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STATIC ELECTRICITY GROUNDING DEVICE

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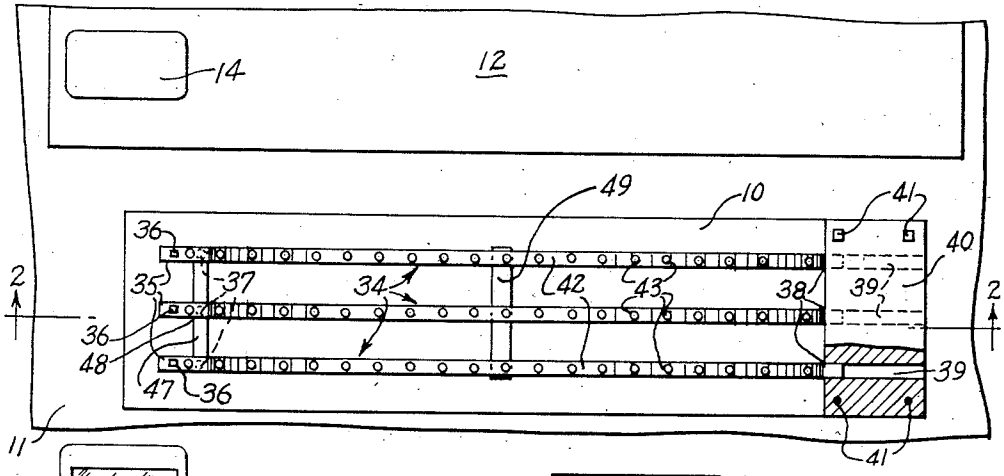


Fig. 1

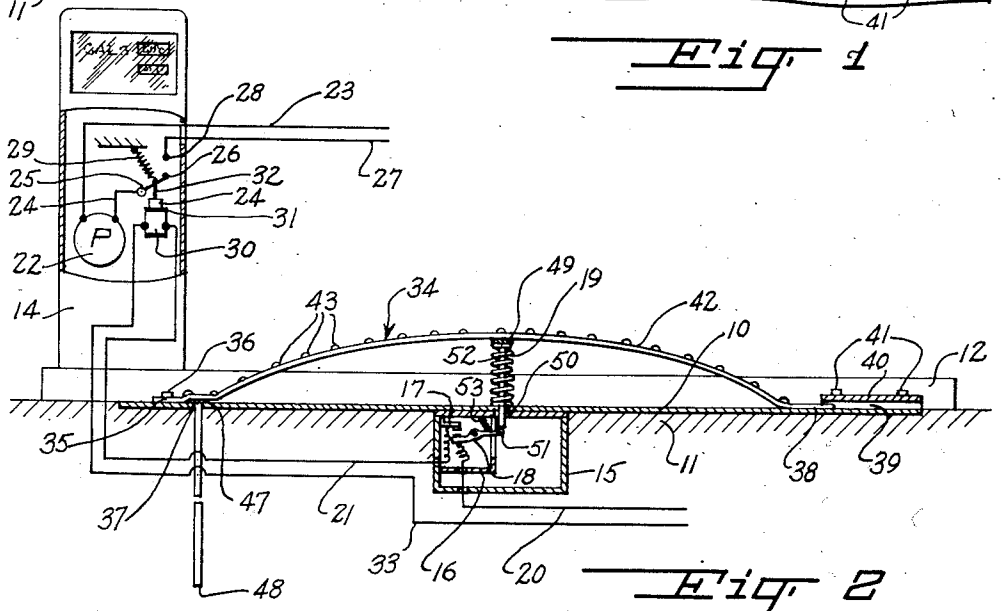


Fig. 2

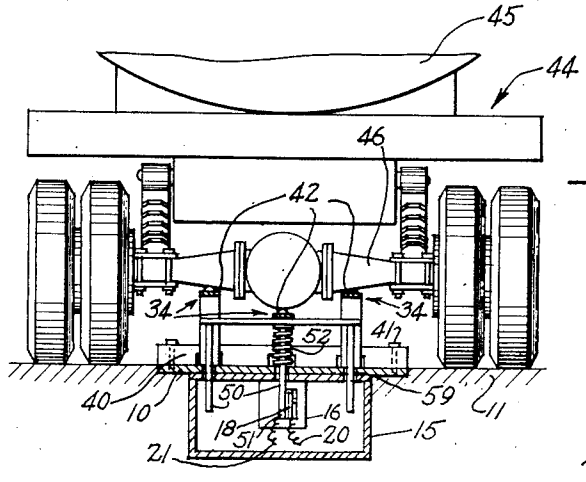


Fig. 3

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STATIC ELECTRICITY GROUNDING DEVICE

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5 Claims. (Cl. 103—25)

This invention relates to a safety device, and more particularly to an apparatus for preventing fires or explosions resulting from static electricity during handling of gasoline and the like by trucks or trailers.

