

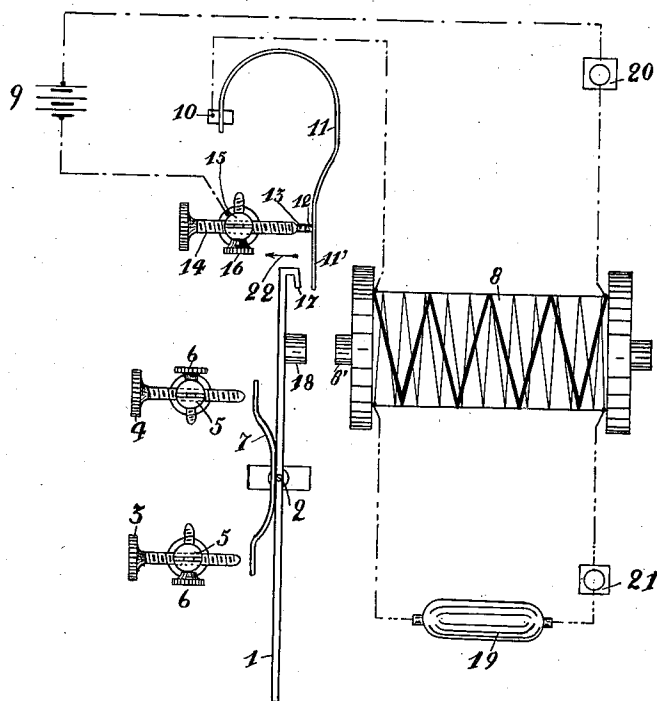
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L. CZIKAN

STROBOSCOPIC APPARATUS

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per: *[Signature]*
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LOUIS CZIKAN, OF IXELLES, NEAR BRUSSELS, BELGIUM.

STROBOSCOPIC APPARATUS.

Application filed September 19, 1924. Serial No. 738,641.

To all whom it may concern:

Be it known that I, LOUIS CZIKAN, a subject of the King of Belgium, residing at Ixelles, near Brussels, Belgium, 56 Rue Vautier, have invented a new and useful Stroboscopic Apparatus, of which the following is a specification.

The present invention relates to an improved stroboscopic apparatus, serving to control and observe the mechanical parts of an engine which are subjected to rapid movements, and the said invention is principally characterized by the application in an apparatus of the kind referred to and in conjunction with an induction coil of an oscillatory interrupter of which the rate of oscillation may be regulated in order to obtain a synchronization between the moving parts to be observed and for instance a source of luminous flashes influenced by the stroboscopic apparatus.

The apparatus to which the invention applies substantially comprises a source of electricity, such as a battery or storage battery, an induction coil having the oscillatory interrupter previously referred to inserted in the circuit of its primary winding, a lamp of the vacuum tube type filled with rarefied gas, and a pair of condensers, and the invention essentially resides in the specific features of construction of the oscillatory interrupter, the oscillatory interrupter, which includes a ticker arranged to cooperate with a spring contact-member and of which the rate of oscillation may be varied at will through the medium of suitable adjusting means, as hereinafter described. The source of electricity supplies electric current to the circuit of the primary winding of the induction coil, and a condenser is interposed on the said primary circuit in order to attenuate as much as possible the rupture spark at the contact of the ticker. The secondary current engendered by the energization of the primary circuit of the induction coil is caused to pass through a tube filled with rarefied gas or a lamp of similar type. The interrupter being of a type which permits of varying in a large proportion its rate of oscillation, the number of the interruptions of the primary circuit may be varied in consequence. Each of the interruptions of the primary current induces a secondary current which, passing through the lamp or flash tube, produces a luminous flash therein. A condenser is moreover inter-

posed in the secondary circuit in such a manner as to obtain in the lamp a discharge as instantaneous as possible.

When the apparatus is in use, the lamp or flash-tube gives successive luminous flashes at equal time intervals, and by varying the rate of oscillation of the ticker, the number of such flashes produced within a determined period of time may be increased or reduced.

An embodiment of the stroboscopic apparatus according to the invention is, by way of example, illustrated in a purely diagrammatic manner by the accompanying drawing.

