C. A. PALMGREN.

TIME CONTROLLED CIRCUIT CLOSING DEVICE.

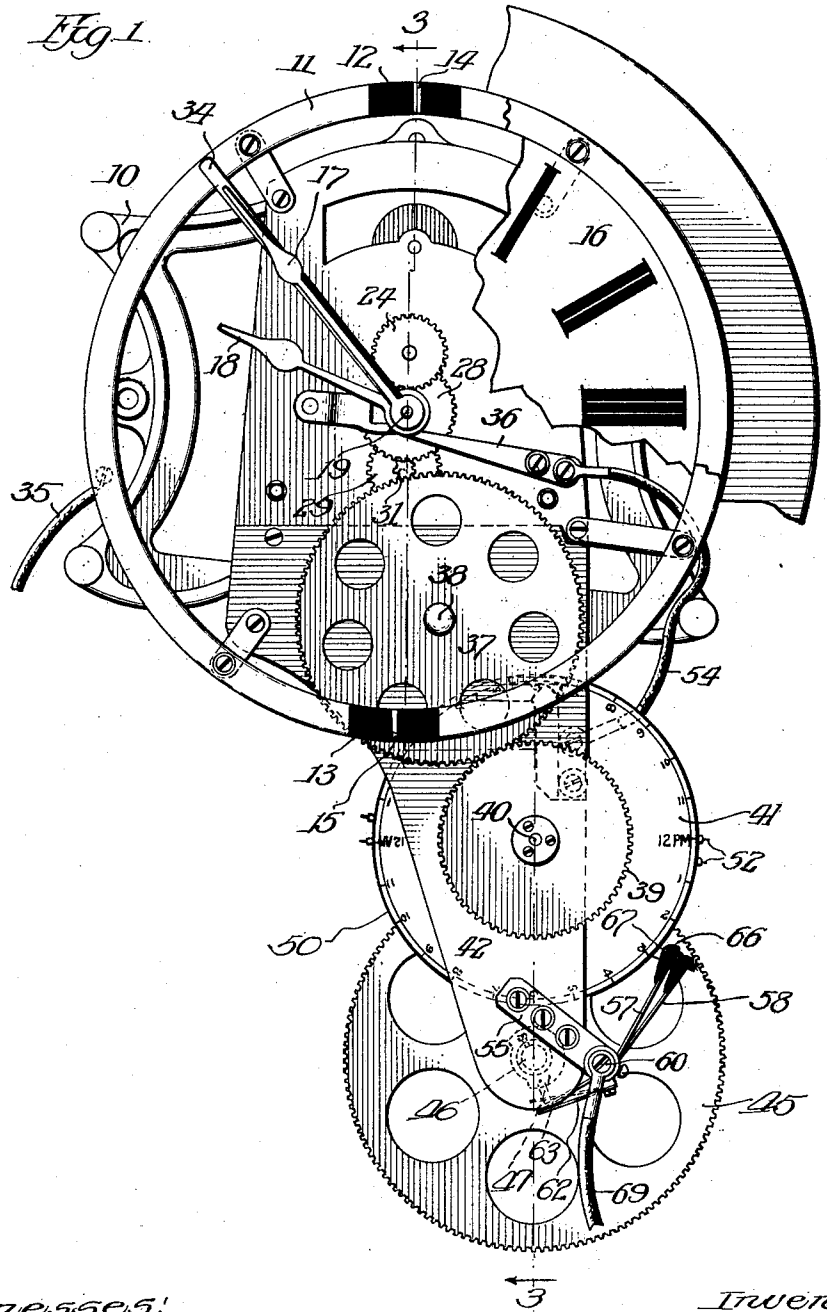
APPLICATION FILED JAN. 8, 1912.

1,074,813.

