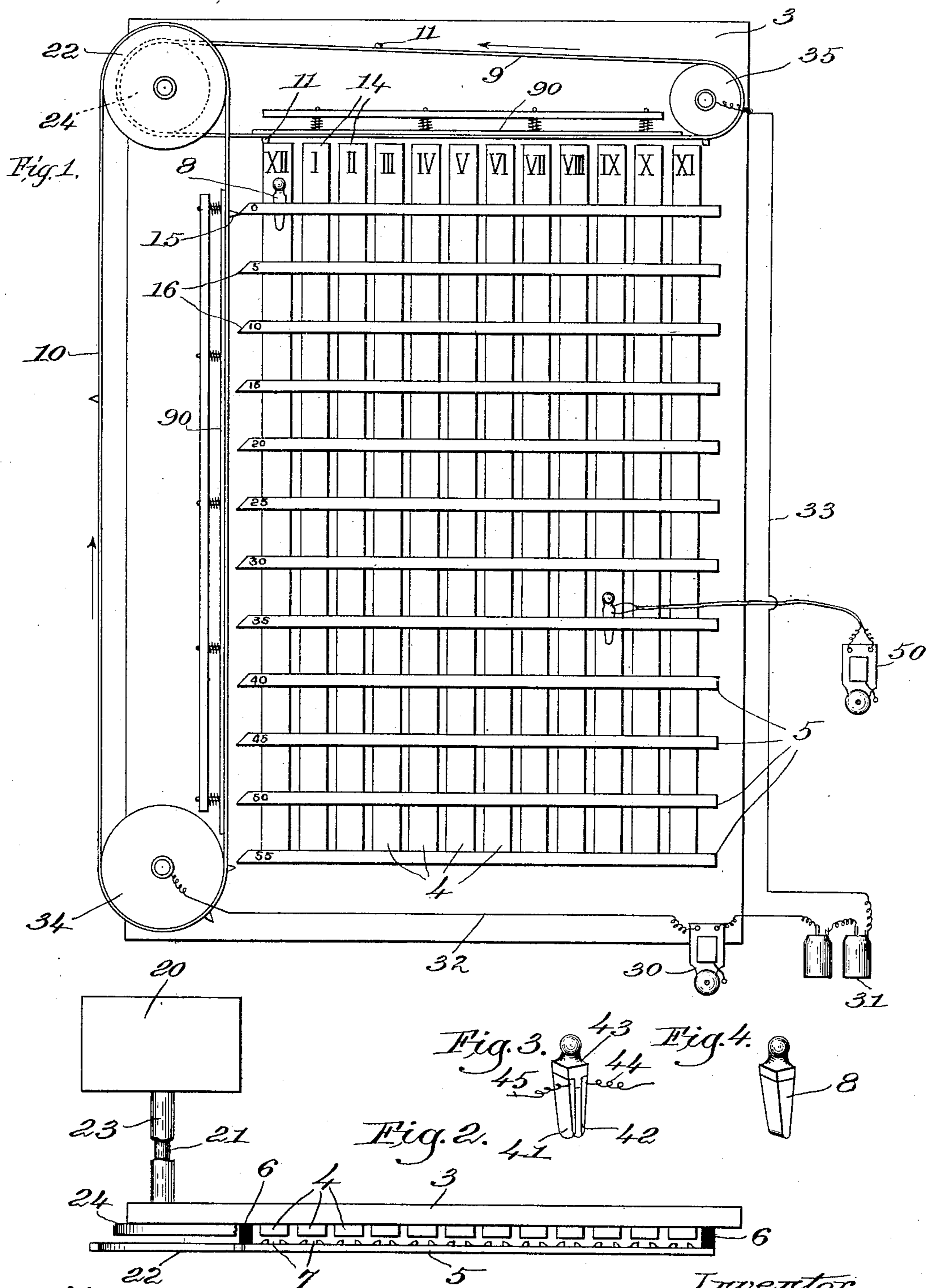
No. 704,108.

Patented July 8, 1902.

O. D. RICE.
PROGRAM CLOCK.

(Application filed July 30, 1901.)

(No Model.)



Witnesses.

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UNITED STATES PATENT OFFICE.

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PROGRAM-CLOCK.

SPECIFICATION forming part of Letters Patent No. 704,108, dated July 8, 1902.

Application filed July 30, 1901. Serial No. 70,246. (No model.)

To all whom it may concern:

Be it known that I, OTIS D. RICE, a citizen of the United States, and a resident of Winthrop, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Program-Clocks, of which the following description, in connection with the accompanying drawings, is a specification, like numerals on the drawings representing like parts.

