June 24, 1930. A. H. FALK 1,768,240

LOADING COIL CASE

Filed Nov. 30, 1926 3 Sheets-Sheet 1

Fig. 1

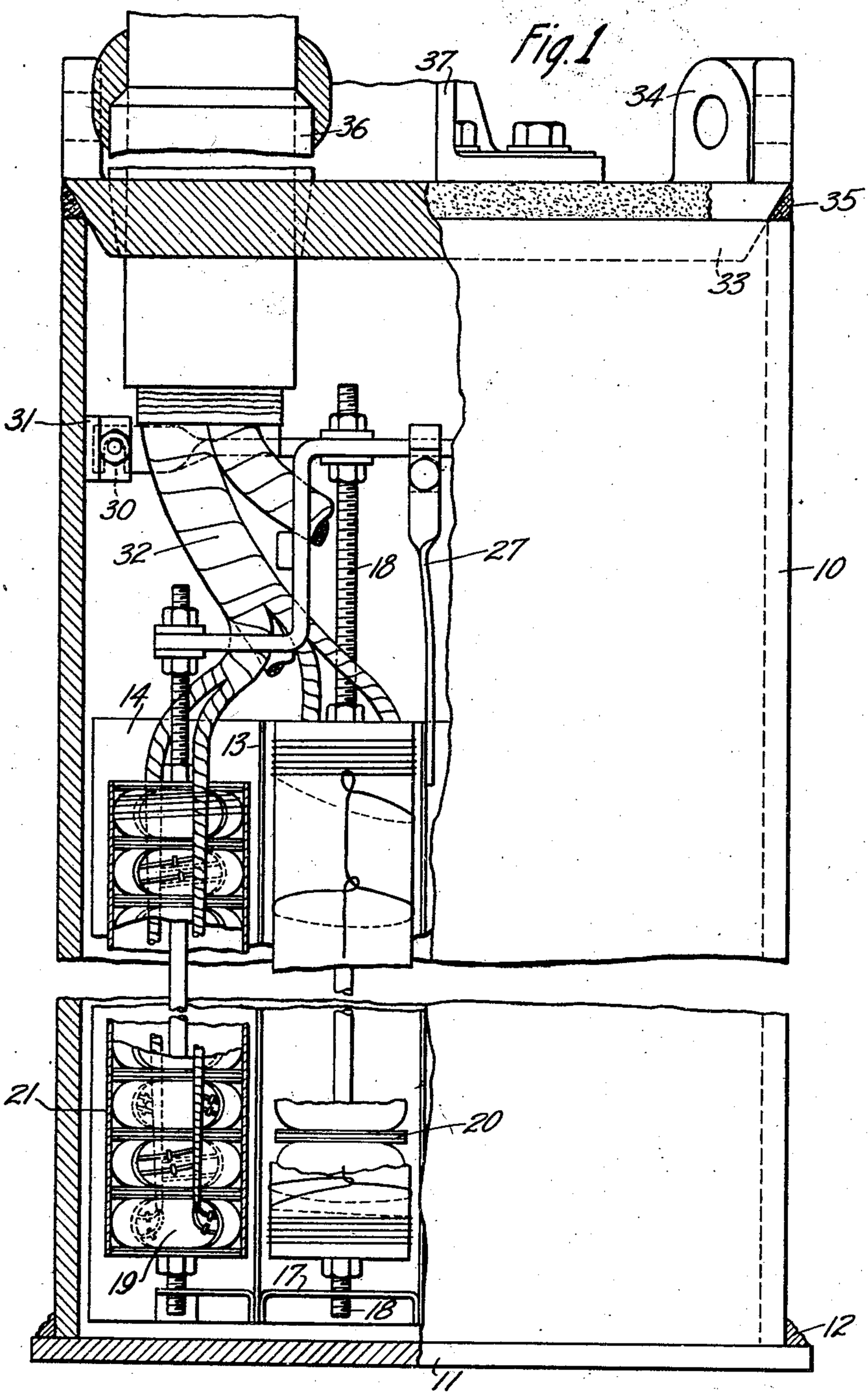

