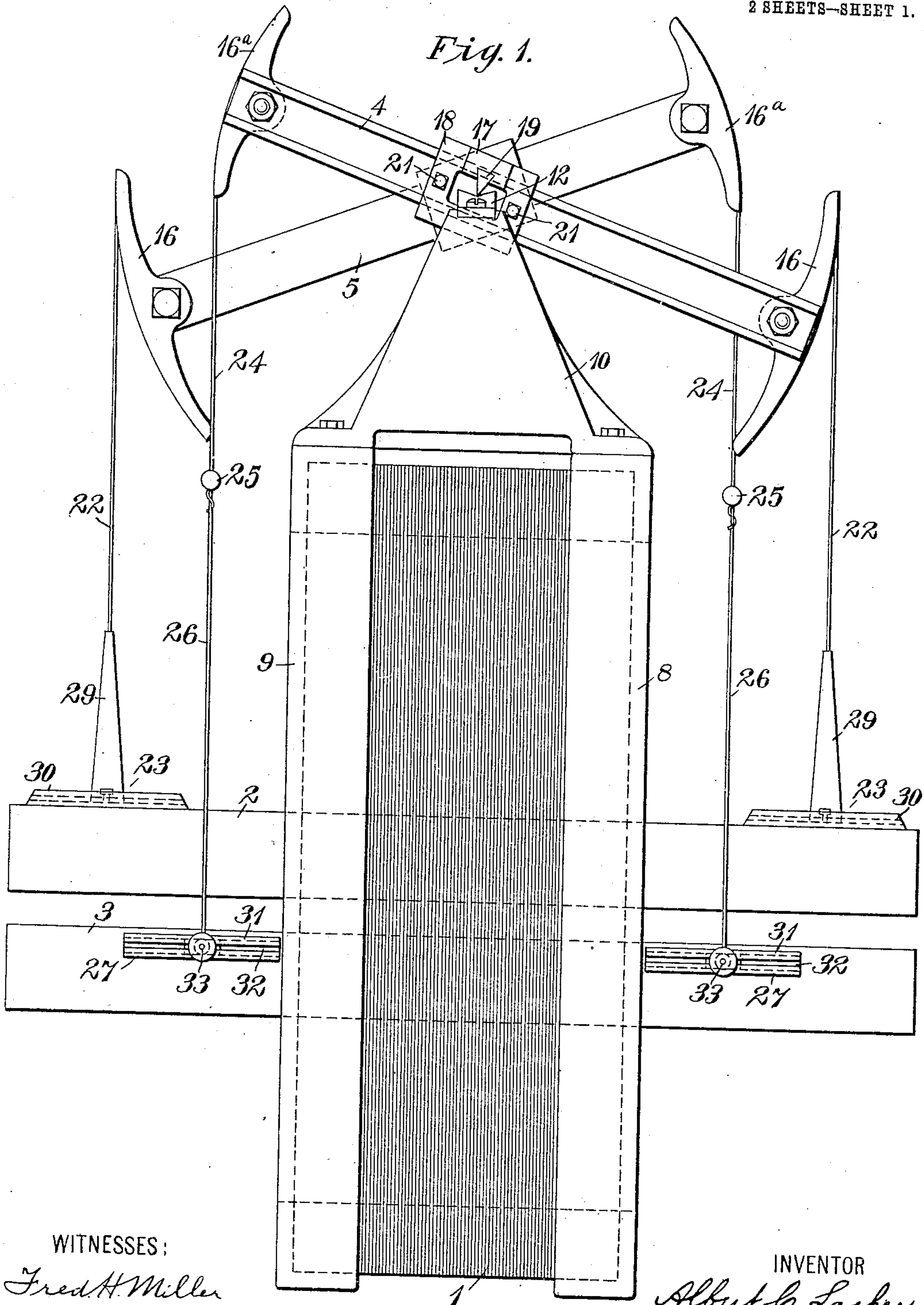


A. C. LASHER.
 ALTERNATING CURRENT TRANSFORMER REGULATOR.
 APPLICATION FILED NOV. 26, 1908.

933,767.

