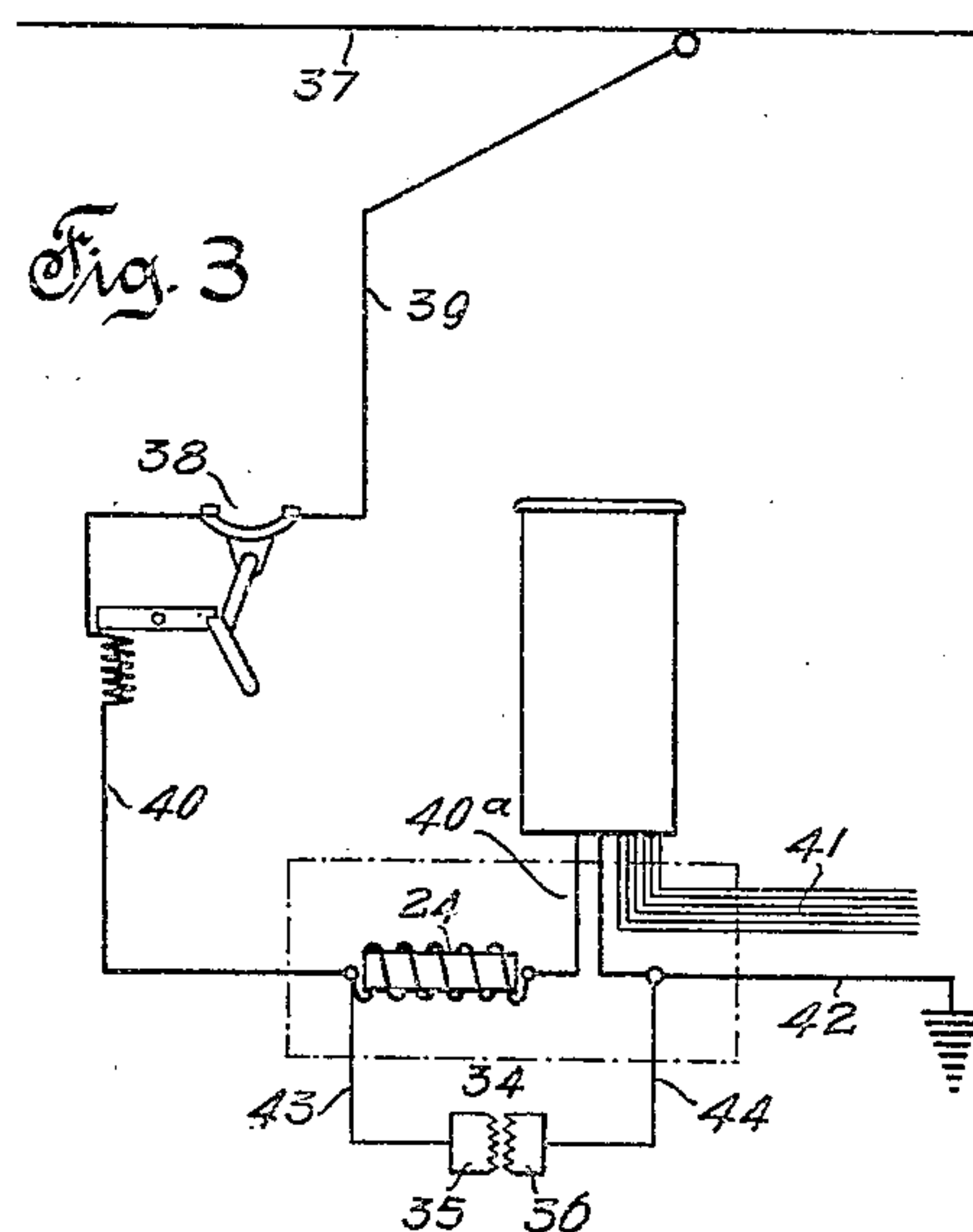