Patented Oct. 7, 1913.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

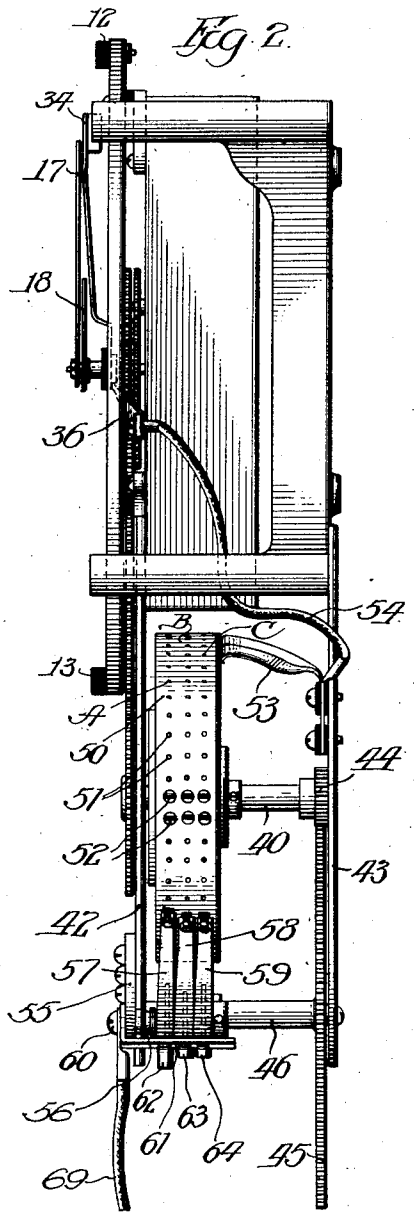
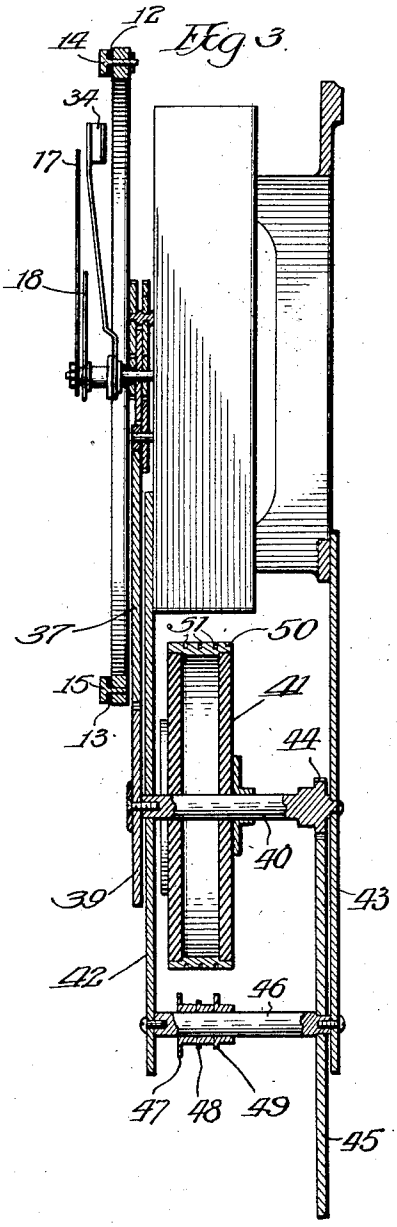


Fig. 3.



