

March 13, 1934.

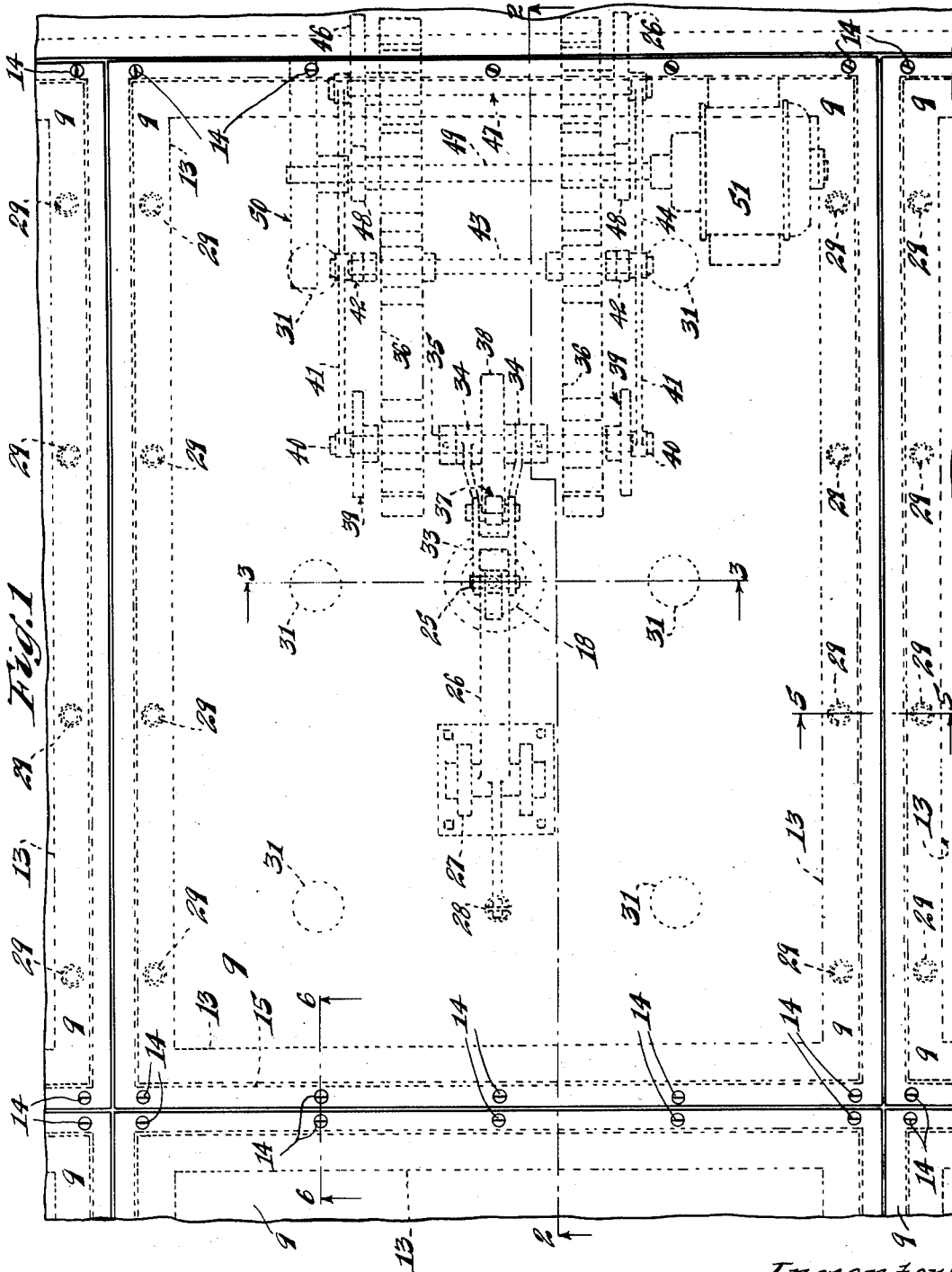
R. J. MULVEY

1,950,993

ROADWAY POWER GENERATOR

Filed March 18, 1932

3 Sheets-Sheet 1



Witnesses:
C. E. Wessels
F. C. Appleton

Inventor:
Robert J. Mulvey,
By Joshua R. H. Foltz,
his Attorney.

March 13, 1934.

