R. S. JACOBSEN.

TIMING OR CONTROLLING MECHANISM.

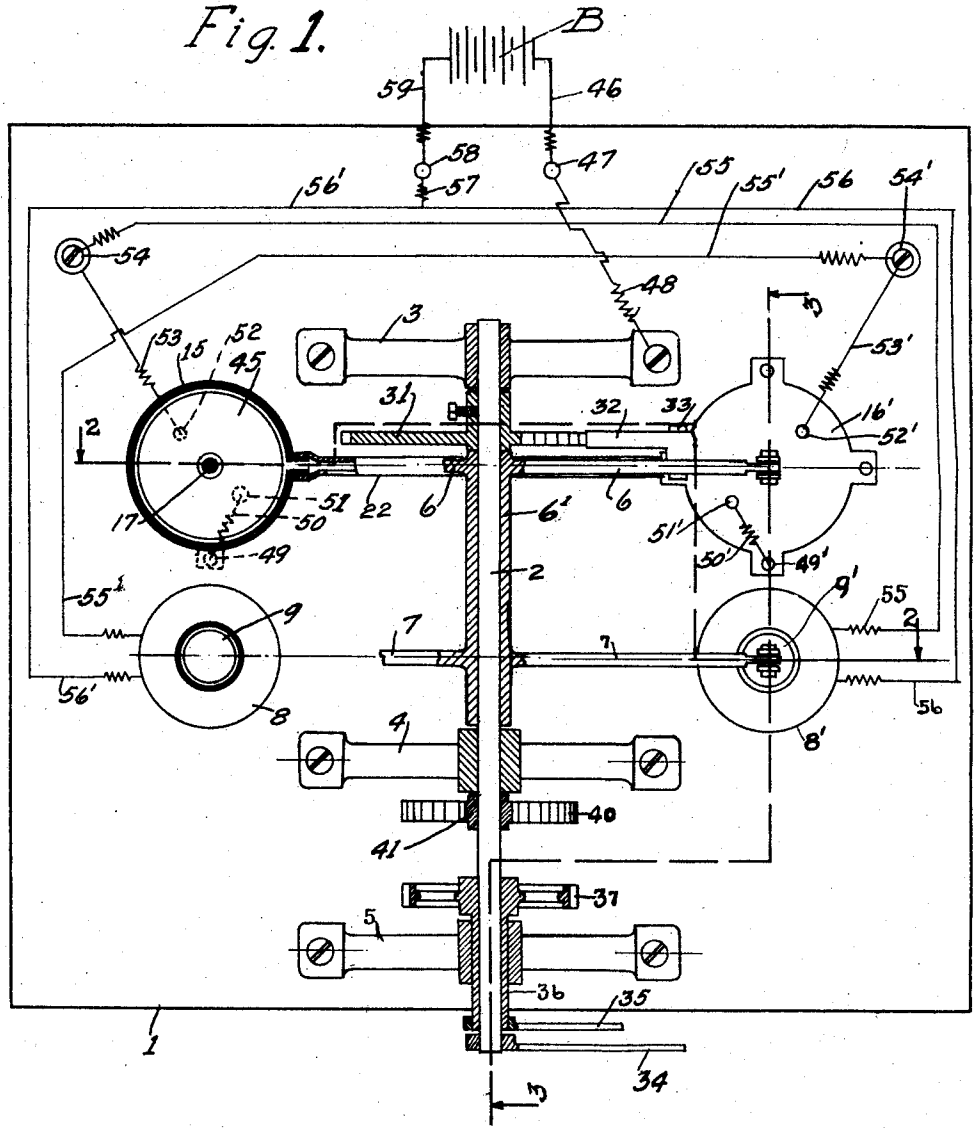
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1,187,625.

Patented June 20, 1916.

3 SHEETS—SHEET 1.

Fig. 1.



