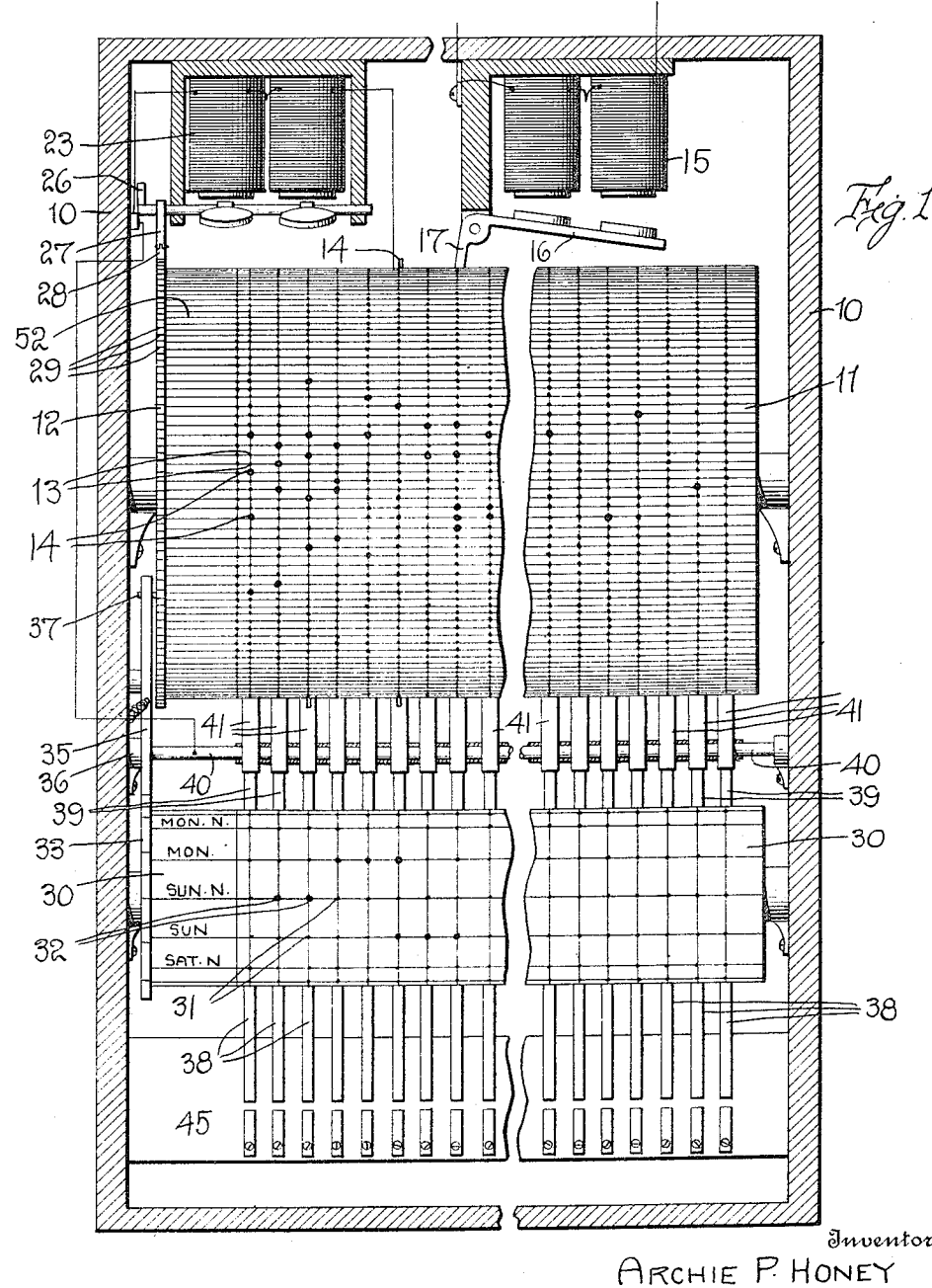