The object of the invention is to provide an apparatus which will serve to effectively discharge static electricity from gasoline trucks when the trucks are being loaded with the fuel so that there will be no danger of fires, explosions and the like.

Another object of the invention is to provide a static electricity discharge mechanism which includes a plurality of spring members that are adapted to be driven over and engaged by the lower portion of a fuel truck so that when the spring members are engaged and flexed downwardly, an electrical circuit to a fuel pump will be energized whereby the pump motor will be permitted to pump fuel into the waiting truck so that there will be no danger of the fuel pump operating until the truck is in a position to cause any static electricity thereon to be safely discharged into the ground.

Another object of the invention is to provide a static electricity discharge mechanism which is extremely simple and inexpensive to manufacture.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this application, and in which like numerals are used to designate like parts throughout the same:

Figure 1 is a top plan view of the static electricity discharge mechanism, constructed according to the present invention, and with parts broken away and in section.

Figure 2 is a sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a transverse sectional view taken through the apparatus, and showing a gasoline truck in position thereon.

Referring in detail to the drawings, the numeral **10** designates a horizontally disposed plate which can be made of any suitable material, and the plate **10** is adapted to be mounted on a suitable surface **11** of concrete or the like. Spaced from the plate **10** is a horizontally disposed base **12** which has a fuel or gasoline pump **14** extending upwardly therefrom. Positioned below the plate **10** is a housing **15** which has a switch **16** mounted therein. The switch **16** includes a fixed contact **17**, and a movable contact **18** is mounted for movement into and out of engagement with the fixed contact **17**. The contact **18** is pivotally mounted in the switch **16** by means of a pin **19**. A first wire **20** leads from the movable contact **18** to a suitable source of electrical energy. Leading from the fixed contact **17** is a second wire **21** for a purpose to be later described.

There is further provided a motor **22** of conventional construction, and the motor **22** serves to operate a fuel pump whereby fuel can be readily pumped into a waiting truck when desired. A third wire **23** leads from the pump motor **22** to a suitable source of electrical energy, and a fourth wire **24** also leads from the pump motor **22**.

The wire **24** is connected to a terminal **25**, and a movable contact **26** has one end connected to the terminal **25**. A fifth wire **27** leads to a suitable source of electrical energy, and the wire **27** leads to a contact **28** which is adapted to be selectively engaged by the movable contact **26**. A coil spring **29** has one end connected to the contact **26**.

Also arranged in the fuel pump housing **14** is a solenoid **30** which serves to actuate a core **31**, and a link **32** extends from the core **31** to the movable contact **26**. The wire **21** is connected to the core **30**, and a sixth wire **33** is adapted to lead from the solenoid **30** to a suitable source of electrical energy.

Mounted above the plate **10** is a plurality of spaced parallel spring members **34** which each include an end portion **35** that is secured in place to the plate **10** by means of a suitable securing element such as a bolt or screw **36**. Each spring member **34** further includes an offset section **37** and a major curved portion **42**. Each curved portion **42** terminates in a flat portion **38** which is slidably mounted in a slot **39** in a bracket **40**. The bracket **40** may be secured to the plate **10** by suitable securing elements **41**.

The spring members **34** are each provided with a plurality of upstanding knobs or protuberances **43** which are adapted to be engaged by the lower portion such as the rear or front portion of a gasoline truck **44**. Thus, an axle housing **46** may engage the curved portions **42** of the spring members **34** as shown in Figure 3 so as to cause these spring members **34** to flex or bend downwardly. The truck **44** may include the usual tank **45** which is adapted to be filled with fuel such as gasoline.

Extending transversely beneath the offset sections **37** of the spring members **34** is a horizontally disposed bar **47**, and a ground rod **48** depends from the bar **47**. The rod **48** extends down into the ground so that static electricity from the truck **44** will be readily discharged safely into the ground.

Extending transversely beneath the curved portions **42** of the spring members **34** is a horizontally disposed bar or brace **49**, and depending from the brace **49** is a plurality of vertically disposed arms or rods **50**. The intermediate rod **50** has its lower end pivotally connected to the movable contact **18** by means of a pivot pin **51**. A coil spring **52** may be circumposed on the intermediate rod **50** for normally urging the middle rod **50** to its upward or raised position.