Patented Sept. 14, 1909.
 2 SHEETS—SHEET 1.



WITNESSES:
Fred H. Miller
R. J. Dearborn

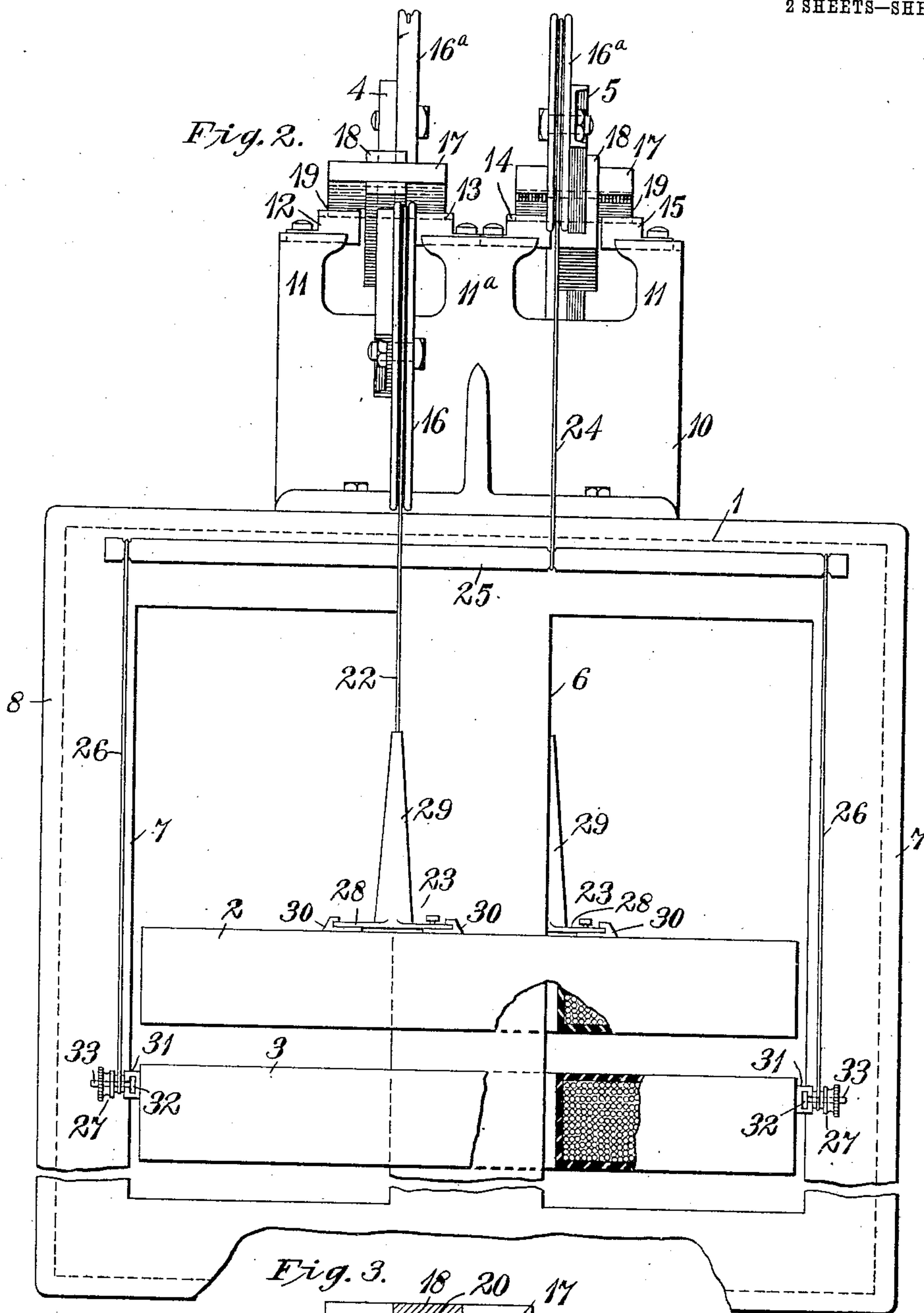
INVENTOR
Albert C. Lasher
 BY
Wesley E. Carr
 ATTORNEY