The ticker proper is constituted by an iron piece 1 which oscillates about the point 2. On one side of the ticker 1 and on different sides of the point of oscillation 2 are provided two abutment screws 3, 4 mounted in terminals 5 provided with screws 6 by means of which the abutment screws 3, 4 may be secured in their adjusted position. The points of these screws 3 and 4 bear on the respective ends of a blade 7 attached to the ticker 1 and extending on one side and the other respectively of the point of oscillation 2. The apparatus comprises an induction coil 8 (or an electro-magnet interposed on the primary circuit of such a coil) of which the primary winding is, at one of its ends, connected to one of the terminals of a source of electricity 9. The other end of the primary winding of the coil is connected to the point of fixation 10 of a blade spring 11 which has the shape of a portion of a loop and carries a platinum or tungsten contact piece 12 which the spring 11 normally tends to maintain in contact with a similar contact piece 13 provided at the end of a screw 14 connected to the other terminal of the source of electricity 9, this screw 14 being mounted in a terminal provided with a screw 16 by means of which the screw 14 may be secured in its adjusted position. The free end 11' of the spring 11 also normally tends to act on one of the ends 17, suitably bent, of the ticker 1, so as to maintain at a distance from the adjacent end of the core 8' of the induction coil 8 a stud 18 provided on the ticker 1 opposite the said end of the core 8' and between the end 17 of the said ticker and its point of oscillation 2.

On the secondary circuit of the induction coil 8 is placed a flash-tube 19 filled with rarefied gas, and two condensers 20 and 21

are moreover interposed respectively on the primary and on the secondary circuit.

The rate of oscillation of the ticker may thus be modified by adopting one or several of the following means:

1, by acting on the spring 11 by means of the screw 14;

2, by adjusting the abutment screw 3 to regulate the movement of the ticker 1 which, by influencing the free end 11' of the spring 11, determines the limit of spacing between the contact 12 and the contact 13 for the interruption of the primary circuit between these two contacts;

3, by adjusting the abutment screw 4, which limits the amplitude of the return movement of the ticker 1 in the direction of the arrow 22; and

4, by providing an induction coil which is itself adjustable in relation to the ticker.

The described apparatus operates in the following manner:

The contact being established between the points 12 and 13, the current passes through the primary circuit and the core 8' of the induction coil 8 being thus energized, the stud 18 is drawn towards the adjacent end of the said core: consequently, the end 17 of the ticker 1 is caused to press on the end 11' of the spring 11, so that the contact piece 12 moves away from the contact piece 13. The passage of the current in the primary circuit being thus interrupted, the core 8' of the induction coil ceases to draw the ticker, so that the latter is repulsed by the spring 11, which re-establishes the contact of the point 12 with the point 13. The ticker 1, under the influence of the impulse imparted thereto by the spring 11 before the point 12 comes into contact with the point 13, continues its movement in the direction of the arrow 22 until stopped by the contact against the point of the abutment screw 4 of the corresponding end of the blade 7. The contact between the contact pieces 12 and 13 being re-established, the primary circuit is again closed and the ticker is again drawn towards the core of the coil, the cycle being thus repeated indefinitely.

If it be assumed that it is desired to control or observe a mechanical part of which

the speed is too high to permit of its movement being followed with the naked eye, such as for instance a driving shaft rotating at 2000 revolutions per minute, the interrupter of the described apparatus is adjusted until it produces 2000 interruptions of current per minute. The flash-tube will consequently give 2000 luminous flashes per minute, and if the rays thus emitted are projected on the moving shaft, the said shaft will appear to be at a standstill although in reality it rotates at 2000 revolutions per minute. If instead of synchronizing the luminous flashes with the number of revolutions, the frequency of the interrupter be somewhat retarded in relation to the number of revolutions, the observer will have the impression that the shaft rotates at a greatly reduced speed which may be easily followed with the naked eye, although the said shaft in fact rotates at a very high speed.

I claim:

In a stroboscopic apparatus of the type comprising an induction coil of which the secondary circuit comprises a condenser and a flash-tube filled with rarefied gas while its primary winding also comprises a condenser and is at one end electrically connected to one of the terminals of a source of electricity an interrupter including an oscillatory ticker, two abutment screws arranged on the same side of the ticker and on different sides of its point of oscillation in such a manner as to allow the adjustment of the amplitude of the oscillations of the ticker in each direction, an adjustable contact screw electrically connected to the other terminal of the source of electricity, and a contact spring having its point of fixation electrically connected to the other end of the primary winding of the induction coil and arranged in such a manner as normally to tend to keep contact with the aforesaid contact screw and to maintain the ticker at a distance from the adjacent end of the core of the induction coil, substantially as described.

In testimony whereof I signed hereunto my name.

LOUIS CZIKAN.