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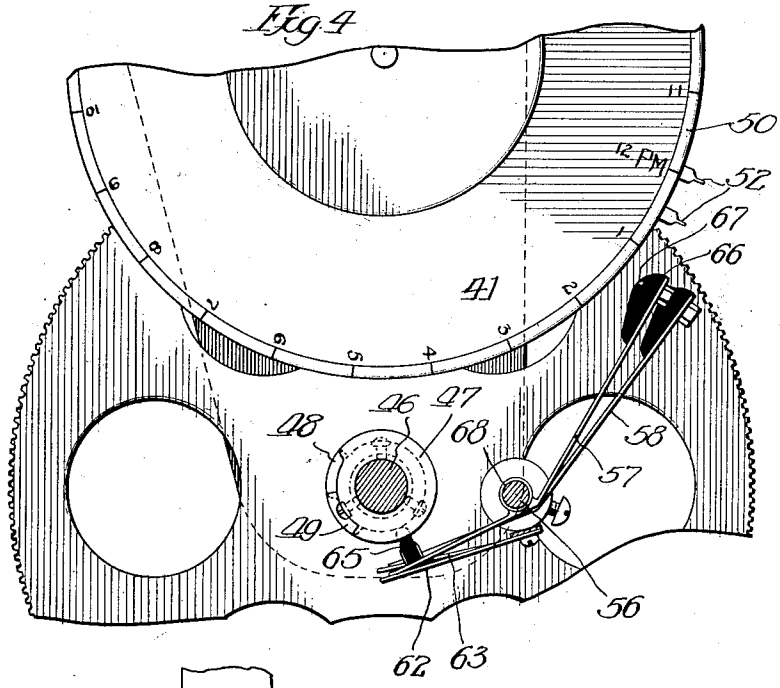
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3 SHEETS—SHEET 3.

Fig 4



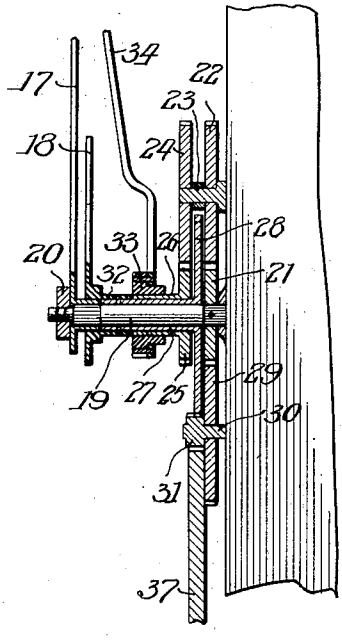


Fig 5.

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UNITED STATES PATENT OFFICE.

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TIME-CONTROLLED CIRCUIT-CLOSING DEVICE.

1,074,813. Specification of Letters Patent. Patented Oct. 7, 1913.

Application filed January 8, 1912. Serial No. 670,036.

To all whom it may concern:

Be it known that I, CARL A. PALMGREN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Time-Controlled Circuit-Closing Devices, of which the following is a specification.

My invention relates to circuit-closing devices, and refers particularly (although not exclusively) to devices of this class which are time controlled and adapted to close circuits which are used for the blowing of whistles, the ringing of bells, or the like.

In Patent No. 870,900, issued to Arthur H. Young and myself on November 12, 1907, a device is disclosed which, in general, accomplishes similar results to those obtained in the device which forms the subject-matter of this application.

It is well known that in factories and other industrial establishments it is customary to have the same hours of labor from Mondays to Fridays, inclusive, whereas there is a special schedule observed for Saturdays and a still different schedule for Sundays. In a time-controlled device for automatically blowing whistles at the desired times it is therefore necessary to provide means by which the whistles will be blown at different times according to the particular schedules which are in effect on given days.

It is the object of my invention to accomplish this result by means of a simple, efficient and economical apparatus. This apparatus is adapted to go through one cycle of operation each week with no attention on the part of the operator except a preliminary setting of suitable parts which will be described hereafter.

In the above-mentioned patent a pair of contact rings were used, and it was necessary to conduct the electrical current through both of these rings before the circuits could finally be closed by the operation of a suitable contact carried by the hour hand of the clock. In the present invention I have so simplified the parts that only a single contact or time ring is used, this ring being provided with three rows of holes adapted to receive suitable contact plugs. These plugs are, in turn, engaged by contact arms, one arm being brought into operation at a time through the instrumentality of suitable time-actuated cams. I have described three rows or holes in the contact ring and three contact arms since, under ordinary circumstances, as previously mentioned, three schedules for hours of labor are used; but it will be evident that these could be increased or diminished without departing from the spirit of my invention.