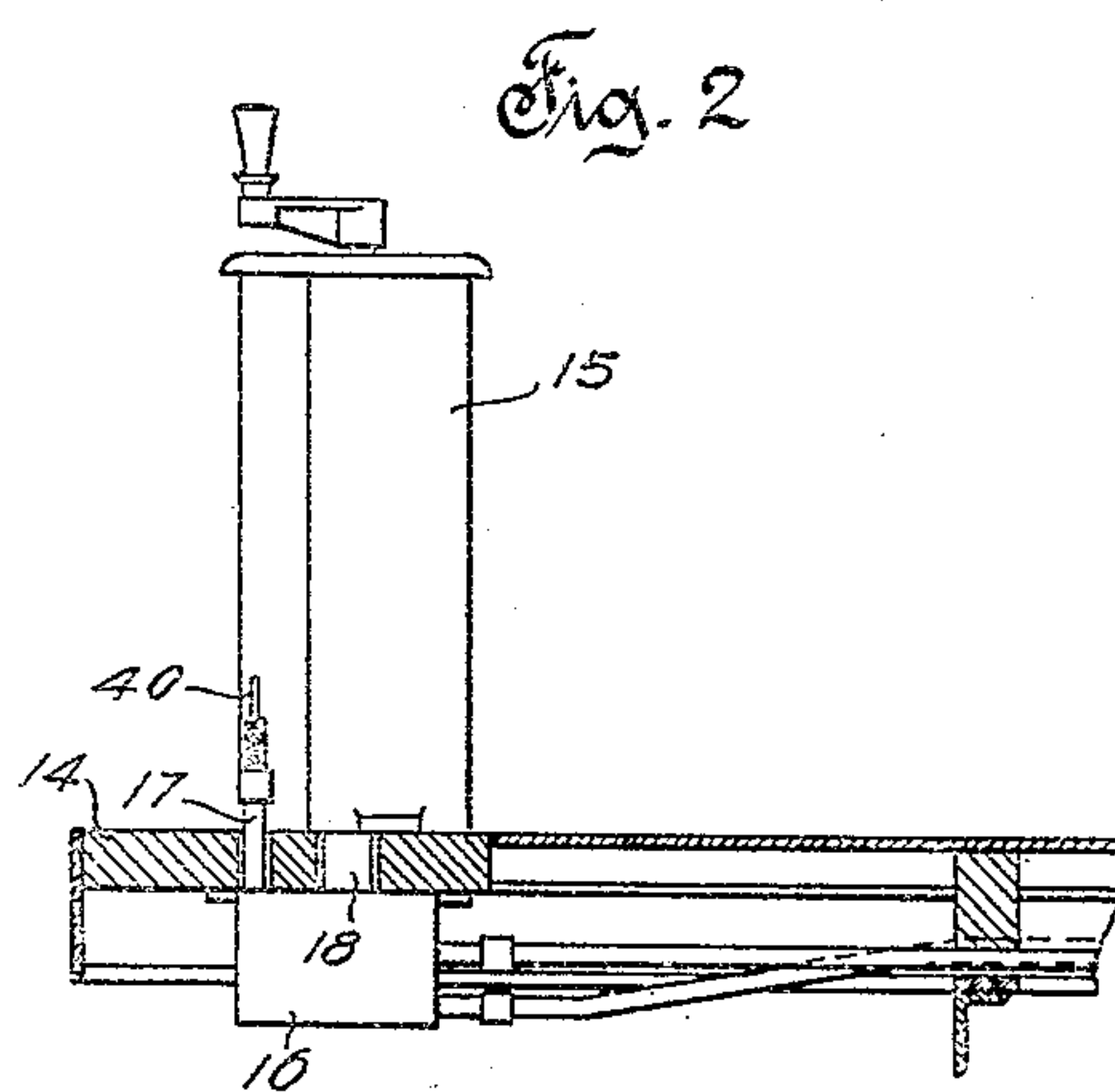
