

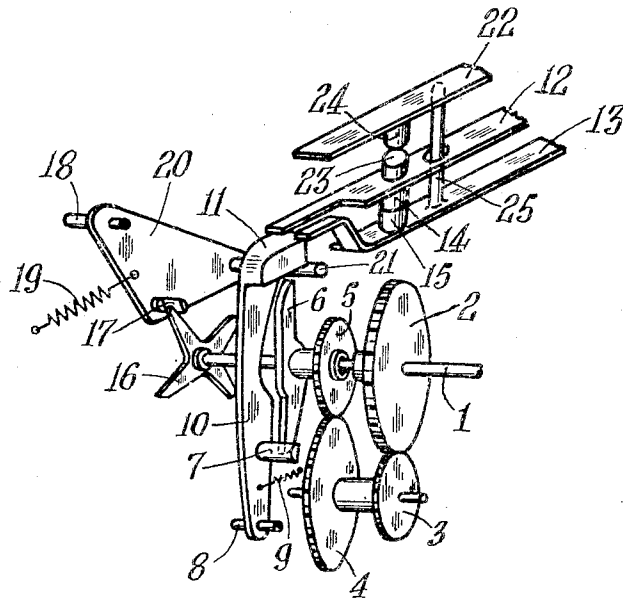
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SWITCH CONTACT

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SWITCH CONTACT

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The present invention relates to a maximum contactor for time switches, the usual use of the contactor being its connection through a relay with a maximum indicating meter or a maximum recorder.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations, and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

The present invention has for an object the provision of an improved maximum contactor which is compact in construction and which actuates the contacts in a time which is completely independent of the length of the recording period for the maximum indicating meter or maximum recorder. Another object of the invention is the provision of a maximum contactor of the above characteristics which may be simply adjusted for different recording periods without the exchange of a large number of the essential elements thereof.

The drawing is a perspective view, in part schematic, of a typical and illustrative embodiment of the invention.

Apparatus with which the present invention is adapted to be used, that is, maximum indicating meters or maximum recorders, may require an open circuit contactor. In this type of apparatus the maximum contactor must break a circuit for a short time periodically. With other embodiments of maximum apparatus closed circuit contactors are used in which the contactor is closed for a short time to transmit a periodic current impulse at the end of a recording period. In the operation of conventional maximum contactors a mechanical or electrical timing mechanism acts through suitable transmission means to actuate a cam on which slide two contact arms with slightly offset terminal edges, forming a contactor which is actuated for a short time at the close of each recording period. During this actuation of the contacts a maximum device in the maximum apparatus is returned to its neutral position. This normally takes about a second. As

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a rule a recording period is 5, 10, 15, 30 or 60 minutes, and is set by interchangeable transmission means for the contactor.

A principal difficulty with conventional contactors is that the period of actuation thereof varies with the length of the recording periods, and, also, a number of different pinions must be kept on hand for the interchangeable transmission mechanism. Moreover, reliable control of the relay current is very difficult, since the cam controlling the maximum contactor moves at a relatively low speed.

Some improvements have been introduced to enable the actuation period of a maximum contactor to be kept constant and independent of the recording period, but these have required bulky mechanical parts, such as scissors levers, for instance, they are difficult to adjust, and they require changes in transmission gearing for different recording periods.

These defects are remedied in accordance with the present invention by providing a contactor which is compact, which allows the change of the recording period by the exchange of a single, easily accessible part, leaving the transmission gearing as a permanent part, and in which the actuation period is independent of the recording period.

Referring now in detail to the illustrative embodiment of the invention shown by way of example in the accompanying drawing the reference numeral 1 designates the hour shaft of any suitable timing mechanism (not shown). The shaft 1 carries a gear wheel 2 fixed thereto which drives a gear 5 freely mounted on the shaft through gear wheels 3 and 4. The gearing 2, 3, 4 and 5 provides a transmission having a fixed velocity ratio for all recording periods of the contactor.

A two armed lifting lever 6 is fixed to gear 5 for rotation therewith, and after each half-revolution of the lever one arm contacts a pin 7 extending outwardly from a release lever 10. The lever 10 is pivoted about a shaft 8 and is spring biased toward the lever 6 by a spring 9. The upper end of release lever 10 has an enlarged head 11 having an upper surface to support the two contact arms 12 and 13 of a maximum contactor. The contacts 14 and 15 of arms 12 and 13 respectively are closed in normal position as shown in the drawing. The arrangement of a maximum contactor which is open in the normal position is represented by a contact arm 22 actuated from arm 13 by an insulated push rod 25 passing through arm 12 and engaging the under

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surface of arm 22. The contacts 23 and 24 then provide a contactor of the normally open type. It will fully be understood by those skilled in the art that a contactor may comprise both types of contacts as shown in the drawing, or only one, either one being chosen as desired and the other left out of the construction.

On the left end of spindle 1 as seen in the accompanying drawing there is fixedly but removably mounted an interchangeable cam plate 16 provided with a number of radially extending arms. The number of arms will vary with the duration of the recording period which is desired. A triangular lever 20, adapted to pivot about a shaft 18, has a laterally extending pin 17 to be engaged successively by the arms of cam plate 16, the lever 20 being thereby rotated in a counterclockwise direction. Lever 20 is biased by a spring 19 in the opposite direction toward the arms of cam plate 16. When lever 20 is rotated by plate 16, a pin 21 extending laterally from the lever engages under arms 12 and 13 and raises them to a position such that release lever 10 can swing its head 11 under the ends of the contact arms and support them.