This invention relates to an electric device adapted to automatically announce any predetermined time either by ringing a bell or operating some other suitable signal.

The invention comprises a switchboard having a plurality of series of bars or conductors, with means for automatically connecting any bar of one series with any bar of any other series. Coöperating with the bars of each series is a traveling contact which is in the signal-circuit, and means are provided to move the contacts so that the contact coöperating with one series of bars will be put into electrical connection with the successive bars of the series for predetermined intervals of time, while the contact-pieces coöperating with another series of bars will be put into electrical contact with the successive bars of the series at fractional portions of said predetermined intervals of time. When the contact-pieces are simultaneously in contact with the bars of the various series which are electrically connected, a complete circuit is established and the signal will be sounded.

In the drawings, Figure 1 is a diagrammatic view of my device. Fig. 2 is a top plan view of Fig. 1. Figs. 3 and 4 show different forms of plugs to be used.

The switchboard of the device may be supported in any suitable way upon any suitable backing 3, and said switchboard comprises in this embodiment of my invention two series of bars, one series of bars being designated by 4 and being secured to the backing in any suitable way and insulated from each other, and the second series of bars 5 being spaced from the first-mentioned series and supported by the backing 3 in any usual way. As illustrated, each bar 5 is supported at its end upon a suitable block 6, of insulating material, which is in turn secured to the backing

3. With this construction the bars of the two series are in parallel planes, but are spaced and insulated from each other. The space between any bar of one series and the bars of the adjacent series is adapted to receive one or more plugs, and in the form of invention shown in Fig. 2 the bars 5 are provided on their inner faces with suitable plug-receiving recesses or pockets 7, which are adapted to receive suitable plugs 8, as shown in Fig. 1, and it will be obvious that when a plug is inserted between any two bars they are put in electrical connection. I may, if desired, leave the inner faces of the bars 5 smooth, in which case a plurality of plugs may be placed between any two bars for a purpose hereinafter described. Coöperating with each series of bars is a traveling contact-piece, the said contact-pieces being adapted to be put into electrical connection with the successive bars of the corresponding series at predetermined intervals of time. For convenience the bars 4 are used to indicate the hours, while the bars 5 are used to indicate the minutes or fractional portions of the hours, and, as seen in Fig. 1, where the device contains twelve bars, they will be numbered "1" to "12" successively to designate the hours of the day. I wish it understood, however, that instead of twelve bars 4 I may, if desired, employ twenty-four such bars to indicate the twenty-four hours of the day. Any number of bars 5 may be employed, and, as illustrated, I have employed twelve such bars, they having applied thereto numbers which are multiples of five, as they indicate five-minute intervals.

I prefer to attach my traveling contacts to endless conductors, (shown as endless belts 9 and 10, respectively,) the said belts being of some suitable material having good conductivity and passing around suitable pulleys carried by the backing 3, the endless conductor 9 passing around the drive-pulley 24, and the idler 35 and the conductor 10 passing around the drive-pulley 22 and the idler 34.

It is designed that the contact-piece 11, which is connected to and carried by the endless conductor 9, will be in electrical contact with the successive bars 4 for intervals of an hour and that as soon as the said contact-

piece has moved out of electrical contact with one bar it will immediately come into electrical contact with the next succeeding bar.

Any suitable means may be employed to accomplish this result; but I prefer to make the ends of the bars flat, as shown at 14, so that as the contact-piece 11 moves across the ends of the bars of the series it will remain in contact with each bar for the length of time which it takes to move the width of the bar, and the space between the bars will be such relative to the size of the contact that as soon as the contact has moved off from the end of one bar it will immediately come into contact with the next succeeding bar. Where the bars 4 are built to designate hour intervals of time, the mechanism for driving the endless conductor 9 will be so timed that the contact-piece 11 will move from one bar to the next succeeding bar in just an hour.

In the preferred embodiment of my invention the contact-piece 15, which is carried by the endless conductor 10, is designed to have a momentary contact only with the bars 5 at intervals of time which are fractional portions of the hour, and in order to accomplish this I preferably make the ends of the bars 5 adjacent the conductor 10 pointed, as shown at 16, and make the contact-piece 15 pointed, so that as the endless conductor 10 moves in the direction of the arrow, Fig. 1, the contact-piece 15 thereon momentarily contacts with each of the bars 5 in succession.