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Fig. 2

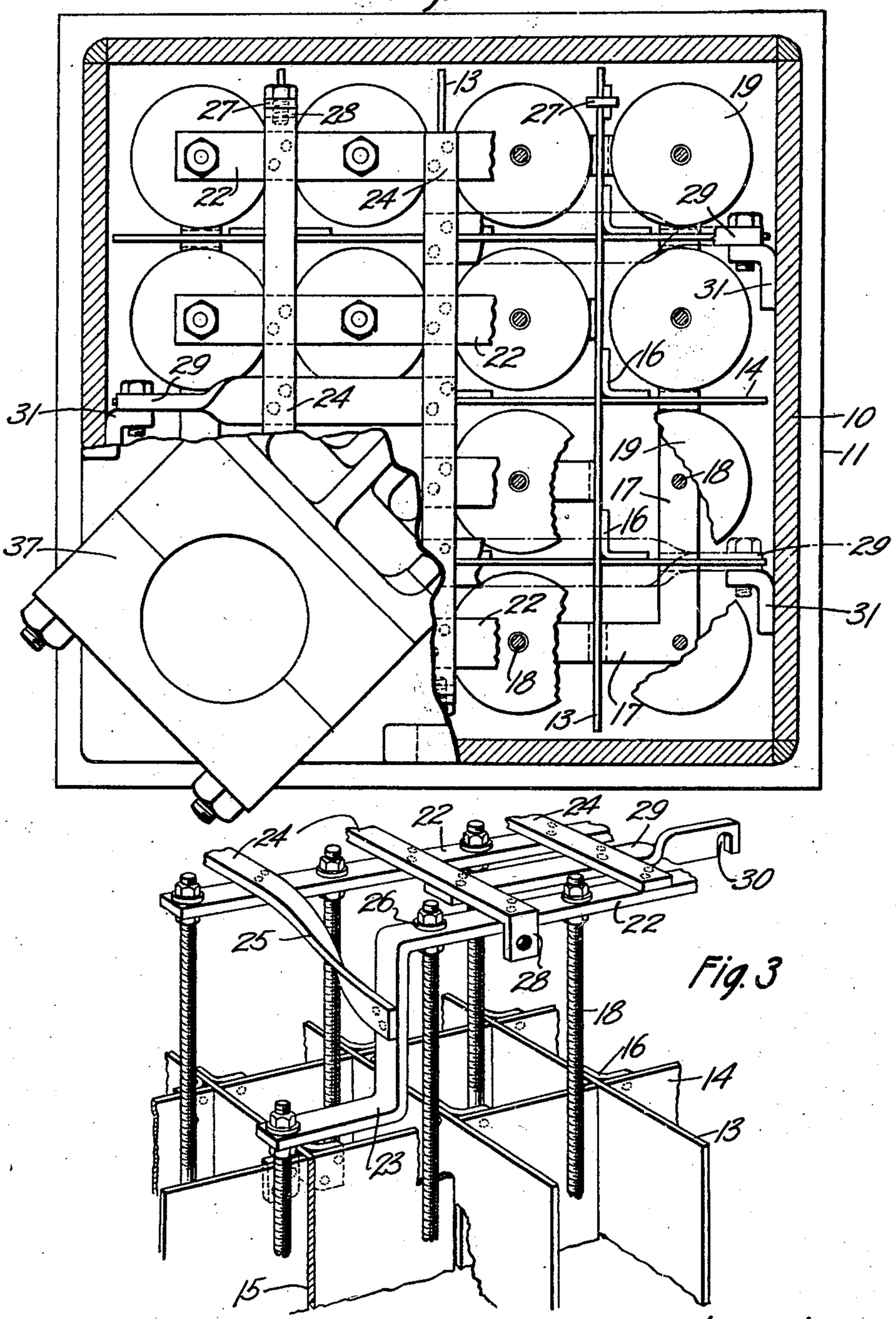

Fig. 3