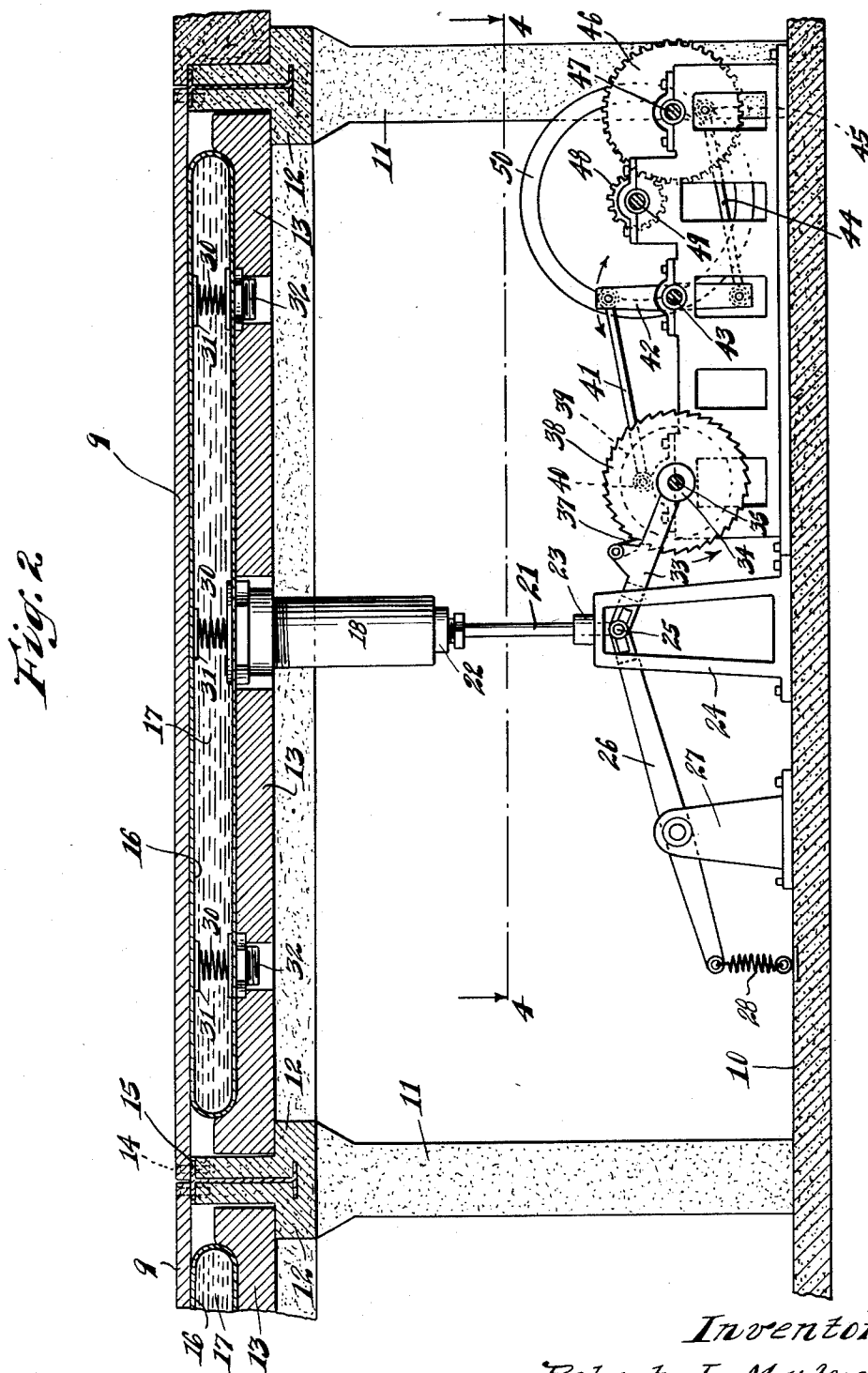
R. J. MULVEY

1,950,993

ROADWAY POWER GENERATOR

Filed March 18, 1932

3 Sheets-Sheet 2



Witnesses:
C. E. Wessels
J. C. Appleton

Inventor:
Robert J. Mulvey,
By Joshua A. H. Coffe.
his Attorney.

March 13, 1934.