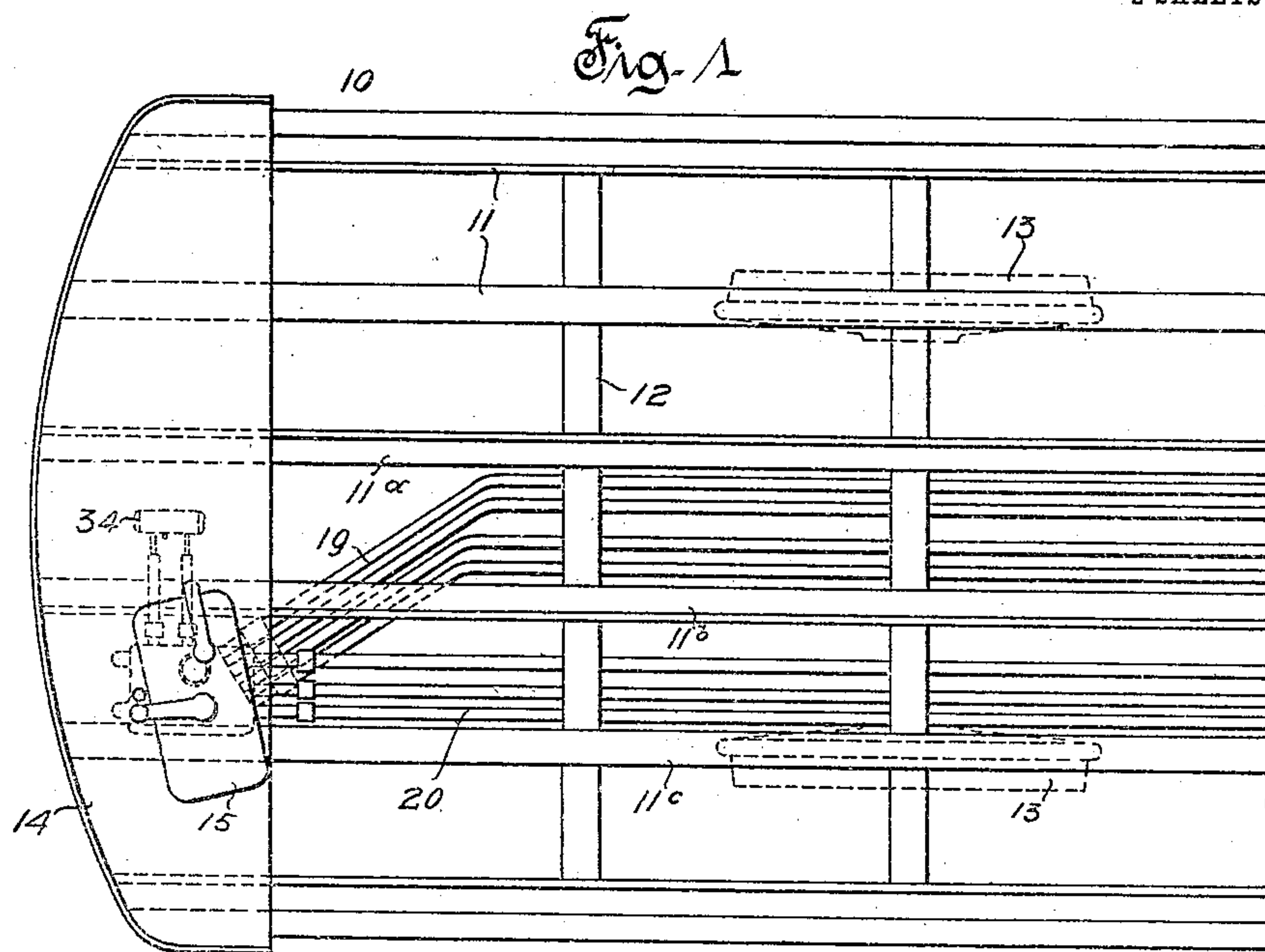