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Fig. 4

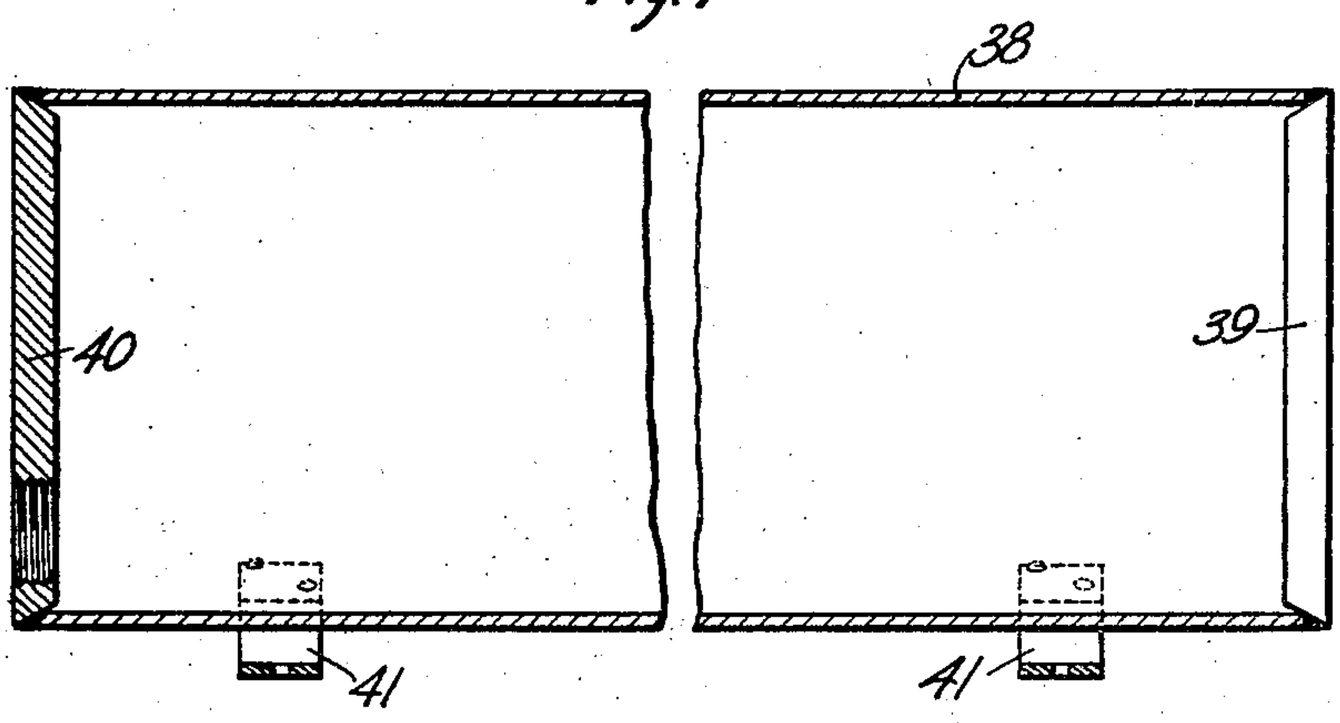
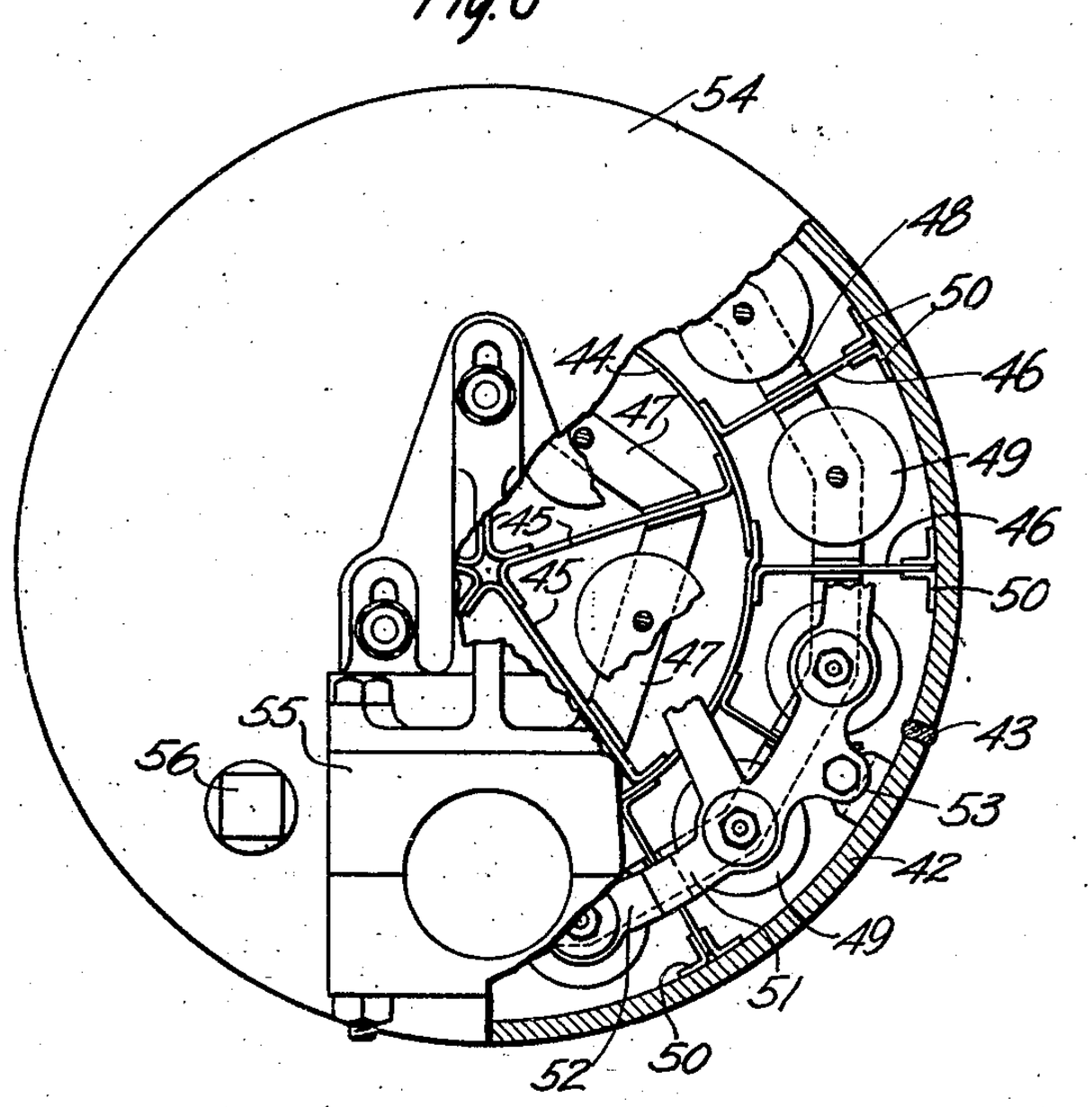


