# United States Patent [19]

**Reed**

[11] **3,771,110**

[45] **Nov. 6, 1973**


[54] **ELECTRICAL CONTACT PINS**


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[73] Assignee: **Walton Products, Inc.,** Broomall, Pa.



[22] Filed: **Nov. 23, 1971**

[21] Appl. No.: **201,506**

[52] **U.S. Cl.**..... **339/214 S,** 339/48, 339/255 R, 339/262 R

[51] **Int. Cl.**..... **H01r 13/50,** H01r 11/22

[58] **Field of Search**..... 339/214, 206, 207, 339/208, 209, 210, 253, 254, 255, 259, 47, 48, 59, 94, 262



[56] **References Cited**

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[57] **ABSTRACT**

An electrical contact pin construction is provided which is particularly suited for use in circuits of railroad cars which are coupled and uncoupled and which cannot have exposed electrically live contact pins, and which includes a slidably mounted electrical contact pin with a readily replaceable contact accessible for replacement without the necessity for disassembly of the pin or of the housing in which the contact pin is mounted, a watertight construction being provided by sealing the contact pin.


**9 Claims, 2 Drawing Figures**

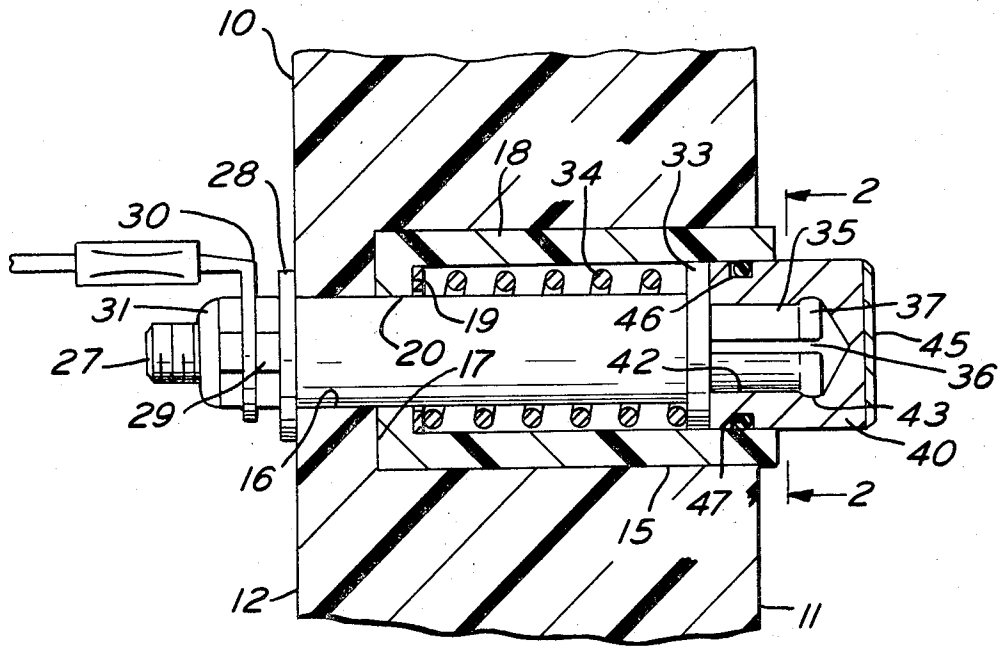

FIG. 1

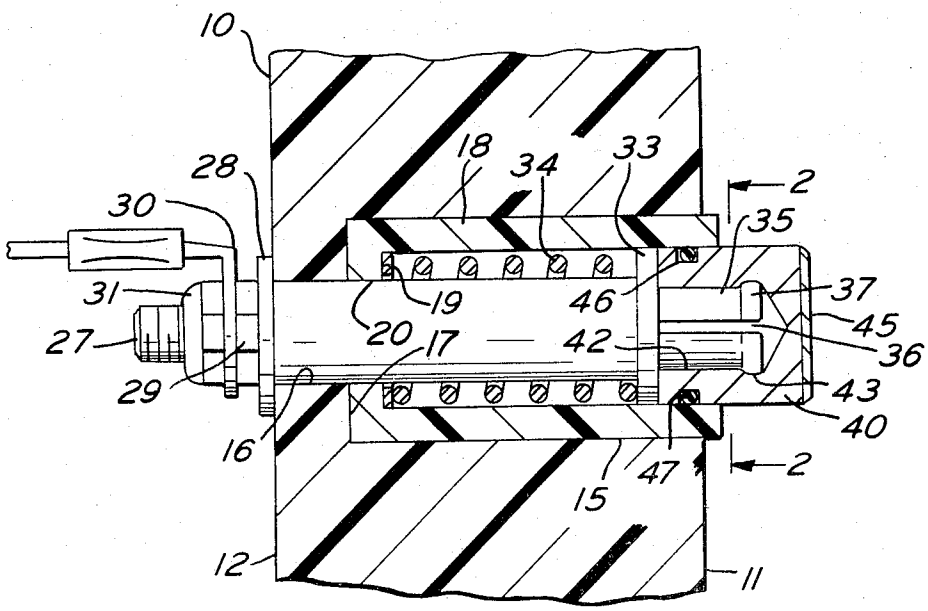
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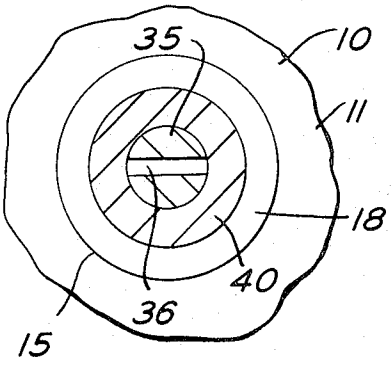
FIG. 2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# ELECTRICAL CONTACT PINS

## BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to electrical contact pins and more particularly to such pins having a readily replaceable contact and with provisions for preventing access of water.

2. Description of the Prior Art

The use of automatic coupling and uncoupling equipment for railroad cars is well known and electrification of railroad cars by means of various contact elements between cars operated in conjunction with automatic coupling and uncoupling equipment is also well known. In the previously available circuit control apparatus live contact pins or elements are exposed to the weather when the cars are uncoupled and present the danger of electrical shock and easy susceptibility to damage.