The endless conductors 9 and 10 may be driven by any suitable means which is adapted to give them the proper speed, and as one convenient form of driving means I have illustrated a clock mechanism, shown generally at 20, the said mechanism including a shaft 21, to which the driving-pulley 22 for the endless conductor 10 is attached, and the shaft 23, to which the driving-pulley 24 for the endless conductor 9 is attached. As illustrated, the shaft 23 is hollow and the shaft 21 is inclosed therein, and the clock mechanism 20 will operate to rotate the shaft 23 at such a speed that the contact-pieces 11 will move from one bar 4 to another in an hour, while the shaft 21 is so driven that the contact-piece 15 will move from one bar 5 to the next bar in five minutes. The said driving mechanism may be placed at any corner of the frame 3 or in any suitable position relative to the two series of bars. Any other suitable form of driving means for the conductors may be employed instead of the one shown, however, without departing from my invention.

The two conductors 9 and 10 form part of an electric circuit including any suitable signal device 30 and a battery or generator 31. Preferably the wires 32 and 33 of said circuit will be connected to the idlers 34 and 35 in any suitable way, the said idlers having an electrical connection with the conductors 10 and 9, respectively. It will be necessary, of course, to either properly insulate

the conductors from the driving-pulleys or the driving-pulleys from the rest of the mechanism.

With this construction and assuming that it is desired to operate the signal at 30 at twelve o'clock a suitable plug 8 will be placed between the bar 4, labeled "XII," and the bar 5, indicating zero, as shown at the upper left-hand corner, Fig. 1, and when the contacts 11 and 15 are in the positions indicated the circuit is completed and the signal operated. Since the contact between the contact-piece 15 and the bar 5 is momentary only the operation of the signal will be momentary. If it is desired to ring the signal at any other time or at any series of times, a plug or a series of plugs will be properly placed in the switchboard, when the signal will be automatically sounded, as desired.

It is sometimes desirable to cause a signal separate from that in the signal-circuit to be sounded, and I may accomplish this by employing the split plug shown in Fig. 3, the said plug comprising the two members 41 and 42, having good electrical conductivity, which are insulated from each other by the insulating member 43. The two members 41 and 42 are connected by suitable wires 44 and 45 to any signal device 50. By means of this construction when the split plug is inserted between any two bars the signal 50 will be brought into the circuit and will be operated simultaneously with the signal 30. By placing two or more such split plugs between any two bars any number of extra signals in different places may be operated, as will be obvious.

Since the conductors 9 and 10 are endless conductors, and since only a portion of the conductor is adjacent the ends of the bars of the series, I provide each conductor with a plurality of contact-pieces, there being three such contact-pieces in this embodiment of my invention, and the said contact-pieces are so disposed relative to each other that when one contact-piece has just left the last bar of any series the next succeeding contact-piece comes into contact with the first bar of said series, as shown in Fig. 1.

The number of contact-pieces employed on each conductor of course would vary according to the size of the driving and idler pulleys used and according to the length of the conductor adjacent the ends of the series of bars.

I may, if desired, employ some suitable mechanism for holding the inner run of the conductors 9 and 10 in proper position to insure the contacts thereon coming against the end of the bars, and in Fig. 1 I have illustrated a spring-pressed guide-strip 90, which is suitably attached to the backing 3 and which engages the inner face of the conductors and serves to hold the contacts against the bars. Such guide-strips will preferably be made of some suitable insulating material.

While I have illustrated in this embodi-

ment of my invention a device adapted to indicate hour-units of time and fractions thereof, yet it will be obvious that by providing suitable clock mechanism the unit intervals of time may be any predetermined amount. It will also be obvious that the bars 5 may indicate any fractional portion of the unit interval of time, there of course being as many bars 5 in the series as in the denominator. Various other changes may also be made in the details of my device without departing from the spirit of the invention, and I therefore reserve the right to make such changes as come within the spirit of the appended claims.

In order to prevent any slip between the endless conductors and the driving-pulleys, it may be desirable to either provide the said pulleys with spurs or teeth which engage perforations in the conductors or with some other suitable means to positively drive the said conductor from the pulleys.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus of the class described, two series of bars, means to electrically connect any bar of one series with any bar of the other series, a circuit including two endless conductors, means to put one conductor in electrical contact with the successive bars of one series at predetermined intervals of time, and to put the other conductor in electrical contact with the successive bars of the other series at fractional portions of such intervals of time.

2. In an apparatus of the class described, two series of bars, means to electrically connect any bar of one series with any bar of the other series, a circuit including two endless conductors, means to put one conductor in electrical contact with the successive bars of one series at hour intervals of time, and to put the other conductor in electrical contact with the successive bars of the other series at fractional portions of an hour.