From the foregoing, it is apparent that there has been provided an apparatus which is especially suitable for use in grounding electricity from gasoline trucks such as the truck **44**. In use, the contact **18** is normally out of engagement with the contact **17**. Also, the contact **26** is normally out of engagement with the contact **28**. The springs **34** are also normally in the position shown in Figure 2. Then, when a truck such as the gasoline truck **44** drives up to be filled with gasoline from the gas pump **14**, as at a loading station, the truck drives over the spring members **34** so that a portion of the truck such as the axle housing **46** engages the spring members **34** and biases or flexes them downwardly as shown in Figure 3. As the spring members **34** move downwardly the brace **49** and rods **50** are moved downwardly to compress the coil spring **52** and at the same time the slot **39** in the bracket **40** permits the flat portions **38** of the spring members **34** to slide therein. As the rods **50** move downwardly, the contact **18** is pivoted into engagement with the contact **17** so that the circuit to the solenoid **30** is completed. As the circuit to the solenoid **30** is completed, the core **31** moves to thereby cause the arm **32** to move the contact **26** into engagement with the contact **28** so that the circuit to the pump motor **22** is completed. Thus, the static electricity will then be grounded or led from the spring members **34** down through the bar **47** and then through

the ground rod **48** so that the static electricity will be safely conveyed away. At the same time the pump motor **22** will be actuated so that the gasoline can be loaded into the tank **45** on the truck **44**. Also, if desired a switch can be used to permit manual control of the flow of gasoline and such a switch may be positioned between the pump motor **22** and the fuel line or fill line.

As soon as the truck **44** has been loaded or as soon as it drives away, the spring **52** will return the parts to the position shown in Figure 2 so that the contact **18** will move away from the contact **17** whereby the solenoid **30** will permit the contact **26** to open the circuit to the pump motor **22** so that no fuel can be accidentally pumped therefrom.

The spring **52** is compressed when a truck passes over the spring members **34**. The size and shape of the parts can be varied as desired. The housing **15** may be made waterproof and explosion proof, and the switch **16** prevents the oil or gasoline or other petroleum products from flowing into the tank truck **44** until the truck is properly grounded. If a tank truck is to be gravity filled, a solenoid valve or a motorized valve of adequate size can be installed in the fill line or pipe leading from the storage tank to the loading platform. With the present invention the truck is automatically grounded so that danger from fires and explosions is automatically prevented. The parts may be made of any suitable material, as for example the bar **47** may be made of copper, and the rod **48** may be made of copper with a steel core. The outermost rods **50** serve as guide rods to help maintain the parts in their proper position as the spring members **34** flex. The present invention is especially suitable for use at petroleum refineries, warehouses, and storage plants or wherever oil or gasoline tank trucks pick up a load since the possibility of an explosion resulting from static electricity will be eliminated, and the present invention will prevent explosions at the loading platform whenever a tank truck arrives to be refilled. Thus, when a tank truck rolls up it is automatically grounded to thereby eliminate the human factor. Heretofore it has been necessary to have an employee whose sole function is to clamp some kind of a ground onto tank trucks when they roll in to be loaded but with the present invention it is not necessary to have an employee standing by for this operation. The number of spring members **34** can be varied as desired. The knobs **43** will scrape along the bottom of the truck as the truck passes over, and the switch **16** will prevent gasoline or fuel oil or kerosene from being pumped out unless there is a proper and complete ground. Thus, the grounding rod **48** carries all of the static electricity safely down into the ground. The bracket **40** safely covers the ends of the spring members **34** which move so that there will be no possibility of any one getting hurt by the movement of these parts. The housing **15** may be positioned in a vault which can be lined with concrete if desired. A suitable cover or door can be provided for gaining access to the housing **15**. A coil spring **53** is connected to the movable contact **18**.

It is to be understood that the motor **22** which starts the flow of oil or gasoline or other product from the pump may be some distance away from the pump itself so that the motor may be in the fuel pump or elsewhere, but it functions as though incorporated therein. The coil spring **52** serves to bring the middle rod **50** back up thus carrying with it the brace **49** and the end rod **50**. As this happens, the spring members **34** also go back up to their normal position. The brace **49** is not secured to the spring members **34** but merely rests immediately beneath them and touches them. Since frequently personnel operating the various apparatus might permit the flow to keep going until the whole yard of a storage depot is flooded with fuel oil or gasoline, the gasoline or other petroleum products may flow automatically, or else a switch can be installed between the pump motor **22** and the fuel line or fill line so as to permit manual control of the flow of gasoline. If desired only one spring member **34** may be used.