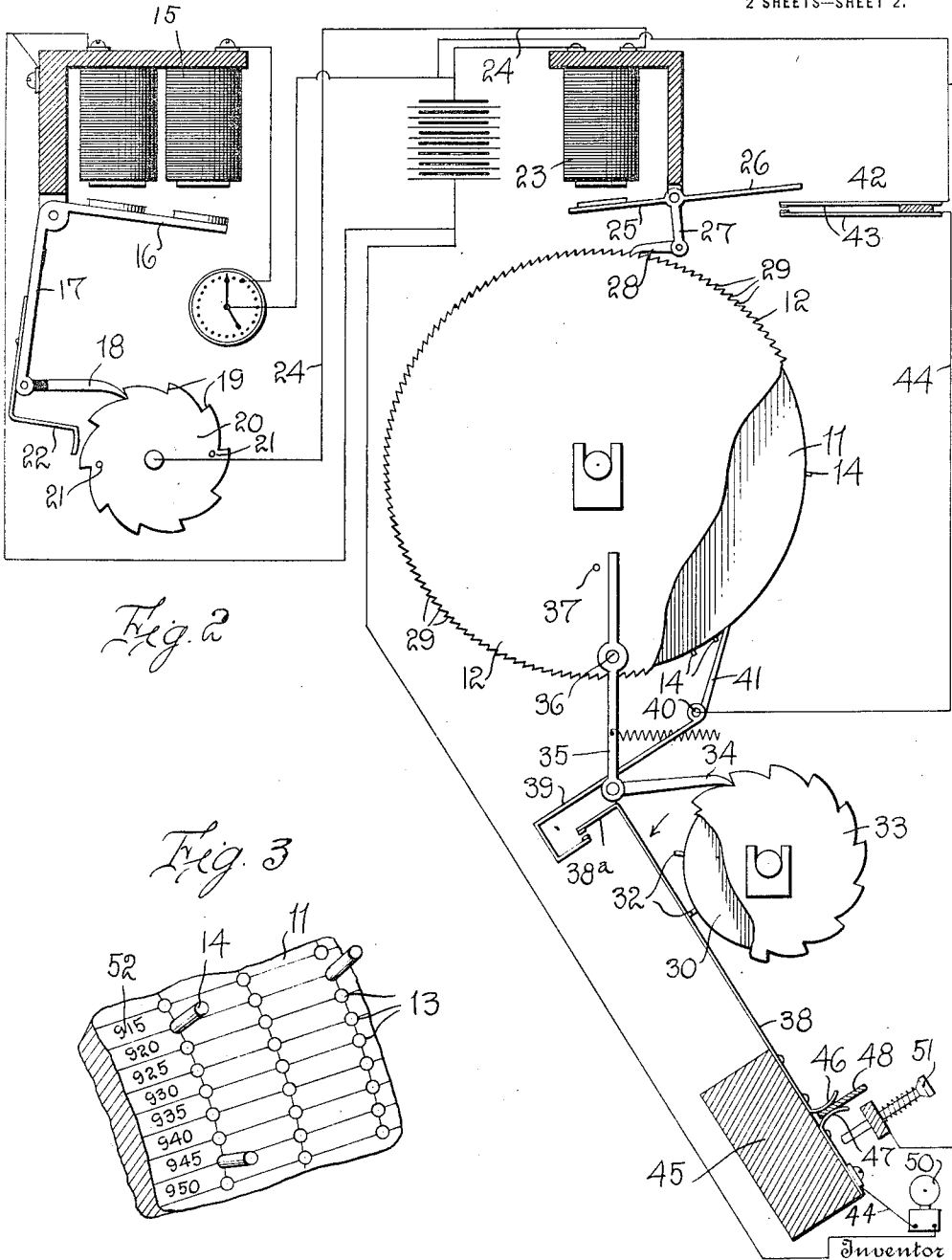