In my prior application for Electrical Circuit Control Apparatus, filed May 19, 1970, Ser. No. 38,775, now U.S. Pat. No. 3,646,498, an improved construction for such usage is disclosed but in that construction the replacement of the contacts requires extensive disassembly for pin removal or contact renewal.

While it has heretofore been proposed to provide replaceable electrical contacts the structures were not suited for rigorous service under severe weather conditions, required special tools or disassembly of the mounting structure or housing for removal of the pin for replacement, were not adaptable to small diameter contact pins, or had other shortcomings.

## SUMMARY OF THE INVENTION

In accordance with the invention an electrical contact pin is disclosed, suitable for use on railroad equipment and the like which is subjected to severe weather conditions, which is suitable for a wide range of uses such as in the electrical circuit control apparatus in my prior application filed May 19, 1970, Ser. No. 38,775, but not restricted to such use, the structure including an insulating block with a bore having a wear resistant insert and within which a resiliently urged captive pin is mounted, the pin having a readily replaceable contact extending outwardly of the block with sealing against access of water.

It is the principal object of the invention to provide an improved movable contact pin, resiliently opposed as to its movement in one direction and resiliently urged but limited in its movement in the other direction.

It is a further object of the invention to provide, in a contact pin construction of the character aforesaid, a replaceable exposed contact, with sealing of the contact against access of water therealong.

Other objects and advantageous features of the invention will be apparent from the description and claims.