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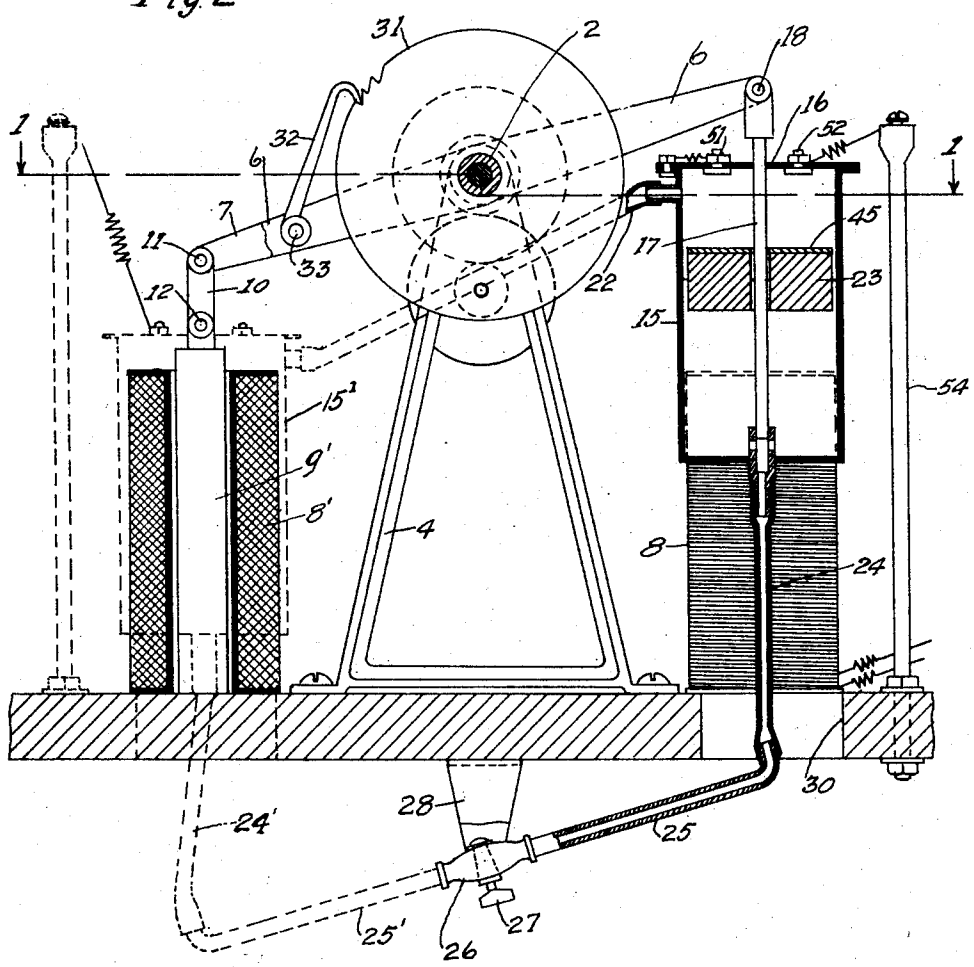
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3 SHEETS—SHEET 2.

Fig. 2



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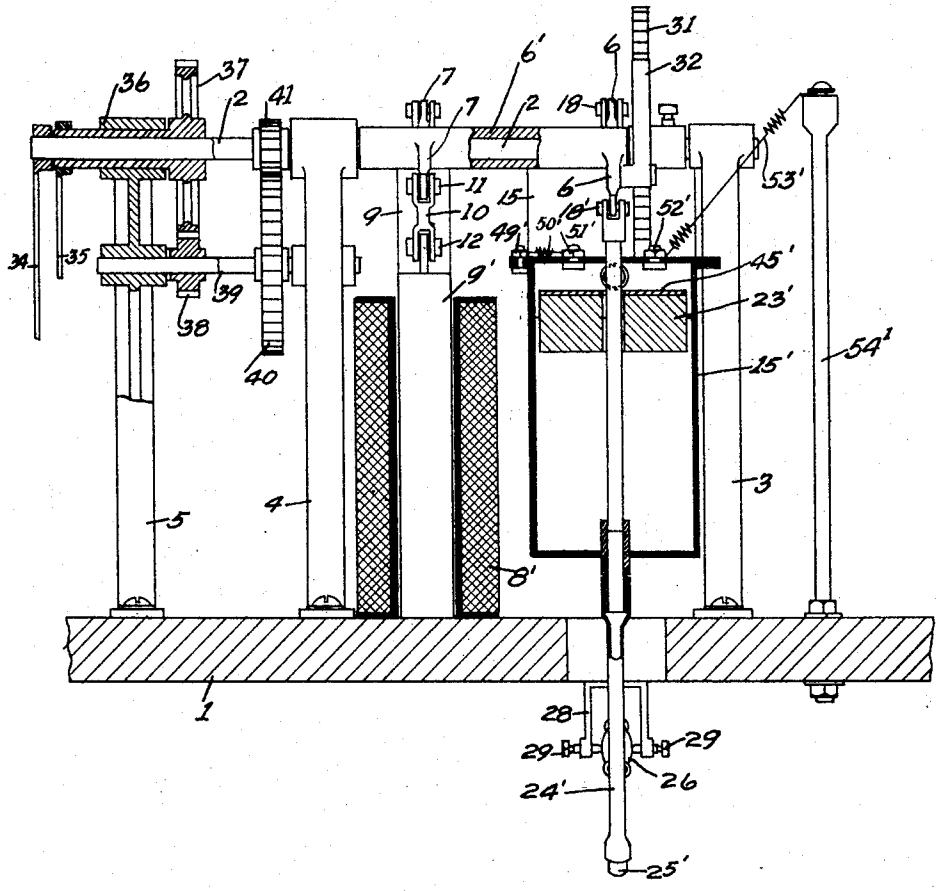
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3 SHEETS—SHEET 3.