I claim:

1. In a static electricity discharge mechanism, a horizontally disposed plate, a hollow housing positioned below said plate, a switch positioned in said housing and including a fixed contact, a movable contact pivotally mounted in said switch and mounted for movement into and out of engagement with said fixed contact, a first wire extending from said movable contact and adapted to be connected to a source of electrical energy, a second wire leading from said fixed contact, a base spaced from said plate, a fuel pump mounted on said base and including a motor, a third wire leading from said motor and adapted to be connected to a source of electrical energy, a fourth wire leading from said motor, a movable terminal having one end connected to said fourth wire and its other end mounted for movement into and out of engagement with a fifth wire, said fifth wire adapted to be connected to a source of electrical energy, a solenoid connected to said second wire and adapted to be connected to a source of electrical energy, a core movably mounted in said solenoid, an arm connecting said core to said movable terminal, a plurality of spaced parallel spring members mounted above said plate, each of said spring members having one end secured to said plate and each of said spring members further including an offset section and a major curved portion terminating in a flat section, a bar extending transversely below the offset sections of said spring members, a ground rod depending from said bar, a brace extending transversely beneath the curved portions of said spring members and above said plate, and a plurality of spaced parallel arms depending from said brace and extending down through said plate, one of said arms having its lower end pivotally connected to the movable contact in said switch.

2. The structure as defined in claim 1, and further including a plurality of spaced apart knobs extending upwardly from said spring members for engagement with a portion of a truck.

3. The structure as defined in claim 1, wherein said spring members are adapted to be flexed downwardly by the lower portion of a fuel truck to be filled with fuel.

4. In a static electricity discharge mechanism, a horizontally disposed plate, a hollow housing positioned below said plate, a switch positioned in said housing and including a fixed contact, a movable contact pivotally mounted in said switch and mounted for movement into and out of engagement with said fixed contact, a first wire extending from said movable contact and adapted to be connected to a source of electrical energy, a second wire leading from said fixed contact, a base spaced from said plate, a fuel pump mounted on said base and including a motor, a third wire leading from said motor and adapted to be connected to a source of electrical energy, a fourth wire leading from said motor, a movable terminal having one end connected to said fourth wire and its other end mounted for movement into and out of engagement with a fifth wire, said fifth wire adapted to be connected to a source of electrical energy, a solenoid connected to said second wire and adapted to be connected to a source of electrical energy, a core movably mounted in said solenoid, an arm connecting said core to said movable terminal, a plurality of spaced parallel spring members mounted above said plate, each of said spring members having one end secured to said plate and each of said spring members further including an offset section and a major curved portion terminating in a flat section, a bar extending transversely below the offset sections of said spring members, a ground rod depending from said bar, a brace extending transversely beneath the curved portions of said spring members and above said plate, a plurality of spaced parallel arms depending from said brace and extending down through

said plate, one of said arms having its lower end pivotally connected to the movable contact in said switch, a plurality of knobs extending upwardly from said spring members, said spring members adapted to be fixed downwardly by engagement with the lower portion of a fuel truck being loaded, and a bracket secured to said plate and provided with slots for slidably receiving the flat portions of said spring members.

5. In a static electricity discharge mechanism, a plate, a housing positioned below said plate, a switch positioned in said housing and including a fixed contact, a movable contact pivotally mounted in said switch and mounted for movement into and out of engagement with said fixed contact, a first wire extending from said movable contact and adapted to be connected to a source of electrical energy, a second wire leading from said fixed contact, a base spaced from said plate, a fuel pump mounted on said base and including a motor, a third wire leading from said motor and adapted to be connected to a source of electrical energy, a fourth wire leading from said motor, a movable terminal having one end connected to said fourth wire and its other end mounted for movement into and out of engagement with a fifth wire, said fifth wire adapted to be connected to a source of electrical energy, a solenoid connected to said second wire and

adapted to be connected to a source of electrical energy, a core movably mounted in said solenoid, means connecting said core to said movable terminal, a plurality of spring members mounted above said plate, each of said spring members having one end secured to said plate and each of said spring members further including an offset section and a major curved portion terminating in a flat section, a bar extending below the offset sections of said spring members, a ground rod depending from said bar, a brace extending beneath the curved portions of said spring members and above said plate, and a plurality of arms depending from said brace and extending down through said plate, one of said arms being pivotally connected to the movable contact in said switch.

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