Rotating with the minute hand of the clock is a contact arm which engages suitable contacts carried by an electrically conducting portion of the frame. There are any desired number of these contacts, according to the times at which it is desired to blow the whistles. In the operation of my device the circuit is first partially closed by the engagement of a contact arm with one of the plugs of the contact ring, and the circuit is then finally closed and the whistle blown by the engagement of the rotating contact arm with one of the contacts on the frame of the apparatus. Since the travel of the last-mentioned contact arm is much more rapid than that of the hour hand, I have found that much more satisfactory results can be obtained than according to the method of operation described in the above-mentioned patent.

These and other advantages of my invention will be more clearly understood by reference to the accompanying drawings, which represent a preferred embodiment of my improvements, and in which—

Figure 1 is a front elevation of my time-controlled circuit-closing device; Fig. 2 is a side elevation of the parts shown in Fig. 1; Fig. 3 is a vertical section taken on the line 3—3 of Fig. 1; Fig. 4 is an enlarged fragmentary front elevation and partial section of the time ring and the disk which carries the same, together with the apparatus for actuating the contact arms; and Fig. 5 is a fragmentary enlarged vertical section showing the gears and pinions controlling the hour and minute hands of the clock and the contact arm rotating with the minute hand.

Attached to the frame 10 is the conducting ring 11, which, at suitable intervals, is provided with insulating members, as 12 and 13. The insulating member 12 has projecting therethrough the conducting strip 14, and the member 13 has a similar strip 15. The clock mechanism is provided

with a face 16 of the ordinary type and the minute hand 17 and the hour hand 18. As most clearly shown in Fig. 5, the minute hand 17 is fastened to the square end of the shaft 19, being held in position by the nut 20. This shaft 19 is actuated by clockwork mechanism of the usual and ordinary type, and which does not form any part of the present invention. Fastened to the shaft 19 is the pinion 21 which engages the gear 22 mounted on the shaft 23, on which is also mounted the companion gear 24 which engages the pinion 25 integral with the sleeve 26, this sleeve being freely rotatable about the sleeve 27, which has integrally mounted therewith the gear 28. The pinion 21, as well as engaging gear 22, also engages the gear 29 mounted on the shaft 30. Also mounted on this shaft is the pinion 31, which engages the gear 28, above mentioned.

Rigidly connected with the sleeve 27 is the sleeve 32 having connected therewith the hour hand 18, while rigidly mounted on the sleeve 26 is the collar 33, having connected therewith the conducting arm 34. It will now be evident that as the minute hand 17 is rotated through the instrumentality of the shaft 19 the movement of this shaft is transmitted from the pinion 21 through the gears 22 and 24 to the pinion 25, and that on account of the fact that the conducting arm 34 is mounted on the sleeve 26 this arm will be rotated at the same speed as the minute hand 17. On the other hand, the rotation of the shaft 19 is also transmitted from the pinion 21 through the gear 29, pinion 31 and gear 28, to the sleeve 27, thereby rotating the hour hand 18 at a speed one-twelfth of that of the minute hand.

As the conducting arm 34 is rotated at the same speed as the minute hand 17 it periodically strikes the conducting strips 14 and 15 of the insulating members 12 and 13, thereby being brought into electrical connection with the conducting ring 11. To this ring is attached the conductor 35, while the collar 33 is engaged by the spring contact 36 mounted on the frame of the clock.

Engaged by the pinion 31 is the gear 37, which has its center of rotation at 38. This gear, in turn, engages the gear 39 rigidly mounted on the shaft 40, on which is also mounted the disk 41, of fiber or other insulating material. The shaft 40 has its bearings in the downwardly projecting frame members 42 and 43, which are connected with the main framework of the clock mechanism. Mounted on the shaft 40 is the pinion 44, which engages the gear 45 mounted on the shaft 46, which also has its bearings in the frame members 42 and 43. As most clearly shown in Fig. 3, the cams 47, 48 and 49 are rigidly mounted on the shaft 46.