Fig. 5



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Patented June 24, 1930 1,768,240

UNITED STATES PATENT OFFICE

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LOADING-COIL CASE

Application filed November 30, 1926. Serial No. 151,641.

This invention relates to metallic casings and more particularly to casings for enclosing loading coils or other electrical apparatus.

In connection with electrical transmission systems, it is often necessary to locate portions of the apparatus in places where the space is more or less limited, and where they are subject to the harmful effects of the surrounding elements. In such locations it is essential to protect the electrical apparatus by protective casings. For example, loading coils are often located in manholes under city streets and therefore require careful protection. Heretofore, it has been customary to provide such protection by mounting the coils in cast-iron cases which are not only bulky, and therefore expensive, where space is at a premium, but are also subject to corrosion.

An object of the present invention is to overcome the disadvantages inherent in former casings by the use of fabricated sheet metal.

In accordance with one embodiment of the present invention a protective casing for loading coils consists of sheet metal members of various shapes held together by welded seams. Compartments for different groups of coils within the enclosing casing are formed of sheet metal partitions interlocked and welded together to form an egg-crate type of unitary structure. The coils are supported within the compartments by a lattice type sheet metal spider which is removably attached to the sheet metal partitions and the casing. The shape of the spider is such that it may be removed from the casing without disturbing the coils or the cables attached thereto.