1,237,517.



ARCHIE P. HONEY

By *Watson E. Coleman*
 Attorney

UNITED STATES PATENT OFFICE.

ARCHIE P. HONEY, OF CROSBY, MINNESOTA, ASSIGNOR OF ONE-THIRD TO CHARLES B. JOCKS, OF CROSBY, MINNESOTA.

PROGRAM-CLOCK.

1,237,517.

Specification of Letters Patent.

Patented Aug. 21, 1917.

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To all whom it may concern:

Be it known that I, ARCHIE P. HONEY, a citizen of the United States, residing at Crosby, in the county of Crow Wing and State of Minnesota, have invented certain new and useful Improvements in Program-Clocks, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to signal actuating mechanism and particularly mechanism whereby signals may be actuated regularly at predetermined intervals, my invention being in the form of a program clock particularly designed for schools, colleges and other places where a regular order of exercise is carried out every day, this order however, being varied according to the different days of the week.

One object of my invention is to provide a construction of this character which is very simple and compact and which includes a plurality of signals such as signal bells with means whereby each bell may be energized according to a predetermined program without interfering with any other bell, this means providing for a change of program at any time.

A further object of the invention is to do away with expensive and troublesome gearing and provide a very simple means for actuating the mechanism without the use of intermeshing gears and without the use of relays.

A further object is to provide means whereby any number of bells may be disconnected and whereby any bell may be actuated independently of the program mechanism.

A further object is to do away with buttons or connecting boards and thus rendering the apparatus so compact that it may be contained in a relatively small case, and in this connection to so construct the device as to do away with the large amount of special insulation as ordinarily required.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:

Figure 1 is an elevation of my program clock, the case being in section;

Fig. 2 is an end elevation of the mechanism of the clock showing diagrammatically the wiring of the clock;

Fig. 3 is a fragmentary perspective view of a portion of the cylinder 11.

Referring to these drawings 10 designates a casing within which the mechanism is inclosed and which may be of any suitable form or material. Disposed within this casing is a cylinder 11 which may be of wood or other suitable material, this cylinder being rotatably mounted in suitable bearings and provided at one end with a ratchet wheel 12. The periphery of the cylinder is formed with a plurality of circumferentially extending perforations designated 13, these perforations being arranged in circumferential rows and in transverse rows, there being as many transverse rows as there are five minute periods in a day or in twelve hours, it being understood however, that these periods might be made shorter or longer than five minute periods if desired. These perforations 13 are adapted to receive pegs 14 of insulating material. Disposed in any suitable location within the case 10 is an electro-magnet 15 which is operatively and electrically connected to a master clock, the connections being such that a circuit will be closed by the master clock through the electro-magnet 15 once every minute, or other predetermined period. Co-acting with the magnet 15 is an armature 16, which armature carries upon it an arm 17 and pivotally attached to the extremity of this arm but insulated therefrom is a pawl 18 which is adapted to engage with the teeth 19 of a ratchet wheel 20 which may be mounted in any suitable manner within the case and which is provided with ten teeth 19. The ratchet wheel 20 carries a pair of projecting studs 21 disposed at diametrically opposite points, it being understood, however, that more or less than two studs might be used. The pawl 18 is insulated from the arm 17 and mounted upon the extremity of the arm 17 is a resilient contact member 22 which extends inward beneath the pawl and is downwardly bent at its extremity so that when the arm 17 is thrown inward or toward the ratchet wheel by the energizing of the magnet 15, one of the studs 21 will wipe against the bent extremity of the contact finger 22.

Suitably supported within the casing 10 is an electro-magnet 23 and from the axis of the ratchet wheel 20, which ratchet wheel is made of electrically conductive material,

extends a conductor 24 which leads to the magnet 23, this magnet in turn being connected on the other side with a battery, the other pole of this battery being operatively
5 connected to the arm 17. Now it will be obvious that the armature 16 will be oscillated once every minute and once every five minutes one of the studs 21 will be brought into such position that it will be electrically
10 engaged by the finger 22 and that when so engaged a circuit will be closed through the electro-magnet 23.