R. J. MULVEY

1,950,993

ROADWAY POWER GENERATOR

Filed March 18, 1932

3 Sheets-Sheet 3

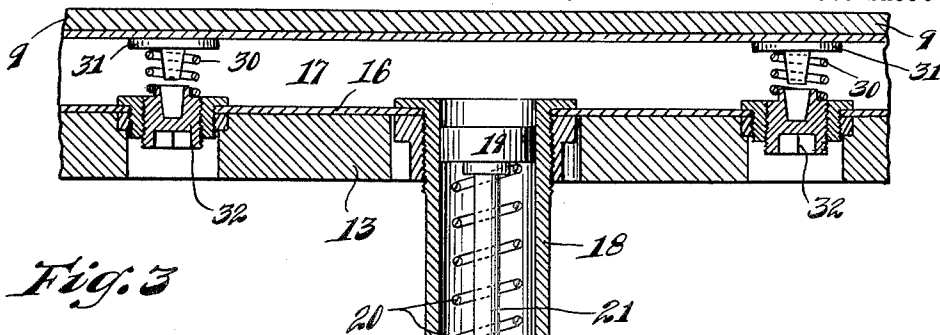


Fig. 3

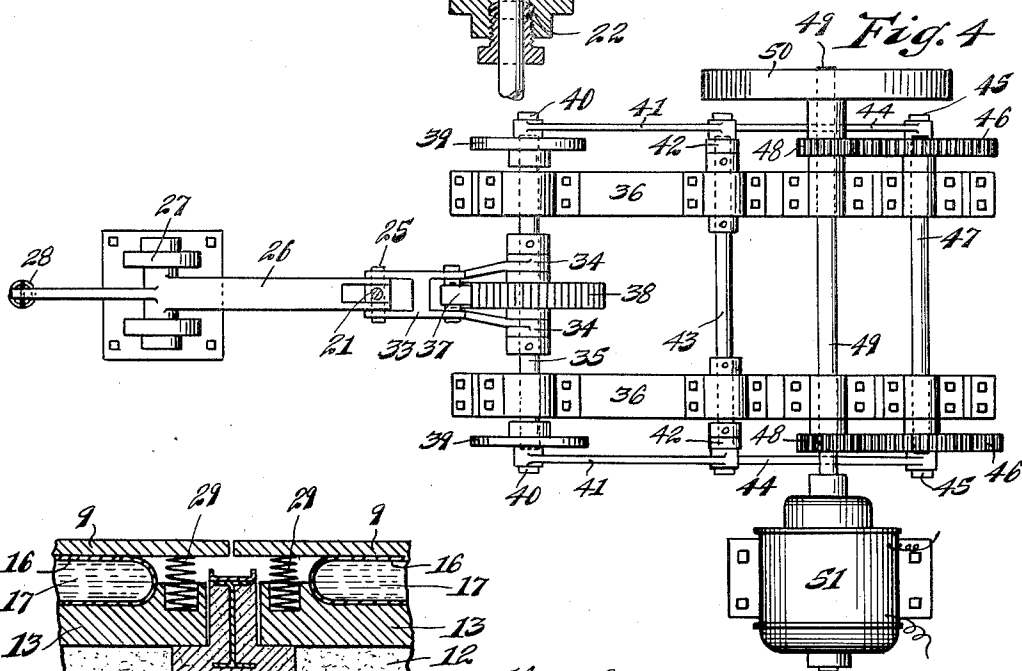


Fig. 4

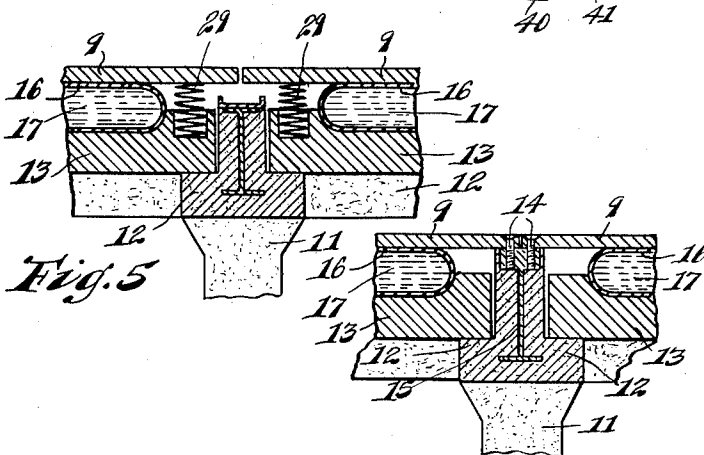


Fig. 5

Fig. 6

Witnesses:
C. E. Wessels
F. C. Appleton

Inventor:
Robert J. Mulvey,
By Joshua R. H. Co. Ws.
his Attorney.