931,521.

2 SHEETS—SHEET 1.



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E. W. STULL.
OUTLET BOX CONSTRUCTION.
APPLICATION FILED APR. 15, 1909.

931,521.

Patented Aug. 17, 1909.
2 SHEETS—SHEET 2.

Fig. 4

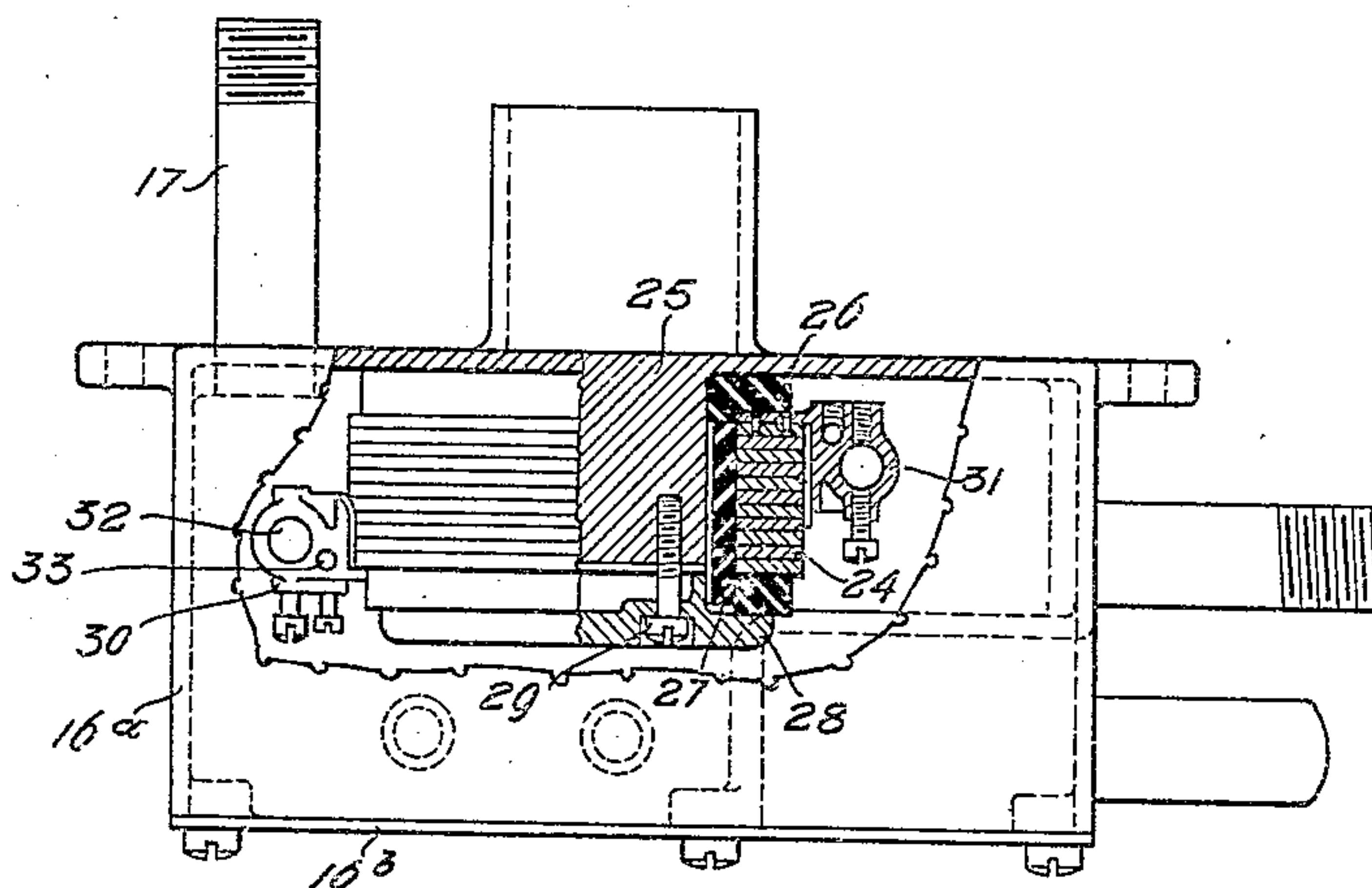
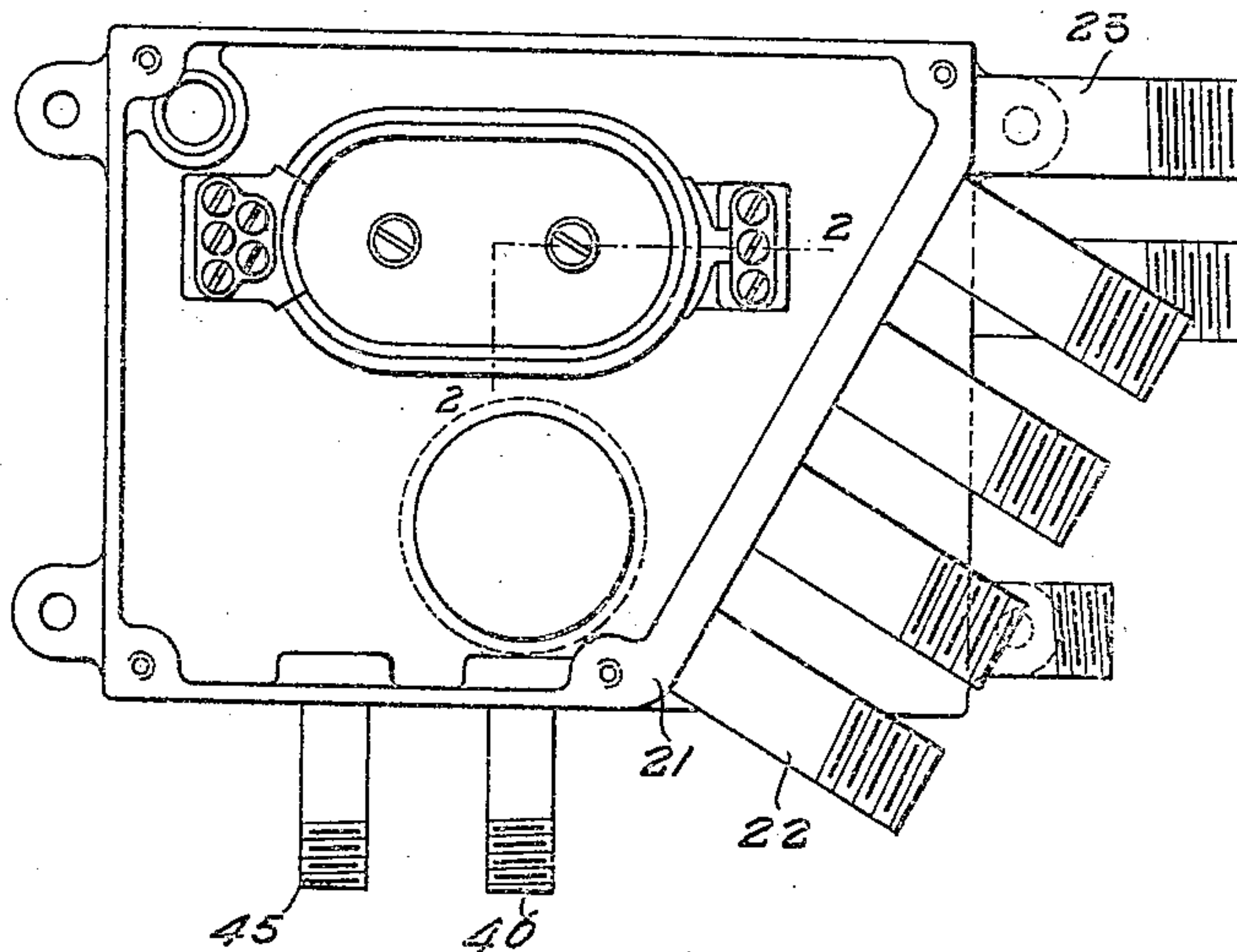