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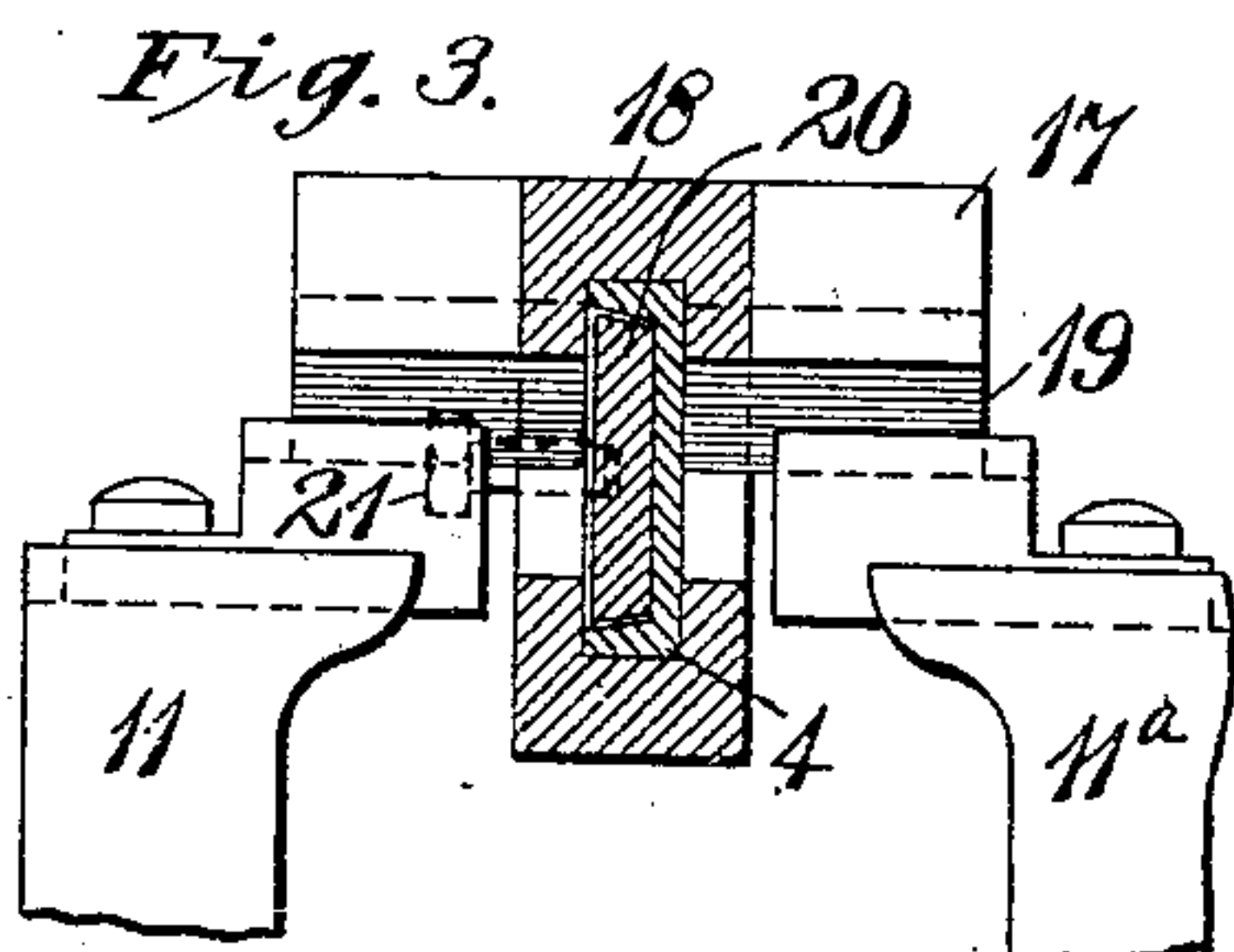
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ATTORNEY

UNITED STATES PATENT OFFICE.