UNITED STATES PATENT OFFICE

1,950,993

ROADWAY POWER GENERATOR

Robert J. Mulvey, Chicago, Ill.

Application March 18, 1932, Serial No. 599,724

4 Claims. (Cl. 60—54.5)

This invention relates to a roadway power generator, and an object of the invention is the provision of mechanism to be interposed upon and beneath the surface of a roadway for contact by passing vehicles, and to utilize the weight of the vehicles for the generation of power. A more particular object is the provision of improved means in the form of a depressible plate mounted flush with a roadway surface and adapted to be depressed by a passing vehicle, and connected mechanism for employing the force of the depressed plate to generate power for driving an electric generator or for other purposes.

Other objects will appear hereinafter.

The invention consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings, forming a part of this specification, and in which:

Fig. 1 is a plan view of a preferred embodiment of the invention, showing a single depressible plate in operative position with portions of such adjacent or adjoining plates as it may be desired to employ;

Fig. 2 is a vertical sectional view, taken substantially on the line 2—2 of Fig. 1;

Fig. 3 is a vertical sectional view showing the power cylinder and piston in detail, taken substantially on the line 3—3 of Fig. 1;

Fig. 4 is a horizontal plan view, taken substantially on the line 4—4 of Fig. 2, and showing the preferred mechanism for converting the reciprocating motion of the driving piston into rotary motion;

Fig. 5 is a detail sectional view, taken substantially on the line 5—5 of Fig. 1; and

Fig. 6 is a detail vertical sectional view, taken substantially on the line 6—6 of Fig. 1.

As illustrated in the drawings, the preferred embodiment of the invention comprises a depressible member 9, as clearly shown in Figs. 1 and 2, which may consist of a sheet of spring steel or equivalent resilient metal or material, the upper surface of which is disposed in a horizontal plane flush with the surface of a roadway. Adjoining plates and mountings are shown in case it is desired to employ a plurality, but inasmuch as the same mechanism is employed in such duplicate units, a description of a single unit will suffice.

As particularly shown in Fig. 2, there is disposed beneath the roadway surface a sub-base 10 for mounting the driving mechanism, and which likewise supports a plurality of pillar mem-

bers 11. In the embodiment disclosed, the portion of the apparatus adjacent the roadway surface is supported on shoulders 12 provided on the pillar members 11, and upon which directly rests a horizontally extending platform 13. Also in the embodiment illustrated the respective ends of the upper plate member 9 are secured by bolts 14 to anchoring pieces 15 embedded in the pillars. By this construction and arrangement the opposite ends of the plate member 9 are rigidly suspended but the entire intermediate portion is depressible and adapted to yield downwardly under the weight of a passing vehicle. It will be understood that the apparatus works to best advantage when there are a number of vehicles passing in succession so as to cause depression of the plate 9 at rather frequent intervals.

In the chamber provided between plate 9 and the platform 13 there is interposed a fluid container 16 which in the preferred construction is adapted to contain a suitable liquid for the purpose, such as a relatively heavy oil, glycerin, or equivalent, and therefore the container 16 may be composed of a suitable flexible material such as thin sheet metal, a rubber composition, or the like. By reference to Fig. 3 it will be noted that under normal conditions when plate 9 is in elevated position the fluid is contained within the chamber 17 and also extends downwardly a slight distance within a cylinder 18, the upper end of which is hermetically sealed and connected to the container 16 and the platform 13. In this position the fluid contacts with the upper surface of piston 19 reciprocally mounted in cylinder 18, and at its uppermost limit of travel when the parts are in the relative positions shown in Fig. 3. Piston 19 is normally urged upwardly by a compression spring 20, and is also secured to piston rod 21 extending through packing gland 22, and also extending through a rod guide 23 provided on the upper surface of bracket 24, as shown in Fig. 2.

The lower end of piston rod 21 preferably carries a pin 25 which extends through slots provided in a bifurcated end of lever 26 which is pivotally mounted in bracket 27, and the opposite end of which is connected by tension spring 28 attached to the base 10 for the purpose of assisting in maintaining piston 19 at its uppermost limit of travel, as shown in Figs. 2 and 3. It is also desirable to maintain the depressible member 9 in an upper horizontal position, and for this purpose there are provided a plurality of lateral spring members 29, as shown in Fig. 5, and also a plurality of intermediate appropriately spaced springs 30, 110

each of which engages an upper plate 31 positioned adjacent the container 16, and also engages a threaded plug 32 insertable through a threaded opening or ring in platform 13 so as to constitute a fluid-tight seal.