## BRIEF DESCRIPTION OF THE DRAWINGS

The nature and characteristic features of the invention will be more readily understood from the following description taken in connection with the accompanying drawing forming part thereof, in which:

FIG. 1 is a sectional view of a portion of a housing block with the contact pin of the invention mounted therein; and



FIG. 2 is a transverse sectional view taken approximately on the line 2—2 of FIG. 1.

It should, of course, be understood that the description and drawings herein are illustrative merely and that various modifications and changes can be made in the structure disclosed without departing from the spirit of the invention.

## DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now more particularly to the drawings, a supporting block **10** is shown which may provide a boundary wall of a housing (not shown). The block **10** is preferably composed of insulating material, such as an electric grade phenolic resinous composition of well known type, and has an outer face **11** and an inner face **12.**

The block **10** has one or more sets of aligned bores **15** and **16,** one set being provided for each contact pin, the outer end of the bore **15** terminating at the outer face **11** and extending to a shoulder **17,** and the bore **16** extending from the shoulder **17** to the inner face **12.**

Within the bore **15,** and preferably with a press fit engagement therewith, a hollow cylindrical insert **18** is provided, extending beyond the face **11** to provide a stop and baffle and having an end wall **19** with a central bore **20** therethrough. The insert **18** is preferably of a water resistant electrical insulating synthetic plastic material with a low coefficient of friction for metallic surfaces to engage therewith. One particularly suitable material for the insert **18** is Teflon which has the further advantage of repelling ice formation and avoiding ice adherence at the end of the insert **18** beyond the face **11.**

A contact pin **25** is provided having a central cylindrical section **26,** slidable in the bores **16** and **20,** and with a threaded end **27** on which a retainer washer **28,** retainer nut **29,** wire terminal **30** and retainer nut **31** are sequentially mounted.

The contact pin **25,** at the end opposite to the threaded end **27,** has an annular shoulder **33** which is slidable within the insert **18.** A preloading compression spring **34,** preferably of stainless steel, is interposed between the shoulder **33** and a metallic washer **32,** preferably of brass which engages the end wall **19** of the insert **18.**

The end **35** of the contact pin **25,** beyond the shoulder **33,** is preferably transversely slotted as at **36** and has an annular enlarged rim **37** to provide a compression type tang.

The contact pin **25** is preferably of brass with a silver plating coating.

A replaceable contact **40** is provided, preferably of brass with a silver plating coating, and of hollow cylindrical shape with an end wall **41** and with a central opening **42.** The contact **40,** at its innermost end preferably abuts the shoulder **33.** The opening **42,** at its inner end, is preferably provided with a groove **43** complemental in shape to the enlarged rim **37** for holding engagement with the rim **37.**

The other end of the contact **40** is preferably provided with silver contact face **45** for engagement by a similar contact face (not shown) brought into engagement therewith.

The contact **40,** on the periphery thereof and at a location to be within the insert **18,** is provided with an annular groove **46** for the reception of a packing **47,** preferably an O-ring, to prevent fluid leakage inwardly

along the contact **40** and contact pin **25** when the same is used in an exposed location.

It will be noted that the contact pin **25** is permitted a limited movement inwardly for resilient engagement with the contact face **45** of another contact face (not shown).

The contact **40**, held by the resilient engagement of the rim **37** in the groove **43**, if worn or damaged, can be readily removed and replaced, if desired, merely by removing the old contact **40** and pressing on a new contact **40**. No removal of stop nuts, wire terminals or contact pins or disturbance of circuit of the wiring package is required for renewal of a contact **40**.

The insert **18** functions as a guide for the contact pin **25** and provides a relatively friction free surface for movement therealong of the packing ring **47**. The compression fit between the packing ring **47** and the interior of the insert **18**, and the engagement of the insert **18** in the bore **15** prevents fluid leakage to the interior of the coupling housing.

The projection of the insert **18** beyond the face **11** of the block **10** provides a stop to limit movement of another block thereagainst and provides a baffle around the contact **40** to aid in diverting moisture at the face **11** from entering the insert **18**.