ALBERT C. LASHER, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE
ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

ALTERNATING-CURRENT-TRANSFORMER REGULATOR.

933,767.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed November 26, 1906. Serial No. 345,202.

To all whom it may concern:

Be it known that I, ALBERT C. LASHER, a citizen of the United States, and a resident of Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Alternating-Current-Transformer Regulators, of which the following is a specification.

My invention relates to transformer regulators and has special reference to devices of the aforesaid class that are adapted to maintain a substantially constant current in the circuit in which they are connected.

The object of my invention is to provide a simple and durable transformer regulator in which the weights of the movable coils shall be solely utilized for providing the necessary mechanical force of attraction in opposition to the electro-magnetic repelling forces exerted between the coils.

A constant current regulating transformer, such as is generally employed in an arc light circuit or in similar relations, comprises a stationary core member having relatively movable coils at least one of which is movable along the core member. A well-known form of regulator of this class comprises two coils having their weights substantially balanced by being suspended from rocking beams which are pivotally mounted on the core structure. With this form of regulator, a counter-weight, usually varying from twenty-five to fifty pounds in devices of ordinary size, is required to oppose the electro-magnetic repelling forces exerted between the coils when they are energized by electric current.

The arrangement of my present invention is such that the counter-weight becomes unnecessary and any desirable mechanical force of attraction between the two coils may be effected by a suitable adjustment.

Figure 1 of the accompanying drawing is a front elevation, Fig. 2 is a side elevation, and Fig. 3 is a detail view, in section, of a transformer regulator constructed in accordance with my invention.

Referring to the aforesaid drawings, the regulator illustrated therein comprises a laminated core structure 1 and movable coils 2 and 3 which are suspended from rocking beams 4 and 5. The core structure is of the shell type and comprises a centrally located vertical body portion 6 which is surrounded by the coils 2 and 3 and a substantially rec-

tangular portion 7 which provides a return circuit for the magnetic flux. The laminated structure is supported in the usual manner by end frames 8 and 9 which, in this instance, also serve to support an upper bearing bracket 10. The bearing bracket 10 has two end projections 11 and an intermediate projection 11^a between which the rocking beams 4 and 5 may operate. Bearing blocks 12, 13, 14, and 15, preferably constructed of some relatively hard material, such as tool steel, and having upper surfaces of approximately V-shape, are supported upon the tops of the bearing bracket projections.

The rocking beams 4 and 5, here shown as of channel iron form, have end shoes or enlargements 16 and 16^a, the outer surfaces of which have substantially cylindrical curvature. Bearing members 17 are adjustably attached to the rocking beams between the end shoes, the arrangement of parts being such that the bearing portions of these members are adapted to engage the V-shaped surfaces of the bearing blocks, thereby forming a pivotal mounting of minimum friction for the rocking beams. Each of the adjustable bearing members 17 consists of a box-like body 18 which is fitted over the corresponding channel beam, knife edge lateral projections 19, a wedge block 20 and set-screws 21 for forcing the wedge block into the channel of the beam.

The coils 2 and 3 are so suspended by flexible cords or straps from opposite ends of the two rocking beams and from the uppermost points of the shoes that their weights are substantially balanced and the cords are always maintained in vertical lines. One pair of suspending cords 22 are attached to the upper coil 2 by clamps 23 and another pair of similar cords 24 are severally attached to spreading rods 25, which, in turn, are connected to the lower coil 3 by means of cords 26 and clamps 27 that project laterally from the coil. When the coils are mounted in the aforesaid manner, their positions may be varied relative to each other and to the core member. Each of the clamps 23 comprises a plate 28 having a central projection 29 and guide strips 30 which may be fixed to the coil by any suitable means, (not shown). The suspending cords or straps are attached to the outer ends of the projections 29. The clamps 27 are disposed