Fig. 3.



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TIMING OR CONTROLLING MECHANISM.

1,187,625. Specification of Letters Patent. Patented June 20, 1916.

Application filed March 14, 1913. Serial No. 754,211.

To all whom it may concern:

Be it known that I, RICHARD S. JACOBSEN, a subject of the King of Norway, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Timing or Controlling Mechanism, of which the following is a description.

My invention belongs to that general class of devices known as timing or controlling mechanism, and relates particularly to mechanism applicable for indicating time, or for controlling or operating suitable apparatus at predetermined intervals, which intervals may be varied as found desirable.

The invention has among its objects the production of a simple, compact, convenient, accurate, efficient and satisfactory device of the kind described, for use wherever found applicable.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the drawings, wherein like reference characters indicate like or corresponding parts, Figure 1 is a sectional view of my device taken substantially on line 1, 1 of Fig. 2. Fig. 2 is a sectional view taken substantially on line 2, 2 of Fig. 1. Fig. 3 is a sectional view taken substantially on line 3, 3 of Fig. 1.

Referring to the drawings, 1 represents a suitable base upon which a shaft 2 is supported in any suitable manner, three brackets 3, 4 and 5 being shown for the purpose. A collar or tubular member 6′ provided with arms 6, 6 and 7, 7 is arranged upon the shaft 2, preferably between the supports 3 and 4. Arranged on the base 1 proximate the ends of the arms 7 are solenoid coils 8 and 8′, or their equivalents, provided with movable cores 9 and 9′, which are connected to the ends of the arms 7, 7, the same forming electromagnets of the type known as solenoidal-magnets. As the several parts upon opposite sides of the shaft 2 are substantially similar, I have given the similar parts the same reference characters with the exception that the characters on one part are primed in order to make the operation of the device more clear, as hereafter set forth. Any equivalent type of electro-magnetic motor or the like may be employed.

Referring particularly to Figs. 2 and 3, the solenoid core 9 is connected to the arm 7 by links 10, which are pivotally secured to the arms and cores at points 11 and 12 respectively. The parts or arms 7 are so arranged that when one core is down in its coil, the other core is raised, and therefore energizing the coil in which the core is raised will draw the core down, the opposite core being drawn up. Raising or lowering the arms 7 rocks the collar 6′ and the arms 6.

Suitable mechanism is provided arranged to coöperate with the arms 6, and control the energizing of the solenoid coils 8 and 8′. At the end of each arm 6 is arranged a receptacle 15 provided with a suitable top 16, the receptacle being supported or carried by a rod 17 pivotally secured at 18 to the arm 6, the opposite receptacle being similarly constructed, as previously mentioned. The two receptacles are connected at their tops by a pipe or tube 22, which is preferably flexible, or flexibly connected to the receptacles, so as to permit the same to be alternately raised and lowered when the arms 6 are rocked about the shaft 2. Within each receptacle is arranged a float 23, of suitable material, which is preferably provided with a top plate 45 of suitable material, as hereafter described. The bottoms of the two receptacles are provided with pipes or tubes 24 and 24′ respectively, which are connected by the pipes 25 and 25′. As most clearly shown in Figs. 2 and 3, a valve casing 26 and valve 27 are provided between the two pipes, the two being preferably pivotally supported by a bracket 28 and screws 29. Enough fluid is placed in the receptacle to raise the fluid in the lower one sufficiently to bring the plate 45 into contact with suitable contacts on the covers or tops 16.