The piston pin 25 also extends through the bifurcated slotted extremity of a divided rock arm 33 secured to collars 34 loosely mounted on shaft 35 journaled in the parallel frame members 36. Pivottally mounted on rock arm 33 is a pawl 37 adapted to successively engage the teeth on ratchet wheel 38 keyed to shaft 35. Each end of shaft 35 has mounted thereon a crank disc 39 provided with crank pin 40 pivottally connected to one end of connecting link 41, the opposite end of which is pivoted to the upper extremity of oscillatory arm 42 mounted on transverse shaft 43 likewise journaled in the frame members 36. The lower extremity of each rock arm 42 is pivottally connected to one end of a second connected link 44, the opposite end of which is pivoted to crank pin 45 on gear 46 keyed to transverse shaft 47 journaled in frame members 36. The gears 46 are arranged to mesh with pinions 48 secured to transverse shaft 49 journaled in the frame 36, and one end of which preferably carries a flywheel 50 for maintaining uniform rotary motion. The opposite end of shaft 49 may be connected to any character of mechanism desired to be driven through the power derived, and in the preferred embodiment shown is continued to constitute the armature shaft of an electric generator 51.

The operation will be understood to a large degree from the foregoing description of the construction, but to supplement the apparent operation, as the vehicles pass over plate 9 the latter is depressed, causing piston 19 to be forced downwardly through the intermediary of the liquid contained in the chamber 17. This action causes descent of piston rod 21, which in turn actuates rock arm 33, causing rotation of ratchet wheel 38 through the medium of pawl 37. Through the connected mechanism described, the gear wheel 46 is driven, which in turn drives pinion 48 mounted on shaft 49 which carries the flywheel 50 to maintain as constant uniform rotary motion as possible, and which also serves to drive an electric generator 51, for example. After each such depression of plate 9 the latter is forced upwardly by means of the spring members described, and piston 19 is also forced upwardly through the medium of spring 20 supplemented by spring 28. A relatively constant stream of traffic maintains the apparatus in operation, with no interference to traffic, and at no cost except normal upkeep and attendance.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a roadway power generator, a compressible container disposed below the roadway surface and containing a non-compressible fluid maintained under pressure sustaining said con-

tainer in expanded normal condition, said container having a communicable connection with a fluid operated power device actuated by fluid displaced from said container upon compression of the container, and a flexible sheet-like load bearing surface member mounted independently but cooperably above said container and supported in direct contact therewith to be thereby supported and being additionally maintained at its opposite ends marginally flush with the roadway surface proper but being depressible between its supported margins whereby to compress said fluid container.

2. In a roadway power generator, a compressible container disposed below the roadway surface and containing a non-compressible fluid maintained under pressure sustaining said container in expanded normal condition, said container having a communicable connection with a fluid operated power device actuated by fluid displaced from said container upon compression of the container, a flexible sheet-like load bearing surface member mounted independently but cooperably above said container and supported and maintained at its opposite longitudinal ends marginally flush with the roadway surface proper but otherwise being depressible between said supported end margins whereby to compress said supporting fluid container, and resilient means for yieldably supporting said flexible sheet-like surface member at its longitudinal side margins independently of said fluid container substantially level with the roadway surface proper.

3. In a roadway power generator, a compressible container disposed below the roadway surface and containing a non-compressible fluid maintained under pressure sustaining said container in expanded normal condition, said container having a communicable connection with a fluid operated power device actuated by fluid displaced from said container upon compression of the container, a flexible sheet-like load bearing surface member mounted independently but cooperably above said container and supported and maintained at its opposite longitudinal ends marginally flush with the roadway surface proper but otherwise being depressible between said supporting fluid container, resilient means adjustably mounted for yieldably supporting said container in extended condition, and supplemental resilient means for supporting said flexible sheet-like surface member yieldably at its longitudinal side margins independently of said fluid container substantially level with the roadway surface proper.

4. In a roadway power generator, a compressible container disposed below the roadway surface and containing a non-compressible fluid, said container having a communicable connection with a fluid operated power device actuated by fluid displaced from said container upon compression of said container, and a flexible sheet-like road bearing surface member mounted cooperably above said container in direct contact therewith and being supported at its opposite ends but being depressible between its supported ends whereby to compress said fluid container.

ROBERT J. MULVEY.