Inclosing the disk 41 is the time ring 50, made of electrically conducting material, such as copper, this ring being provided with a plurality of holes 51, which, in the embodiment of my invention which is illustrated in the accompanying drawings, are placed in three rows, A, B and C. The conducting plugs 52 are adapted to be inserted in any of the holes 51. As shown in Fig. 1, the holes 51 are spaced apart around the periphery of the time ring 50 at such distances that successive holes will be brought into the same position at half-hour intervals. These intervals are arbitrarily chosen, and, if desired, additional holes could be placed in the time ring. Attached to the frame member 43 is the contact 53, which establishes electrical connection with the time ring 50, while connecting the contact 53 with the spring contact 36 is the conductor 54.

As most clearly shown in Figs. 1 and 2, a bracket 55 is attached to the frame member 42, this bracket being provided with a shaft 56, on which the bell crank contacts 57, 58 and 59 are rotatably mounted. Attached to the bracket 55, by means of the screw 60, is an arm 61, to which are attached the springs 62, 63 and 64 which engage the corresponding arms of the bell crank contacts 57, 58 and 59. Each of these bell crank contacts carries near its end an insulating member 65 adapted to engage the corresponding cam 47, 48 or 49, while on the opposite end each bell crank contact carries an insulating member 66, through which passes a conducting strip 67, having electrical connection with the bell crank contact itself. Each of the bell crank contacts 57, 58 and 59 is provided with a sleeve 68 which incloses the shaft 56, forming electrical contact therewith. The conductor 69 is attached to the shaft 56 by means of the screw 60. This conductor 69 and the conductor 35 lead to the opposite poles of a battery of any well known type, which, for the sake of simplicity, is not shown in the drawings.

Having thus described the construction of the various parts used in my invention, its operation may now be clearly understood: Let us assume that on Mondays to Fridays, inclusive, it is desired to blow the whistle of a factory at seven o'clock in the morning, twelve at noon, 12:30, 1:00 and 6:00 in the afternoon. The conducting plugs 52 would then be inserted in the proper holes 51 of the time ring 50, in the row which is designated A. The gear and pinion connections from the shaft 40 are such that the disk 41 and the time ring 50 are rotated once in twenty-four hours, while the gear 45 and the shaft 46 are rotated once in seven days. The cam 47 is so proportioned that for five days it will engage the bell crank contact

57 so that the latter is moved into a position whereby its conducting strip 67 will engage a contact plug 52 when the latter, by the rotation of the time ring 50, is brought into the proper position. The various parts are so adjusted that slightly before seven o'clock in the morning, for example, one of the plugs 52 engages the conducting strip 67 of the bell crank contact 57, and an electrical connection is thereby formed from conductor 69, through shaft 56, bell crank contact 57, plug 52, time ring 50, contact 53, and conductor 54 to the spring contact 36, which engages the contact arm 34. When the contact arm strikes the conducting strip 14 the circuit is entirely completed, since the current now passes from the arm 34 through the strip 14 to the ring 11, thence through the conductor 35 to the battery which forms the source of current. In this circuit may be connected a relay which, on actuation, closes the main circuit controlling the whistle, and in this way the whistle continues to be blown as long as the contact arm 34 remains in electrical connection with the conducting strip 14. A similar operation is repeated at 12:00 o'clock, noon, and again at 12:30, except that in this case the contact arm 34 engages the contact strip 15 instead of the strip 14. In other words, it will be apparent that the circuit will always be closed when the contact arm 34 engages any conducting strip which is connected with the ring 11, provided that an electrical connection has been established between the shaft 46 and the time ring 50 by means of one of the bell crank contacts 57, 58 or 59.