3. In an apparatus of the class described, two series of bars, means to electrically connect any bar of one series to any bar of the other series, a circuit including two endless conductors, each having a contact-piece, means to move said conductors to bring the contact-piece on one conductor in electrical contact with the successive bars of one series at predetermined intervals of time, and to bring the contact-piece on the other conductor in contact with the successive bars of the other series in fractional portions of such interval.

4. In an apparatus of the class described, two series of bars, means to put any bar of one series in electrical contact with any bar of the second series, a circuit including two endless conductors, means to put one of said conductors in electrical contact with each successive bar of one series for a predetermined interval of time and to momentarily put the

other conductor into electrical contact with the successive bars of the other series at fractional portions of such interval of time.

5. In an apparatus of the class described, two series of bars, means to put any bar of any series in electrical contact with any bar of the other series, a circuit including two endless conductors each having a contact-piece thereon, means to put one of said contact-pieces in electrical contact with each successive bar of one series for a predetermined interval of time, and to momentarily put the other contact-piece into electrical contact with the successive bars of the other series at fractional portions of such interval of time.

6. In an apparatus of the class described, two series of bars, means to put any bar of one series in electrical contact with any bar of the second series, a circuit including two endless conductors, each of said conductors having a plurality of contact-pieces, means to move said conductors continuously in one direction, the movement of the conductors bringing each contact-piece on one conductor into electrical contact with the successive bars of one series at predetermined intervals of time, and each contact-piece on the other conductor into electrical contact with the successive bars of the other series at fractional portions of each interval of time, each contact-piece coming into contact with the first bar of the series as the preceding contact has moved out of contact from the last bar of the series.

7. In an apparatus of the class described, two series of bars, means to put any bar of one series in electrical contact with any bar of the other series, an electrical circuit including two endless conductors each having a contact-piece, means to move said conductors continuously in one direction, the movement of said conductors bringing each contact-piece on one conductor into electrical contact with the successive bars of one series for a predetermined interval of time, and each contact-piece on the other conductor momentarily into electrical contact with the successive bars of the other series at fractional portions of such intervals.

8. In an apparatus of the class described, two series of bars, means to put any bar of one series in electrical contact with any bar of the other series, an electrical circuit including two endless conductors, one of said conductors having a contact-piece adapted to move across the ends of the bars in the other series, means to move said conductors with such speeds that one contact-piece is brought into contact with the ends of the successive bars in one series at predetermined intervals of time, and the other series is brought into electrical contact with the ends of the successive bars of the other series in fractional portions of such intervals of time.

9. In an apparatus of the class described, two series of bars, the ends of the bars of one series being flat and those of the other series being pointed, means to put any bar of any

series in electrical contact with any bar of the other series, a circuit including two endless conductors, one of said conductors having a contact-piece adapted to move across the flat ends of the successive bars in the first-mentioned series, and the other bar having a contact-piece adapted to momentarily contact with the pointed ends of the successive bars of the other series, and means to move said conductors with such speeds that one contact-piece is put in contact with the ends of the successive bars in one series at predetermined intervals of time, and the other contact-piece is brought into electrical contact with the pointed ends of the successive bars of the other series in fractional portions of such intervals of time.

10. In an apparatus of the class described, two series of bars, each bar of both series being normally electrically insulated from all the other bars, means to electrically connect any bar of one series with any bar of the other series, a circuit including two moving conductors, means to put one conductor in electrical contact with the successive bars of one series at predetermined intervals of time, and means to put the other conductor in electrical contact with the separated bars of the other series in succession at fractional portions of such intervals of time.

11. In an apparatus of the class described, two series of bars, the bars of each series being electrically independent, means to elec-

trically connect any bar of one series with any bar of the other series, a circuit including two movable contacts, means to move one contact across the bars of one series to bring said contact directly into engagement with the successive bars of said series at predetermined intervals of time, and means to move the other contact across the bars of the other series to bring said last-mentioned contact directly into engagement with the successive bars of the second series at fractional portions of such intervals of time.

12. In an apparatus of the class described, two series of bars, the bars of each series being electrically independent from each other, means to electrically connect any bar of one series with any bar of the other series, a circuit including two movable contact-points, means to put one contact-point in mechanical contact with the successive bars of one series at predetermined intervals of time, and means to put the other contact-point in mechanical contact with the successive bars of the other series at fractional portions of such intervals of time.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

OTIS D. RICE.

Witnesses:

LOUIS C. SMITH,
JOHN C. EDWARDS.