Fig. 5



Witnesses
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UNITED STATES PATENT OFFICE.

EMMETT W. STULL, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO ALLIS-CHALMERS COMPANY,
A CORPORATION OF NEW JERSEY.

OUTLET-BOX CONSTRUCTION.

No. 931,521.

Specification of Letters Patent.

Patented Aug. 17, 1909.

Application filed April 15, 1909. Serial No. 489,986.

To all whom it may concern:

Be it known that I, EMMETT W. STULL, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Outlet-Box Constructions, of which the following is a full, clear, and exact specification.

The present invention relates to improvements in electric railway car equipments and particularly to the arrangement and construction of parts of the apparatus, including the outlet box for the controller leads and the lightning arrester, which are usually provided on the lower side of the car.

One of the objects of the invention is to provide a more compact and simplified construction and arrangement of the apparatus so that part of the electrical connections or conductors can be materially shortened and others done away with entirely.

A further object is to so arrange and connect certain parts of the apparatus that the separate casing or box for the "choking coil" or inductive resistance employed in connection with the lightning arrester and separate junction boxes for the connections of the lightning arrester or of the choking coil, can be eliminated.

My invention may be briefly summarized as consisting in certain novel details of construction and combinations and arrangements of parts which will be described in the specification and set forth in the appended claims.

Reference is had to the accompanying sheets of drawings in which—

Figure 1 is a plan view of part of the bottom or floor structure of an electric railway car showing the controller and some of the other parts of the equipment. Fig. 2 is a longitudinal sectional view of the forward end of the same; Fig. 3 is a diagrammatic view showing part of the electrical connections and certain parts of the car apparatus; Fig. 4 is a side elevation of the box or casing for the controller leads and for the choking coil, parts being broken away and parts being in section to show the construction more clearly; and Fig. 5 is a bottom view of the same with the bottom plate of the box removed.

Referring now to the figures of the drawing, 10 represents part of the lower or bottom structure of the car, said structure as

here shown consisting of longitudinal sills or beams 11 and cross sills 12 which will be supported by means of the usual bolsters (not shown) on suitable trucks, two of the wheels of one of which are shown by dotted lines at 13. Supported at the forward part of the car structure upon a heavy piece of floor timber 14 is a controller 15 which is shown in Fig. 1 in its usual position at one side of the center of the car. Secured to the lower side of the timber directly below the controller 15 is a box or casing 16 which for convenience I shall call the outlet box for controller leads but which, in this case, as will be explained presently, contains and protects other parts and serves other purposes than merely to protect the controller leads. This box, which consists of a main or body portion 16^a and a bottom plate 16^b, is provided at the top with a nipple 17 which extends upwardly through the timber 14 in front of the controller 15 and through which the high voltage conductor from the trolley or from the circuit breaker is brought into the box, and is also provided at the top with a tubular projection or flange 18 which extends through the timber 14 directly below the controller and through which all the conductors extending to and from the controller are adapted to pass.

Referring again to Fig. 1 it is seen that between the central floor sills 11^a and 11^b are a number of conduits 19, in this case four in number, which extend longitudinally of the car and near the forward end of the latter are bent or inclined toward the box 16, and between the sills 11^b and 11^c are a number of conduits 20 which are straight throughout their length and which extend from the box 16 lengthwise of the sills. The casing 16 is provided at one side with an inclined portion 21 and this portion is provided with four nipples 22 which are inclined with respect to the length or axis of the car and are connected to the four conduits 19. Extending from the same side of the box 16 in the direction of the axis of the car are three nipples 23 which are connected to the three conduits 20 which, as before stated, extend lengthwise of the car between the sills 11^b and 11^c. It may be here stated that the conduits 19 are adapted to carry the conductors which connect the controller to the fields and armatures of an equipment of four motors, which for the

sake of clearness, are not shown, and two of the conduits 20 are adapted to carry the conductors which extend from the controller to the resistance grids, likewise not shown, and the third conduit 20 is adapted to carry the ground conductor which will have special reference presently. All these conductors will extend from the controller through the tubular flange 18, and through the proper nipples 22 or 23 and conduits 19 or 20.

It is customary to include with the car equipment a lightning arrester including two normally separated members, one connected to the current supplying or high tension conductor extending from the circuit-breaker or the trolley to the controller and the other to the ground conductor, and including an inductive resistance including a choking coil which causes the heavy current due to a discharge of lightning to jump the gap between separated members of the lightning arrester and thus to be carried directly to the ground instead of passing through the controller and motors. Instead of placing the choking coil in a separate casing at a distance from the outlet box 16, and instead of employing a separate junction box where the choking coil is connected to the ground conductor, I arrange the choking coil, which is here shown at 24, directly in the outlet box 16, and in so doing am able to do away with considerable apparatus and long electrical connections. As here shown the coil 24 is formed of edgewise wound strap copper which surrounds a core 25 which is integral with the top of the box and extends downwardly therefrom. The coil 24 is separated from the top of the box and from the core 25 by insulation 26 and 27 respectively and is held in position by a clamp 28 secured by screws 29 to the lower end of the core. This coil 24 is provided at its ends with terminals 30 and 31 each of which is provided with a large socket 32, and the terminal 30 with a smaller socket 33 by which the connections to be explained presently, are adapted to be made. The lightning arrester which is shown at 34 is located below the timber 14 at one side of the outlet box 16 (see Fig. 1), and this arrester, as is usually the case, consists of two separated parts 35 and 36 (see Fig. 3), one of which, as will be explained, is connected to the conductor extending from the circuit-breaker to the controller or to one terminal of the choking coil, and the other to ground.

