Aug. 22, 1939. W. H. FRANK ET AL 2,170,296

TROLLEY OR COLLECTOR

Filed June 20, 1935 3 Sheets-Sheet 1

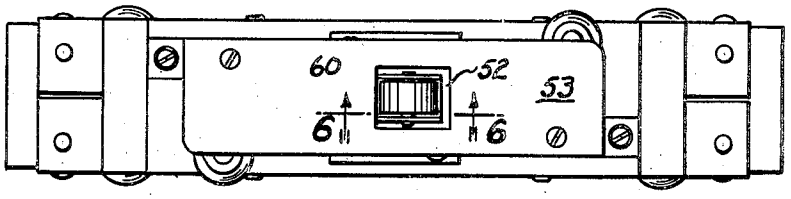


Fig. 2

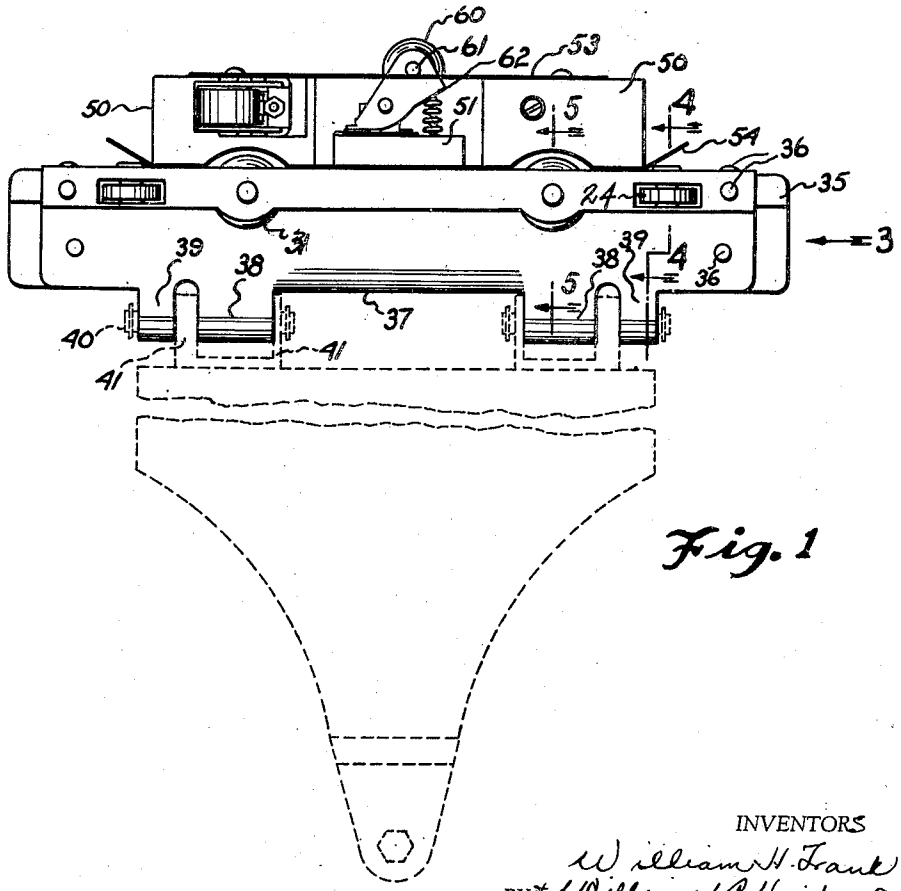


Fig. 1

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Aug. 22, 1939. W. H. FRANK ET AL 2,170,296