The magnet 23 coacts with a pivoted armature 25 which has an arm 26 and an arm
15 27, this last named arm carrying a pawl 28 which engages with the ratchet teeth 29 on the ratchet wheel 12. The ratchet wheel 12 has one hundred and forty-four teeth corresponding to the one hundred and forty-
20 four five minute periods into which the day of twelve hours is assumed to be divided. It will thus be seen that every five minutes the ratchet wheel 12 will be moved one notch. There are, of course, as many rows
25 of apertures or sockets 13 as there are ratchet teeth, so that with each step of the ratchet wheel 12, the cylinder 11 will be moved one step so as to carry a transverse series of perforations into alinement with
30 a fixed line extending parallel to the axis of the cylinder.

Disposed below the cylinder 11 or in any other convenient relation thereto is a day
cylinder 30 which is rotatably mounted in
35 any suitable manner and is provided with as many circumferential rows of perforations 31 as the cylinder 11 and as many longitudinal rows of perforations as there are days in the week, namely seven. Pegs 32
40 are adapted to be disposed in these perforations, these studs being of insulating material. On the extremity of the cylinder 30 there is carried a ratchet wheel 33 which is actuated by a pawl 34 pivotally mounted
45 upon a lever 35 which is in turn pivoted upon a stud 36, the lever extending beyond the stud 36 and parallel to the face of the ratchet wheel 12. This ratchet wheel 12 carries upon it a stud 37 into whose path of
50 movement the upper end of the lever 35 projects. The ratchet wheel 12 revolves once in every twelve hours and as a consequence the ratchet wheel 33 and the cylinder 30 will be given one step every twelve hours.
55 Inasmuch as there are fourteen transverse rows of perforations on the cylinder 30 and fourteen teeth on the ratchet wheel 33, it will be obvious that the cylinder 30 will move once every twelve hours.

Disposed adjacent to the cylinder 30 are a plurality of resilient contact strips 38, these strips being so disposed that they will be engaged by pegs 32 disposed in rows corresponding to the strips 38, these pegs acting
65 ing to force the corresponding strips in the

direction of the arrow in Fig. 1, the resiliency of the strip carrying it back again toward the face of the cylinder 30 when the peg has passed the strip. Pivotally mounted in connection with the contact strips 38
70 are the contact strips 39, these strips being pivotally supported as at 40 and having arms 41 which extend up to and approximately contact with the surface of the cylinder. There are as many of these strips 39
75 and arms 41 as there are circumferential rows of perforations 13 and when a stud 14 contacts with its corresponding arm 41, the outer end of the contact strip 39 will be shifted upward toward the outwardly bent
80 end 38^a of the corresponding contact strip 30. If this contact strip has been forced out by the corresponding stud 32, the two contact strips 38 and 39 will engage with each other. If, however, the strip 38 has
85 not been so forced out then the strip 39 will pass the extremity of the strip 38 and will not electrically engage with it. In order to close a circuit from a source of current through the contact strips 38 and 39, I provide
90 a switch designated 42 and comprising two spaced resilient fingers 43 insulated from each other, one of these fingers being connected to a battery or other source of current while the other finger is connected
95 by means of a conductor 44 to the pivotal axis of the several contact strips 39. The fingers 43 of the switch 42 are so disposed that when the magnet 23 is energized the arm 26 will force the fingers 43 into electrical engagement with each other, thus the current will pass from the battery through the conductor 44 to the strips 39 and from these strips 39 to whatever strips 38 have been forced out by the proper pegs or studs
105 32, this current then passing to the signal bells as will be now stated.

The lower ends of the spring contact members 38 are connected to a supporting base 45 having spaced contacts 46 and 47
110 between which a plug 48 is adapted to be disposed, the spring contact 47 being connected by a conductor 44 to the signal bell or other annunciator 50, this bell being connected to the negative pole of a battery.
115 For the purpose of manually closing the circuit between the bell and battery independently of the program clock, I provide for each bell a push button 51 which is connected to the battery and which, when
120 pushed in, closes the circuit between the bell and battery.