The transmission gearing 2, 3, 4, 5 causes the lever 6 to rotate through a complete revolution in a fixed period of time say, for example, 10 minutes. Thus, at the end of every five minutes one of the ends of the lever encounters the pin 7 and swings the release lever 10 out of the contact arm supporting position, allowing arms 13 and 22 to drop simultaneously, and contact arm 12 a little later. In order to effect this timed dropping of the contact arms the front edge of arm 13 is cut back to a slight extent from parallelism with the front edge of arm 12, so that arm 13 will drop off of head 11 first. In an illustrative embodiment of the invention shown the length of arm 13 may be about 0.4 mm. less than the length of arm 12, which corresponds in point of time to about one second between the falling of the arms.

The fall of the shorter arm 13 separates contacts 14, 15 and closes contacts 23, 24. The subsequent fall of the longer contact arm 12 restores the original condition of the contacts, that is, 14, 15 closed and 23, 24 opened. The arms 12 and 13 are not restored, for further contact actuation, to a position on the top surface of head 11 of lever 10 until an arm of cam plate 16 engages and rotates triangular lever 20, the latter governing the length of the recording period. It may therefore be seen that the time elapsed in actuating the contacts is always the same irrespective of the length of the recording period.

The cam plate 16 controlling lever 20 may be provided with a number of arms which will depend upon the length of the recording period desired. For example, in the case of the periods hereinbefore enumerated, namely 60, 30, 15, 10 and 5 minutes, the cam 16 will have 1, 2, 4, 6 and 12 arms respectively. When one of these arms contacts pin 17 on lever 20, the contact arms 12, 13 and 22 are lifted into a position in which release lever 10 may be spring moved to support them as shown in the drawing, and the contacts are in condition for actuation when an arm of lever 6 next engages release lever 10.

It will be apparent from the construction shown and described that the mechanism is compact, there is only one fixed transmission, and the time occupied in actuating the maximum contactor is entirely independent of the recording period. Moreover, the length of the recording period may be changed simply by exchanging a

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simple cam plate 16, so that, apart from this member, the fully assembled contactor may always be kept in stock.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:

1. A switch to be actuated from a continuously rotating shaft comprising, in combination, a pair of switch arms supported by a pivotal lever in an original position, said arms and lever being so formed that upon pivoting the lever one arm falls free of the lever before the other arm falls free, said arms assuming an actuated position upon falling free of the lever, means interconnecting the shaft and said lever for periodically pivoting the lever, means for returning the lever, and means interconnecting the shaft and said arms for periodically returning said arms from actuated to original position, said lever being inoperative to support said arms while said arms are in an actuated position.

2. A switch to be actuated from a continuously rotating shaft comprising, in combination, a pair of switch arms supported by a pivotal lever in an original position, said arms and lever being so formed that upon pivoting the lever one arm falls free of the lever before the other arm falls free, said arms assuming an actuated position upon falling free of the lever, means interconnecting the shaft and said lever for periodically pivoting the lever, means for returning the lever, and means interconnecting the shaft and said arms for periodically returning said arms from actuated to original position, said means comprising a removable cam on said shaft, said lever being inoperative to support said arms while said arms are in an actuated position.

3. A switch to be actuated from a continuously rotating shaft comprising, in combination, a pair of switch arms supported by a pivotal lever in an original position, said arms and lever being so formed that upon pivoting the lever one arm falls free of the lever before the other arm falls free, said arms assuming an actuated position upon falling free of the lever, means interconnecting the shaft and said lever for periodically pivoting the lever, means for returning the lever, and means interconnecting the shaft and said arms for periodically returning said arms from actuated to original position, said means comprising a removable cam on said shaft and a pivotal member engageable by said cam to be pivoted to engage said arms, said lever being inoperative to support said arms while said arms are in an actuated position.

4. A switch to be actuated from a continuously rotating shaft comprising, in combination, a pair of switch arms supported by a pivotal lever in an original position, said arms and lever being so formed that upon pivoting the lever one arm falls free of the lever before the other arm falls free, said arms assuming an actuated position upon falling free of the lever, means interconnecting the shaft and said lever for periodically pivoting the lever, said means comprising a cam and fixed ratio gearing between the shaft and said cam, means for returning the lever, and means interconnecting the shaft and said arms for periodically returning said arms from actuated to original position, said lever being inoper-

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ative to support said arms while said arms are in an actuated position.

5. A switch to be actuated from a continuously rotating shaft comprising, in combination, a pair of switch arms supported by a pivotal lever in an original position, said arms and lever being so formed that upon pivoting the lever one arm falls free of the lever before the other arm falls free, said arms assuming an actuated position upon falling free of the lever, means interconnecting the shaft and said lever for periodically pivoting the lever, said means comprising a cam to engage and pivot said lever and fixed ratio gearing between the shaft and said cam, means for returning the lever, and means interconnecting the shaft and said arms for periodically returning said arms from actuated to original position, said lever being inoperative to support said arms while said arms are in an actuated position.

6. A switch to be actuated from a continuously rotating shaft comprising, in combination, a pair of switch arms having parallel ends supported

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by a pivotal lever in an original position, said lever ends terminating at different positions with respect to said lever so that upon pivoting the lever one arm may fall free of the lever before the other arm falls free, said arms assuming an actuated position upon falling free of the lever, means interconnecting the shaft and said lever for periodically pivoting the lever, means for returning the lever, and means interconnecting the shaft and said arms for periodically returning said arms from actuated to original position, said lever being inoperative to support said arms while said arms are in an actuated position.

HANS MEIER.

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