Some of the advantages of the sheet metal type of casing over the cast iron cases are; greater resistance to electrolytic corrosion, greater imperviousness to moisture, smaller cross section and lighter weight per unit of potted coil, and materially reduced manufacturing cost due to the adaptability of the sheet metal to assemble in various sizes and shapes. Furthermore, the sheet metal closures compensate for irregularities in the shell wall, overcome the disadvantage of an overhanging flange, and hermetically seal the casing. The egg-crate type metallic partition provides greater shielding effect against cross talk and is inexpensive and simple to manufacture. The advantage of the lattice type spider is its removability from the casing without disturbing the cable connections or the coils in the casing.

A more detailed description of the invention follows and is illustrated in the accompanying drawings in which:

Fig. 1 illustrates a welded sheet metal loading coil case made in accordance with this invention, a portion being broken away to show details of construction;

Fig. 2 is a plan view of a casing with the cover cut away to clearly illustrate the interior assembly;

Fig. 3 is a partial perspective view showing the relative positions of the lattice type spider and the metallic partition;

Fig. 4 illustrates a modified form of casing; and

Fig. 5 is a plan view of a circular casing showing the assembly of parts in this type of casing.

Referring to Figures 1, 2 and 3 of the drawings, a square type of casing is shown, in which the walls are cut to the desired size from sheet metal, formed into a shell 10, having the walls fabricated by welding. A metallic base member 11 closes one end of the shell and is welded thereto as shown at 12, to form a receptacle for a plurality of coil columns. A metallic partition is inserted in the casing to form individual cells for the coil columns deposited in the casing. This metallic partition comprises a plurality of sheet-metal members 13 and 14 having a number of equally spaced vertical slots 15 preferably extending half the length of the mem-

bers. The partition members are arranged in sets so that one set of members 13 are at right angles to the other set of members 14, with the slots 15 of one set interlocked with slots of the bisecting members of the other set, to form an "egg crate" type of partition. The bisecting edges of the members may be arc-welded or an angle member 16 may be spot-welded to the angular surfaces of the partition. A sheet-metal bridge member 17, having downwardly extending ends is welded to the surfaces of parallel members, to form a support for the coil columns. A metallic spindle 18 carrying a plurality of coils 19 is supported in each cell formed by the "egg crate" type partition and is threaded to the bridge members 17. Arranged between adjacent coils are spacers 20, consisting of two fibre separators between which is interposed a metal separator, and the assembled coil unit may be surrounded by an insulating cover 21, such as tubing or insulating fabric. The "egg crate" type partition forms an efficient suport for the coil columns and prevents cross-talk between adjacent coil columns.

A supporting spider is arranged above the assembled coil columns and comprises a plurality of parallel sheet-metal strips 22, one of the strips having a downwardly extending angular extension 23. The parallel strips of the spider are maintained in their proper space relation by means of tie bars 24 which are spot-welded to the parallel members 22. An extension 25 on the tie bars 24, in alinement with the angular extension 23, is welded thereto. This arrangement forms a "lattice" type spider of rigid construction for supporting the spindles 18. The parallel members 22 are provided with drill holes in alinement with the spindles 18, and an insulating bushing 26, is inserted in the drill holes. The spindles 18 pass through the bushings 26 and are fastened to the spider by nuts. An upwardly extending arm 27, welded to the partition is connected to an angular extension 28, on the tie bar 24, by a threaded screw. A plurality of supporting extensions 29 are welded to the tie bars 24 adjacent the outer edge of the spider and a notch 30 is formed at its outer end. The notch 30 engages a threaded screw passing through an angular member 31 welded to the inner surface of the shell 10, to fasten the complete assembly in the casing. This arrangement forms an assembly unit which may be easily removed from the casing. A cable 32 entering the casing supplies the connections for the various groups of coils in the casing. The construction of the spider facilitates its removal from the casing without disturbing the connections to the coils and provides an efficient arrangement for positioning the coil assembly in the protective casing.

The metallic closure for the casing comprises a tapered member 33, which may be of cast metal having lugs 34 for supporting the casing. The tapered edge of the closure member 33 presses against the edge of the casing and compensates for any irregularities in the shell wall. The casing is hermetically sealed by welding as shown at 35. The cable passing through the closure member 33 is sealed at 36 to prevent air or moisture entering the casing and a mounting 37 attached to the closure member surrounds the cable seal to prevent damage thereto. The protective casing according to this invention greatly resists corrosion due to the use of sheet metal which is of uniform thickness instead of cast metal likely to contain blow holes or slag inclusions, and the tapered closure member facilitates assembly due to its construction and overcomes the disadvantage of an overhanging flange present in former cases.