As is obvious, when one receptacle, that is, the filled one, is raised, the fluid passes through the bottom of the higher one through the pipes 24 (see Fig. 2) 25, 25′, and 24′, to the other receptacle, where it raises the float in that receptacle until it makes contact, electrically closing the circuit to energize the solenoid controlled by it, and reversing the relative positions of the two receptacles, at which time the fluid flows back again to the other one. The tube or pipe 22 permits the escape or flow of air from the receptacle being filled to the one being emptied. The electrical connections mentioned will be more fully described hereafter, it being sufficient to say at this time that, in the structure shown, the receptacle that is at the lower level when filled, controls

the solenoid coil of the raised core. The time required for the flow of the fluid from one receptacle to the other may be varied or controlled by operating the valve 27, for instance the valve may be opened sufficiently to require one minute, or one-half minute, or any other interval, of time, for the fluid to flow from one to the other sufficiently to raise the floats and close the circuits.

The movement of the arms and tubular collar 6′ may be transmitted to the shaft 2 in any suitable manner. The connection is preferably so arranged that the shaft 2 is rotated periodically in one direction. The construction shown to accomplish this is a ratchet wheel 31 (only a portion of the teeth being shown in Fig. 2), secured to the shaft 2, and arranged to coöperate with a pawl 32 pivotally secured at 33 to one of the arms 6. As the arm 6 is rocked on the shaft it periodically rotates the shaft 2. In the drawings I have shown but one pawl secured to one of the arms, it being understood, however, that a suitable pawl, or equivalent, may be employed, so that the shaft is rotated during the rocking of the tubular part 6′ and the arms in both directions. This rotation of the shaft 2 may be utilized wherever found desirable, the same being particularly convenient for clock mechanisms, since the device may be so arranged or controlled that the shaft may be rotated periodically, so that it makes one complete rotation per hour, the hand being regularly advanced at intervals of one or one-half minute, or any other desired interval. I have shown a minute hand 34 secured to the shaft 2, which is arranged to make one complete rotation every hour, and an hour hand 35 secured to a collar 36, suitably connected to the shaft and arranged to make two complete revolutions every twenty-four hours. The collar 36 may be connected to the shaft in any suitable manner. As shown, I provide the same with a gear 37, in mesh with the pinion 38 on the shaft 39, which is driven by a gear 40, meshing with the pinions 41 on the shaft 2. These gears are so arranged or proportioned that the hand 35 makes the only complete revolution for each twelve revolutions of the hand 34. The application of the device to a clock is particularly mentioned, since this is a particularly desirable and convenient use for the mechanism.

The top 16 of each of the receptacles is provided with a contact or binding post 51 and 52 suitably insulated from each other. A conductor 50 connects the binding posts 51 or contact with contact or binding post 49, grounding the same on the receptacle, shaft and frame, etc. The contact 52 is connected by a conductor 53 to a binding post 54. A battery B, or other source of energy, is connected by a conductor 46 to a binding post 47 on the base 1, which is connected by a conductor 48 to the standard 3. The standard, shaft 2, arms 6 and rods 17, etc., electrically connect the receptacles to which the contacts 51 are grounded, and conductor 48. A conductor 59 from the battery is connected to a binding post 58.

It will be noted by referring to Fig. 1, that one receptacle is connected to the binding post 54 and the other to the binding post 54′. The binding post 54 is connected by a conductor 55 to the solenoid coil 8′, and the solenoid coil 8′ by a conductor 56 and conductor 57 to the binding post 58. The binding post 54′ is connected by a conductor 55′ to the solenoid 8, and the solenoid coil by a conductor 56′, and a conductor 57, to the binding post 58.

Assuming that the parts are as shown in the drawings, with the receptacle 15 raised and the receptacle 15′ in its lower position: As soon as sufficient fluid has passed into the receptacle 15′, to raise the float 23′, so that the plate 45′ contacts with the contact members 51′ and 52′, closing the circuit, a circuit is then formed as follows: battery B, 46, 47, 48, and through the bracket 3, shaft 2, and arm 6, etc., to the post 49′, conductor 50′ to contact 51′, through plate 45′ to contact 52′, conductor 53′, binding post 54′, conductor 55′, solenoid 8, conductor 56′, 57, binding post 58, conductor 59, to the battery. Coil 8 is therefore energized, drawing the coil core 9 down, and with it the receptacle 15, thereby elevating the receptacle 15′, so that the fluid flows back to receptacle 15, when the other circuit is closed in a similar manner. As the core 9′ is pulled down each time, the pawl 32 partically rotates the ratchet wheel 31, thereby partially rotating the shaft 2, and as the core 9 is pulled down, the pawl takes a new purchase on the ratchet wheel, so as to partially rotate the shaft at the next operation. As previously mentioned, the parts may be so arranged that the hand 34 makes twenty-four rotations in twenty-four hours, and the hand 35 makes two complete rotations in twenty-four hours.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention, hence I do not wish to be understood as limiting myself to the exact form, construction, arrangement or combination of parts herein shown and described, or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:—