Reference is had to the diagrammatic view of Fig. 3 wherein 37 represents the trolley wire, 38 the circuit-breaker, which is usually provided in the car, 39 the conductor connecting the trolley wheel to the circuit-breaker, 40 the conductor connecting the circuit-breaker to the controller, 41 the several conductors extending from the controller to the motors and resistance elements, and

which will be carried by the conduits 19 and two of the conduits 20, and 42 the ground wire of the controller or the last conductor which leaves the controller, and which is usually grounded on the motor frames. The conductor 40 extends down into the box 16 through the nipple 17 and is connected to the terminal 30 at one end of the choking coil, and a continuation 40^a of the conductor 40 is connected to terminal 31 of the choking coil and extends through the tubular flange 18 into the controller. The high tension side 35 of the lightning arrester is connected by conductor 43 to the terminal 30 of the choking coil and the low tension side 36 of the arrester is connected by conductor 44 to the ground conductor 42, the connection to this ground conductor being made in the box 16 so that the junction box which is usually provided at this point is not necessary. The conductors 42 and 43 pass into and from the box through a pair of nipples 45 and 46 which are provided on the side toward the lightning arrester 34.

I do not desire to be confined to the exact details shown, but aim in my claims to cover all modifications which do not depart from the spirit and scope of my invention.

What I claim as new is:

1. In combination, in an electric railway car, a controller, controller leads extending from the controller, an outlet box for said leads located below the controller, a lightning arrester having high and low tension connections, and a choking coil between the controller and the high tension connection of the lightning arrester, said choking coil being located in said outlet box.

2. In an electric railway car, a controller, controller leads extending through the lower part of the controller, an outlet box for said leads located below the controller, a lightning arrester having high and low tension connections, a choking coil between the controller and the high tension connection, and a core for said coil integral with one of the walls of the outlet box.

3. In combination, a controller, conductors extending to and from said controller including a high tension conductor, and a grounded or low tension conductor, an outlet box for said conductors, said box being located below the controller, a lightning arrester having high and low tension sides connected in the box to the high and low tension conductors respectively, and an inductive resistance comprising a coil located in the box and connected between the controller and the connection of the high tension side of the lightning arrester.

4. In combination, in an electric railway car, a controller, conductors extending through the lower part of the controller including a current supplying conductor and a low voltage or grounded conductor, an

outlet box for said conductors, said box
being located below the controller, a plu-
rality of conductor-inclosing conduits ex-
tending along the car and connected to said
5 outlet box, a lightning arrester exterior to
said outlet box and having high and low
tension sides connected within the box to the
current supplying conductor and to the
grounded conductor respectively, and an in-
10 ductive resistance within the box and com-
prising a coil connected between the con-
troller and the connection of the high vol-
tage side of the lightning arrester.
5. In combination, in an electric railway
15 car, a controller, controller leads, an outlet
box for said leads, said box having at the
top tubular projections, a current supplying
or high tension conductor passing into the
box through one of said tubular projections
20 and all the controller leads including a low
tension conductor passing through the other
tubular projection, a plurality of tubular
projections at one side of the box, conduits
for leads or conductors connected to said

last named tubular projections, a lightning 25
arrester exterior to the box and having high
and low tension conductors extending
through the box and connected to the high
and low tension conductors within the box,
and an inductive resistance within the box 30
comprising a coil intermediate the controller
and the high tension connection of the
lightning arrester.

6. In combination, in an electric railway
car, a controller, controller leads, a lightning 35
arrester including a choke coil, a casing in-
closing said choke coil and a portion of the
controller leads, and serving as an outlet box
for the latter, said choke coil having a core
integral with the casing, and means for 40
clamping the coil in position on the core.

In testimony whereof I affix my signature,
in the presence of two witnesses.

Milwaukee, Wis., April 1, 1909.

EMMETT W. STULL.

Witnesses:

H. C. CASE,

CHAS. L. BYRON.