A modified form of casing is shown in Fig. 4 in which the metallic shell 38 is provided with tapered closure members 39 and 40 which are welded to the shell openings in a manner similar to the casing shown in Fig. 1. The casing may be supported either in a vertical or a horizontal position by means of angular mounting members 41 welded to the outer surface of the shell.

In Fig. 5 is shown the assembly of a group of coil columns in a cylindrical casing. The shell 42 may be formed of sheet metal rolled into a cylinder and the adjacent edges are welded at 43. The metallic partition for the separation of the coils comprises, a cylindrical member 44 having a plurality of sheet-metal members 45 welded to the inner surface thereof. The members 45 converge at the axis of the cylindrical member 44 and are welded together to form compartments for the coil columns. A plurality of radial members 46 also of sheet metal are welded to the cylindrical member 44 on the outer surface, to form additional cells for the coil columns. A bridge member 47 is welded to the adjacent surfaces of the members 45 and a bridge member 48 is welded to the adjacent surfaces of the members 46, to form the lower supports for the coil columns 49. The metallic partition is prevented from shifting in the cylindrical casing by angular guides 50 welded to the inner surface of the shell 42. These guides are spaced at equal distances around the shell and receive the radial partitions 46. A cast spider 51 supports the upper ends of the coil columns and is provided with a downwardly extending extension 52, adjacent the cable entrance. The spider is attached to the casing by a supporting lug 53 welded to the casing. A tapered cover 54 closes the cylindrical casing and carries a cable mounting 55, for the protection of the cable seal. A cap screw 56 in the cover 54 is provided for filling the casing with an insulating compound.

While the detail description relates to a protective casing for loading coils, the invention is not limited to this specific use but is adaptable to a wide range of uses as a hermetically sealed metallic casing.

What is claimed is:

1. In a protective casing for electrical apparatus, means for electrically shielding certain parts of said electrical apparatus from the other parts thereof, said means comprising a metallic partition comprising at least two members at right angles to each other, said members having interlocking slots in opposed relation, and reinforcing means welded to said members.

2. In a protective casing for electrical apparatus, means for electrically shielding certain parts of said electrical apparatus from the other parts thereof, said means comprising a metallic partition comprising metallic members interlocked at right angles to each other, and a supporting bracket having angular extensions welded to two of said members.

3. In a protective casing for electrical apparatus, means for electrically shielding certain parts of said electrical apparatus from the other parts thereof, said means comprising a partition comprising sheet metal members welded together to form cells, bridge members on the ends of each cell, and a coil column supported in each cell and attached to said bridge members.

4. In a protective casing for electrical apparatus, means for electrically shielding certain parts of said electrical apparatus from the other parts thereof, said means comprising a partition comprising a set of parallel sheet metal members, a second set of parallel members arranged at right angles to said first set, each of said members having parallel slots extending from the edges of said members, said sets of members being interlocked with the edges of one set in the same plane as the edges of the other set, angular reinforcing means connecting the bisecting surfaces of said members, and a metallic closure member for said casing, said member having a tapered edge extending inside of and in contact with the edge of said casing.

5. The combination of a protective casing containing a plurality of coil columns with a plurality of parallel supporting members connected to said columns and casing, and connecting cross members welded to said supporting members.

6. In a protective casing containing a plurality of coil columns, a supporting spider for said coil columns comprising a pair of parallel members, an adjacent parallel member having an angular end in a plane lower than said members, tie bars welded to said members to maintain their space relation, and a link member extending from one of said members, and welded to said angular end.

7. The combination of a protective casing containing a plurality of coil columns, with a metallic partition separating said coil columns into individual cells, cable connections for said coil columns, and a lattice type spider attached to said coil columns and casing whereby said spider is removable without disturbing said cable connections.

In witness whereof, I hereunto subscribe my name this 24th day of November, A. D. 1926.

ARTHUR H. FALK.