

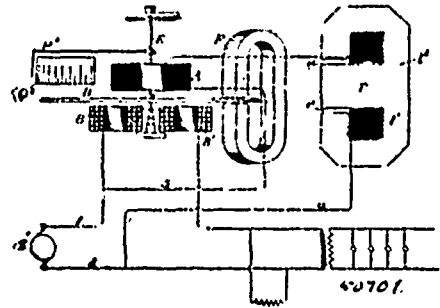
practically free from distortions due to the magnetization of the iron. 11th. In an electric meter for alternating currents, an inductance coil consisting of a conducting coil and a nearly closed laminated soft iron core having an air gap sufficient to require for any given magnetization a magnetizing force largely in excess of that required to equally magnetize the iron. 12th. In an alternating current electric meter an inductance coil having a nearly closed soft iron core, in which the air gap is sufficient to render the apparent energy of the circuit in which said coil is included large relatively to the energy consumed in the winding and in the iron and at the same time maintaining a low magnetization of the iron. 13th. In an electric meter for alternating currents an inductance coil having an approximately closed soft iron core in which the air gap is sufficiently large relatively to the length of the iron portion to cause the magnetization to be proportional to the magnetizing current through a wide range. 14th. An inductance coil consisting of a magnetizing coil, an interrupted soft iron core, the cross-section of iron in which is sufficient to remain well below magnetic saturation, while the interruption of air gap in the core is sufficient to require a magnetizing current which is large relatively to that required for magnetizing the iron, but the iron portion of the core occupying a sufficient length of the magnetic circuit to secure a high coefficient of self-induction with relatively very small loss due to the resistance of the winding. 15th. An inductance coil comprising a winding and a nearly closed laminated soft iron core having an interposed air gap of sufficient length relatively to the length of the iron core to render the form of the waves of magnetizing current practically independent of the distortions due to the magnetization of the iron. 16th. In an electric meter, the combination of an inductance coil in which the magnetizing current is approximately proportional to the induction, an armature and means for subjecting it to an inductive influence proportional to the magnetizing current. 17th. In an electric meter, the combination of an inductance coil in which the magnetizing current is approximately proportional to the induction, an armature of conducting material having a small coefficient of self-induction, and means for subjecting said armature to an inductive influence proportional to the magnetizing current. 18th. In an alternating current electric meter having a resultant shifting field produced by two magnetic fields or groups of fields, differing in phase, an inductance coil of constant permeability throughout the working limits of the meter controlling one of said magnetic fields and rendering its wave form approximately the same as that of the impressed electromotive force, and an armature, the permeability of whose magnetic circuit is approximately constant, subjected to the action of the two fields, the induction of each field having a wave form similar to the current producing it. 19th. In an electric meter for alternating electric currents, the combination of inducing coils, a movable element in which for given currents in said inducing coils, a torque is produced directly proportional to the periodicity and an inductance coil in which the current is inversely proportional to the periodicity. 20th. An inductance coil comprising a winding of insulated wire and an enclosing subdivided iron core having an interruption in the magnetic circuit, the reluctance across said interruption being greater than that of the remaining portion of the magnetic circuit, the total reluctance being sufficiently low to render the coefficient of self-induction high relatively to that of the winding alone. 21st. The method of maintaining in an actuating circuit of an inductively operated electric meter, an inductive effect proportional to the electromotive force impressed upon said circuit independently of the periodicity, which consists in creating by means of the current in said circuit a controlling magnetic field, and by means of the counter electromotive force induced by said field, automatically varying the current in said circuit in inverse ratio to the periodicity. 22nd. The combination of a circuit conveying an alternating current, an actuating device in said circuit tending to vary its effects proportionally to the periodicity of said current, and means for inductively varying the current in said circuit in inverse proportion to the periodicity. 23rd. In an alternating current meter, an actuating coil in shunt circuit, and a compensating inductance coil connected in said circuit made to automatically vary the current in said circuit in inverse ratio to the periodicity. 24th. In an alternating current controlling device made to automatically vary the current in one of the actuating circuits in inverse proportion to the periodicity. 25th. In a meter for alternating electric currents, the combination of an armature and actuating coils thereof, one of said coils being of large wire, adapted for series connection, and the other being of fine wire adapted to be connected in shunt, and an adjustable soft iron core within one of said coils.