During the days from Monday to Friday, inclusive, the cam 47 holds the bell crank contact 57 in such position that it will form electrical contact with any of the plugs 52 which come in its path, the bell crank contacts 58 and 59 meanwhile being held out of the path of any of such plugs by means of the springs 63 and 64. After a lapse of time equivalent to the five days above mentioned, the portion of the cam 47 of decreased radius will engage the insulating member 65 of the bell crank contact 57, and the latter will thereby be moved out of the path of the plugs 52. At the same time the portion of the cam 48 which is of greater radius engages the insulating member 65 of the bell crank contact 58, and the latter is thereby brought into the path of the plugs placed in row B of the time ring 50. The plugs may be placed in any desired positions in this row, as, for example, 7:00 a. m. and 4:30 p. m. In the manner previously explained, the whistle will automatically be blown at these times. After twenty-four hours the bell crank contact 57 is again moved to inoperative position, and by means of cam 49 the bell crank contact 59 is moved into operative position and the whistle is blown at appropriate times for Sunday; as, for example, 8:00 a. m. and 4:00 p. m.

It will be apparent from the above description that the cycle of operations will be performed week after week without any attention from the operator, while if a holiday should intervene it is only necessary for the operator to place the time plugs 52 in the proper holes corresponding to the times which it is desired to operate the whistle for that particular day. After that day has passed, the plugs may be returned to their original positions, and the cycle of operations continues as before. I have shown the contacts as placed only at half-hour intervals, but it will be apparent that if desired they could be placed at more frequent intervals without departing from the spirit of my invention. For example, if it is desired to blow the whistle at 12:05, an extra contact could be placed on the ring 11, and the appropriate bell crank contact would remain in electrical connection with its plug for a sufficient length of time so that the partial closing of the circuit would be available for the complete closing of the circuit both at 12:00 o'clock and 12:05. If, on the other hand, it is desired to blow the whistle at 15-minute intervals through any part of the day, it would be preferable to make additional holes in the time ring 50 at proper intervals.

It will be clear to those skilled in the art that many changes could be made in the detailed construction of the parts which I have described without departing from either the spirit or scope of my invention; for example, the number of rows of holes on the time ring might be increased or decreased, the method of transmitting motion between the various parts could be changed, and the like.

What I claim is:

1. In a device of the class described, the combination of a time-controlled actuating mechanism, a contact member driven by said actuating mechanism, a second contact member adapted to be periodically brought into electrical connection with said first contact member, a time ring, means for electrically connecting said time ring with said first-mentioned contact member, means operatively connecting said time ring with said actuating means, a plurality of contact arms adapted to engage selected points on said contact ring, and means for automatically actuating said contact arms, thereby electrically connecting said contact arms with said second contact member during independently selected periods of engagement of said second contact member by said first contact member on successive revolutions of said time ring, substantially as described.

2. In a device of the class described, the

combination of a time ring having a plurality of rows of holes in its periphery, contact plugs adapted for insertion in any of said holes, a plurality of contact arms, each of said arms adapted to engage the plugs in one of said rows of holes, electric conductors connected with said contact arms and said time ring, means for actuating said ring, cams for engaging said contact arms, and means for operatively connecting said cams with the actuating means of said time ring, whereby a different contact arm is brought into position to engage said contact plugs on successive rotations of said time ring, substantially as described.

3. In a device of the class described, the combination of time-controlled actuating means, a contact arm driven by said actuating means, electrically conducting members adapted to be periodically engaged by said contact arm, said conducting members being electrically connected to each other, a time ring having a plurality of rows of adjustable contact plugs mounted on its periphery, means for rotating said ring by said actuating means, means electrically connecting said time ring with said contact arm, a contact member for each row of plugs of said time ring, and cams for causing the selective engagement of one of said rows of plugs by its corresponding contact member, whereby the electrical circuit from said contact members to said conducting members is periodically closed when said contact arm engages one of said conducting members and one of said contact members simultaneously engages a plug of said time ring, substantially as described.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."