The operation of my invention is obvious from what has gone before. The connections of the master clock have not been illustrated for the reason that these are obvious and well known but it is plain that every minute at the sixtieth second the circuit will be closed through the electro-magnet 15, thus actuating the armature 16 and advancing
130

ing the gear wheel 20 one notch. At the end of five minutes, assuming that five minute intervals are being used, a contact stud or peg 21 will be in position to be electrically engaged by the finger 22 and the circuit will thus be closed through the electromagnet 23. This will cause the advance of the cylinder 11 one notch corresponding to a five minute interval. At the same time the contact members 43 of the switch 42 will be electrically engaged with each other and this will electrically connect the contact member 39 with the battery. If now the member 38 is forced outward the member 29 will electrically engage the member 38 and a circuit will be completed through the proper signal bell, this signal bell or other annunciator being located in the class room or other place where it is desired the signal shall be given.

It will be seen that no signals are given unless the contact members 38 are held in operative position by the pegs 32 and so if there are no pegs disposed in the cylinder 30 for a certain day or certain period, no signals will be given, thus on Sunday and we will assume Saturday no signals will be given but signals will be given on the remaining days of the week and certain of the nights of the week. Inasmuch as the cylinder 11 only shifts once every five minutes it is a relatively easy matter to place the pegs 14 in position, particularly as the cylinder is provided at one end with a space 52 having therein time indications corresponding to various lines of perforations, it being understood that the circumferential lines of perforations corresponding to all of the possible or probable events which are to be signaled. I have illustrated a certain number of circumferential rows of perforations 13 and a corresponding number of contact members 38, each of which is connected to a corresponding bell, but it is to be understood that this is purely illustrative and that a greater number or a less number of these bell connections may be provided in any one machine. It is also obvious of course, that all of the bell connections need not be utilized where the events to be signaled are fewer in number than the number of signal connections in any one machine.

Having described my invention, what I claim is:

1. A signal actuating mechanism including a rotatable cylinder having a plurality of circumferential series of sockets, a controlling cylinder having a plurality of corresponding series of sockets, pegs insertible into the socket of both cylinders, means for giving a step by step rotation to the first cylinder, means actuated by a predetermined rotation of the first cylinder, for rotating the controlling cylinder one step, a plurality of signals, and means disposed in coactive

relation to the rows of sockets on both cylinders adapted when actuated by pegs on both cylinders to close the circuit through the corresponding signal.

2. A signal actuating mechanism including a rotatable cylinder having a circumferential row of sockets thereon, a controlling cylinder having a circumferential row of sockets, pegs insertible into said sockets, means for giving a step by step rotation through the first named cylinder, means actuated by a predetermined rotation of the first named cylinder for rotating the controlling cylinder one step, a signal, a contact member adapted to be shifted by engagement with a peg on the first named cylinder, and a contact adapted to be shifted by a peg on the second named cylinder into the path of movement of the first named contact, said contacts being disposed in an interrupted circuit with a source of energy and said signal.

3. A signal actuating mechanism including a rotatable cylinder having a plurality of circumferential rows of sockets, a controlling cylinder having a corresponding plurality of circumferential rows of sockets, pegs insertible into said sockets and removable therefrom, means for giving a step by step rotation to the first named cylinder, means actuated by a predetermined rotation of the first named cylinder to rotate the controlling cylinder one step, a plurality of signals, one for each row of sockets, a plurality of pairs of contacts electrically connected each pair in an interrupted circuit with the corresponding signal and source of energy, said contacts being so disposed as to be engaged by pegs on the corresponding cylinders and in the corresponding rows of sockets and be relatively shifted into engagement with each other.