No. 50,701. Indicating Watt Meter for Alternating Electric Currents. (*Mètre pour courant électrique alternatif.*)

Oliver B. Shallenberger, Rochester, Pennsylvania, U.S.A., 2nd December, 1895; 6 years.

Claim. 1st. The combination of a disc of conducting material, a shaft carrying the same, a spring opposing the rotation of the disc, means for producing two magnetic fields differing in phase, the axes of which fields traverse said disc at points so located that the two fields combine to form a resulting shifting field for rotating said disc, an index for noting the degree of rotation produced, and a damping device applied to said disc. 2nd. In an electric indicating

device for alternating currents, the combination of a disc of conducting material, a shaft carrying the same, a solenoid having its



axis approximately perpendicular to the plane of the disc, a second solenoid or set of solenoids having their axes directed toward said disc at another point or points than the first, a spring for opposing the motion produced in said disc by the action of said solenoids and an indicating device for noting the position of said disc. 3rd. In a meter for alternating currents, an actuating device consisting of a rotary disc of conducting material, a shunt connected coil upon one side of said disc, a series connected coil upon the opposite side of said disc, said coils having their axes perpendicular to said disc and occupying different circumferential positions, and a scale carried by said disc for indicating the degree of deflection. 4th. In a meter for alternating electric currents, the combination of a rotating disc, a spring or equivalent device opposing the rotation of the disc, a shunt connected coil and a series connected coil having their axes directed toward said disc at different points for producing rotation of the disc by means of currents differing in phase, a scale for noting the deflections of the disc, and a damping device for opposing the oscillations of the disc. 5th. In a meter for alternating electric currents, the combination of a series connected coil, a shunt connected coil of relatively large number of turns, a device in series with the shunt connected coil compensating for variations in periodicity, an armature moved by the inductive effects of said coils, means for opposing the movement of the armature increasing in its effect in proportion to its deflection, and a scale for noting the amount of its deflection. 6th. In a meter for alternating electric currents, the combination of a series connected coil, a shunt connected coil having a relatively large number of turns, and an adjustable resistance connected in series with the last named coil for adjusting for periodicity and temperature, an armature moved by the resultant effect produced thereon by said coils and an indicating device for noting the amount of the movement of such armature. 7th. In a deflecting indicating meter, the combination of a movable scale responding to variations in the energy to be indicated, and a damping device for suppressing the oscillations thereof, comprising one or more magnets and a closed conductor passing between the poles thereof and moving with the scale. 8th. In a meter for indicating multiphase alternating electric currents, the combination of a coil connected across one of the circuits, a second coil connected in series with a second circuit, an armature consisting of a rotary disc toward different points of which said coils are directed, a scale and pointer for indicating the amount of deflection of said armature, and a damping device for suppressing oscillations of said armature. 9th. The combination, with the circuits of a multiphase system of distribution by alternating currents, of a meter containing two actuating coils of which one is traversed by currents to the resultant of two component currents differing in phase, and the other is traversed by currents due to the algebraic sum of the electromotive forces producing those component currents, an armature actuated by the resultant effects of said coils, a spring opposing the motion of the armature, and an indicating device for noting the position of the armature. 10th. In an indicating meter, the combination of an armature, actuating coils for producing rotation thereof, a scale moving with said armature, and a damping device for suppressing oscillations of the moving parts. 11th. In an indicating meter, the combination of a disc of conducting material, actuating coils for producing rotation thereof, a damping device for suppressing oscillations of said disc and a graduated cylindrical band carried by the disc. 12th. In an indicating meter, the combination of a disc of conducting material, actuating coils for producing rotation thereof, a damping device for suppressing oscillations of said disc, a graduated cylindrical band carried by the disc, and an index extending over said band. 13th. An indicating meter for alternating electric currents comprising an armature, a shunt connected coil, and a series connected coil for actuating the same, the shunt connected coil being traversed by currents differing in phase approximately ninety degrees from the current traversing the series connected coil when no lag exists in the current traversing the work circuit, a spring or equivalent device for opposing the motion of the armature, and an indicating device for noting the deflection of the armature. 14th. In an electric indicating meter, the combination of a moving scale for indicating the degree of deflection, a support therefor of conducting material carrying the scale, and damping magnets acting upon said conducting support. 15th. In an electric indicating meter, the combination of a moving scale, a damping con-