substantially at the corners of a rectangle and consist of guide blocks 31 having key slots 32 in which the heads of clamping bolts 33 are adjustably mounted, these bolts being attached to the suspending cords 26. Electrical energy so traverses the coils, when the regulator is active, as to create a considerable repelling force between them, and by suitably adjusting the knife edge bearing members 17 along the rocking beams 4 and 5 in opposite directions, the weight of one of the coils may so overbalance the weight of the other as to produce a mechanical attraction between the two in opposition to the aforesaid electro-magnetic repelling force, since the weight of one of the coils produces forces substantially equal to those produced by the other coil, but at a greater distance from the fulcrum of the lever; *i. e.*, the point at which the rocking beams are supported. The suspending cords or straps may be caused to assume vertical lines after the points of support for the levers are determined by adjusting the clamping members 23 and 27, or the necessary adjustment may be otherwise effected, if desired.

I desire that variations in size and arrangements of details which do not depart from the spirit of my invention shall be included within its scope.

I claim as my invention:

1. In a transformer regulator, the combination with a core member, a supporting frame therefor and a pair of movable coils, of a pair of adjustably mounted rocking beams, cords for suspending the coils from the ends of the beams, and means for adjusting the connections between the cords and the coils.

2. In a transformer regulator, the combination with a stationary magnetizable core member and movable coils, of rocking beams pivotally and adjustably mounted at material distances from their centers and at opposite sides thereof, cords for suspending one of said coils from the shorter ends of said beams, cords for suspending the other coil from the longer ends thereof, and means for adjusting the connections between the cords and the coils.

3. In a transformer regulator, the combination with a core member, a supporting frame therefor, a pair of movable coils which surround a portion of the core member, of a pair of similar rocking beams pivotally and adjustably mounted at opposite sides of their central points, cords for connecting one of said coils to the shorter ends of the two beams, cords for connecting the other coil to the longer ends thereof, and

means for adjusting the connections between the cords and the coils in accordance with the rocking beam adjustments.

4. In a transformer regulator, the combination with a stationary magnetizable core member, a supporting frame therefor and a pair of movable coils surrounding a portion of the core member, of a bracket having bearing blocks, a pair of rocking beams, bearing members adjustably attached to the beams to engage the bearing blocks, suspending cords attached to the ends of the beams, and means for adjustably attaching the lower ends of the cords to the coils.

5. In a transformer regulator, the combination with a stationary magnetizable core member and movable coils, of rocking beams pivotally and adjustably mounted at material distances from their centers and at opposite sides thereof, cords for suspending one of said coils from the shorter arms of said beams, cords for suspending the other coil from the longer arms thereof, and means for adjusting the connections between said cords and said coils in accordance with the rocking beam adjustments.

6. In a transformer regulator, the combination with a vertical magnetizable core member, and a pair of movable coils surrounding a portion of said member, of a pair of similar rocking beams so pivotally mounted at the top of the stationary core member as to have arms of unequal length and provided with guide shoes having cylindrically curved outer surfaces, flexible cords or straps depending vertically from said shoes and adjustably connected to the coils to support the lower coil from the shorter arms of the two beams and the upper coil from the longer arms thereof.

7. In a transformer regulator, the combination with a vertical magnetizable core member, and a pair of movable coils surrounding a portion of said member, of a pair of similar rocking beams so pivotally mounted at the top of the core member as to have arms of unequal length and provided with guide shoes having cylindrically curved outer surfaces, flexible cords or straps suspended from the upper ends of said shoes and adjustably connected to the coils to support the lower coil from the shorter arms of the two beams and the upper coil from the longer arms thereof.

In testimony whereof, I have hereunto subscribed my name this 23rd day of November, 1906.

ALBERT C. LASHER.

Witnesses:

CHAS. B. GIBSON,
BIRNEY HINES.