4. A signal actuating mechanism including a rotatable cylinder having a circumferential row of sockets, a controlling cylinder having a like circumferential row of sockets, pegs insertible into said sockets, means for giving a step by step rotation to the first named cylinder, a pair of coaxing contacts normally spaced from each other, a signal electrically connected to a source of power and said contacts, a peg on the second named cylinder acting to shift one of said contacts into the path of movement of the other contact, and a peg on the first named cylinder acting to shift the corresponding contact toward the last named contact.

5. A signal actuating mechanism including a rotatable cylinder having a plurality of circumferential rows of sockets, a controlling cylinder having a plurality of circumferential rows of sockets, pegs adapted to be removably disposed within said sockets, means for giving a step by step rotation to the first named cylinder, means actuated by

a predetermined rotation of the first named cylinder for rotating the controlling cylinder one step, a plurality of signals, a plurality of pivoted contact members coacting with the pegs on the first named cylinder, and arranged in alinement with the series of sockets, a plurality of contact fingers arranged in coactive relation to a series of sockets on the controlling cylinder and movable by the pegs on said cylinder into the path of movement of the first named contacts, and a plurality of signals each signal being connected in an interrupted circuit with a source of current and the corresponding contact member and contact finger.

6. A signal actuating mechanism including a rotatable cylinder having a plurality of circumferential rows of sockets, a controlling cylinder having a plurality of circumferential rows of sockets, pegs adapted to be removably disposed within said sockets, means for giving a step by step rotation to the first named cylinder, means actuated by a predetermined rotation of the first named cylinder for rotating the controlling cylinder one step, a plurality of signals, a plurality of pivoted contact members coacting with the pegs on the first named cylinder, and arranged in alinement with the series of sockets, a plurality of contact fingers arranged in coactive relation to the series of sockets on the controlling cylinder, and movable by the pegs on said cylinder into the path of movement of the first named contacts, a plurality of signals each signal being connected in an interrupted circuit with a source of current and the corresponding contact member and contact finger, each of said circuits being interrupted at one point, and means for closing each circuit at this point of interruption.

7. In a signaling mechanism, a signal, a pair of contacts normally spaced from each other and connected in a circuit with said signal and a source of energy, independent time controlled adjustably variable means for each contact, shifting said contacts independently toward a common point, both of said contacts being required to be shifted toward said common point in order to bring the contacts into electrical engagement with each other.

8. A signal actuating mechanism including a rotatable member having a circumferential row of sockets thereon, a controlling rotatable member having a circum-

ferential row of sockets, pegs insertible into the sockets, means for giving a step by step rotation to the first named rotatable member, means actuated by a predetermined rotation of the first named rotatable member for rotating the controlling rotatable member one step, a signal, and means disposed in coactive relation to the sockets on both rotatable members adapted when actuated by simultaneous engagement with the pegs on both rotatable members to close the circuit through the signal.

9. A signal actuating mechanism including a pair of cylinders, each having signal actuating pegs projecting therefrom, a pair of contacts normally spaced from each other and connected in a normally interrupted circuit with a source of current, said contacts being movable toward a common meeting point and being moved to said point each by engagement with a pin on the corresponding cylinder, a switch disposed in said circuit, means for giving a step by step rotation of one of said cylinders and simultaneously closing said switch, and means giving a predetermined rotation to the other cylinder upon a complete revolution of the first named cylinder.

10. A signal actuating mechanism including a cylinder having signal actuating members thereon, a second cylinder having signal actuating members thereon, a pair of contacts coacting with each cylinder and disposed in a normally open circuit with a signal and a source of energy, said contacts being movable respectively to a common meeting point by engagement with the signal actuating members on the respective cylinders, means for rotating the second named cylinder one step upon a predetermined rotation of the first named cylinder, a normally open switch in said circuit, means for giving a step by step rotation to the first named cylinder and including an electro-magnet, an armature, and a pawl operatively connected to the armature and engaging said first named cylinder, and an arm actuated by the armature to close the circuit when the electro-magnet is energized.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

ARCHIE P. HONEY.

Witnesses:

A. E. LOVDAHL,
GUS GEMDERSON.