The insert **18** and projection of the insert **18** beyond the face **11** also aid in repelling formation of ice and prevents sticking of the contact assembly under freezing conditions.

When opposing contacts are brought together a constant force is maintained by the spring **34** in opposing directions. In a specific embodiment each contact **40** moves about three sixteenths of an inch upon coupling and contact engagement with the spring **34** compressed from a 10 to 12 pound force applying position up to an 18 to 20 pound force applying position.

Upon uncoupling, the contacts **40** separate and the spring **34** moves the assembly outwardly, as limited by the engagement of the washer **28** with the inner face **12**, to its free or uncoupled position.

I claim:

**1.** Electrical circuit control apparatus comprising
block means having an inner and an outer face,
said block means having an opening between said faces,
an insert within said opening and having a central opening therethrough,
an electrically conductive contact pin member mounted in said opening in said insert and extending beyond said inner face for the connection of a wire terminal,
a stop member on said contact pin engageable with said inner face,
resilient means on said contact pin member and within said insert for normally urging said contact pin member toward said outer face, and
an electrically conductive contact member extending inwardly within said insert and outwardly beyond said outer face, and
interengaging portions on said contact member and said contact pin member detachably securing said contact member on said contact pin member,
said contact pin member having an annular shoulder slidable in said insert, and
said resilient means being a spring in engagement at one end with said shoulder and at the other end in said insert.

**2.** Electrical circuit control apparatus comprising
block means having an inner and an outer face,
said block means having an opening between said faces,
an insert within said opening and having a central opening therethrough,
an electrically conductive contact pin member mounted in said opening in said insert and extending beyond said inner face for the connection of a wire terminal,
a stop member on said contact pin engageable with said inner face,
resilient means on said contact pin member and within said insert for normally urging said contact pin member toward said outer face, and
an electrically conductive contact member extending inwardly within said insert and outwardly beyond said outer face, and
interengaging portions on said contact member and said contact pin member detachably securing said contact member on said contact pin member,
said insert and said block having portions with which said contact pin member is in engagement for guiding said contact pin member.

**3.** Electrical circuit control apparatus comprising
block means having an inner and an outer face,
said block means having an opening between said faces,
an insert within said opening and having a central opening therethrough with a portion facing outwardly at said front face,
an electrically conductive contact pin member mounted in said opening in said insert and extending beyond said inner face for the connection of a wire terminal,
a stop member on said contact pin engageable with said inner face,
resilient means on said contact pin member and within said insert for normally urging said contact pin member toward said outer face,
said contact pin member having a forward extension,
an electrically conductive contact member extending inwardly within said portion of said opening and freely insertable and removable with respect to said portion of said opening, and
interengaging members on said forward extension and said contact member detachably securing said contact member on said contact pin member.

**4.** Electrical circuit control apparatus as defined in claim 3 in which for said interengaging portions
said contact pin member has an annular shoulder slidable in said insert, and
said contact pin member has an extension disposed beyond said shoulder for reception in a complemental opening in said contact member.

**5.** Electrical circuit control apparatus as defined in claim 3 in which
said opening in said block means comprises aligned bores of different diameters and the end of one bore has a shoulder for engagement by said insert.

**6.** Electrical circuit control apparatus as defined in claim 4 in which
said extension has a slot extending inwardly from the end thereof and an annular rim for engagement in said contact member.

**7.** Electrical circuit control apparatus as defined in claim 3 in which

said insert contiguous to said outer face has an inner cylindrical surface, and

said contact member has an outer cylindrical surface in sliding engagement with said inner cylindrical surface.

**8.** Electrical circuit control apparatus as defined in claim **7** in which

one of said surfaces has a groove therein and a packing in said groove in engagement with the other of said surfaces for preventing fluid leakage along said contact member.



**9.** Electrical circuit control apparatus as defined in claim **7** in which

the outer surface of said contact member has a groove therein and a packing in said groove in engagement with the inner surface of said insert for preventing fluid leakage along said contact member.

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