1. In a device of the kind described and in combination, a rotatable shaft, operating means therefor, including a pair of electromagnets, and fluid operable controlling means therefor comprising a pair of arms, means connected with said magnets for ac-

tuating said arms, a fluid receptacle pivotally carried by each arm, piping means connecting said receptacles, and adjustable means for controlling the passage of fluid through said piping means.

2. A device of the kind described, comprising a rotatable shaft, electrically operated actuating mechanism therefor, and fluid operable controlling mechanism for said actuating means comprising a fluid receptacle arranged on each side of said shaft, supporting means therefor pivotally carried by said shaft and operatively connected with said actuating mechanism, piping means connecting the bottoms of said receptacles, and piping means connecting the upper ends thereof.

3. In a device of the kind described and in combination, a driven shaft, actuating means therefor, comprising a pair of solenoidal magnets, means for operatively connecting the same with said driven shaft comprising a tubular sleeve arranged on the shaft, and provided with an arm for each magnet, and means for operatively connecting said arms with the cores of said magnets, and means for alternately controlling said magnets including a fluid receptacle arranged on each side of said shaft, a supporting arm for each receptacle carried by said tubular sleeve, and piping means for connecting said receptacles.

4. In a device of the kind described and in combination, a driven shaft, actuating means therefor, including a pair of solenoidal magnets, means for operatively connecting the same with said driven shaft comprising a tubular sleeve arranged on the shaft, a plurality of arms secured to said sleeve, and pivotally connected with the cores of said magnets, a ratchet wheel secured to the shaft and a coöperating pawl carried by said tubular sleeve, and means actuated by said magnets for periodically controlling said magnets as desired.

5. In a device of the kind described and in combination, a driven shaft, actuating mechanism therefor, including a pair of solenoidal magnets operatively connected therewith, means for alternately controlling said magnets, including a pair of intercommunicating fluid receptacles arranged one on each side of said shaft, a float arranged in each of said receptacles, and means for controlling the operation of said receptacles and floats including piping means connecting the bottom of each receptacle, and adjustable means for controlling the passage of a fluid therethrough.

6. In a device of the kind described and in combination, a driven shaft, actuating mechanism therefor, including a pair of solenoidal magnets operatively connected therewith, and means actuated thereby for alternately and periodically controlling said magnets, comprising a pair of intercommunicating fluid receptacles, each provided with a float arranged therein, means coöperating with said actuating mechanism for alternately elevating said receptacles, and adjustable means for controlling the passage of fluid from one receptacle to the other.

7. In a device of the kind described and in combination, a rotatable shaft, actuating mechanism therefor comprising a tubular member arranged on said shaft provided with arms extending transversely the shaft on opposite sides thereof, means for operatively connecting said tubular sleeve with the shaft, a magnet arranged on each side of said shaft, and operatively connected with an adjacent arm, a fluid receptacle arranged on each side and carried by an adjacent arm, a float arranged in each receptacle, piping means connecting the bottom of each receptacle, means arranged in said piping means for controlling the passage of fluid thereto, a plurality of electrical conductors, and a source of energy, said conductors connected with said magnets and including contacts on said receptacles, and means carried by said floats for closing a circuit by the float in the lower receptacle when the fluid contained in the receptacles has passed from the higher receptacle to the lower.

8. In a device of the kind described and in combination, a rotatable shaft, actuating mechanism therefor comprising a tubular sleeve arranged on said shaft provided with arms extending transversely the shaft on opposite sides thereof, means for operatively connecting said tubular sleeve with the shaft, a suitable magnet arranged on each side of said shaft and each operatively connected with one of said arms, a fluid receptacle arranged on each side and each carried by one of said arms, a float arranged in each receptacle, piping means connecting the receptacles, means for controlling the passage of fluid through said piping means, a plurality of electrical conductors, and a source of energy, said conductors suitably connected with said magnets, and means for closing a circuit in the lower receptacle when the fluid contained in the receptacles has passed from the higher receptacle to the lower, including circuit breakers carried by said receptacles, coöperating with said floats.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

RICHARD S. JACOBSEN.

Witnesses:
ROY W. HILL,
CHARLES I. COBB.

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