TROLLEY OR COLLECTOR

Filed June 20, 1935 3 Sheets-Sheet 2

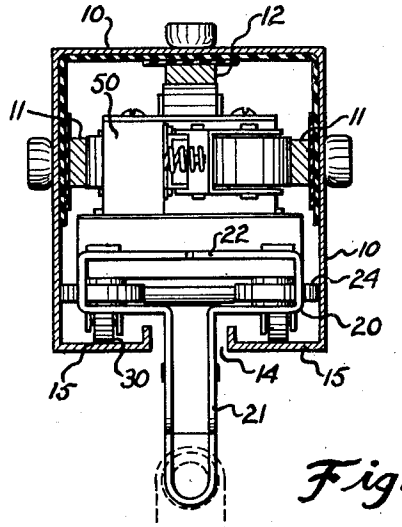


Fig. 3

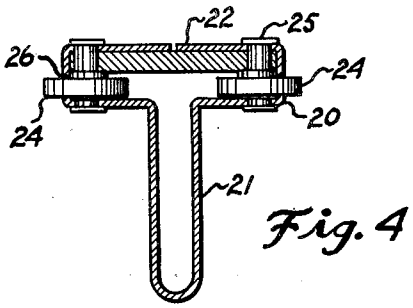


Fig. 4

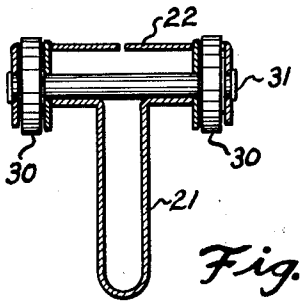


Fig. 5

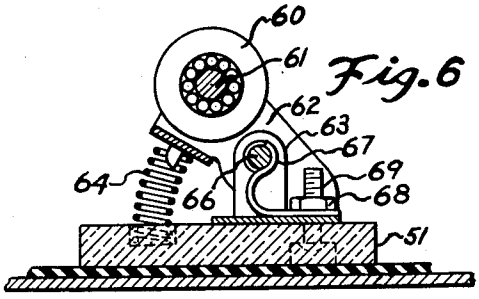


Fig. 6

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TROLLEY OR COLLECTOR

Filed June 20, 1935 3 Sheets-Sheet 3

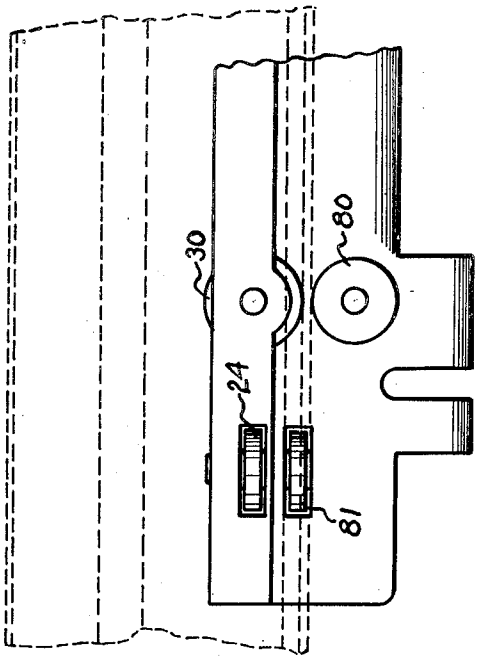


Fig. 8

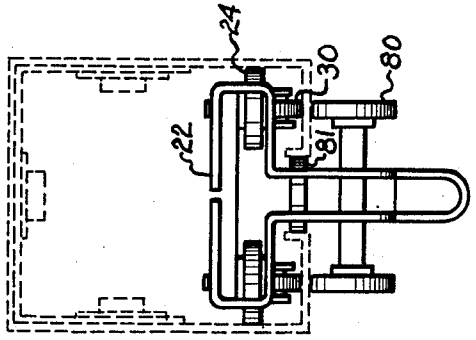


Fig. 7

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UNITED STATES PATENT OFFICE

2,170,296

TROLLEY OR COLLECTOR

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Detroit, Mich.

Application June 20, 1935, Serial No. 27,523

4 Claims. (Cl. 191—45)

This application relates to improvements in trolleys or collectors intended for use with ducts of electrical distribution systems.

The collector here shown is generally of the type shown in a copending application, Serial No. 674,182, filed June 3, 1933, now Patent No. 2,007,893, and is intended for use, as is the collector of that application, with a duct of the type shown in a prior application, Serial No. 674,183, filed June 3, 1933, now Patent No. 2,018,846.

A collector of the character shown in the applications referred to and in this application comprises three parts in general. First, there is a carriage provided with thrust and support rollers and bumpers. Second, there is a head provided with contacts for engaging the bus bars of the duct, and this head is supported on the carriage; the head and the carriage together ride within the duct and a portion of the carriage rides in the slot in the bottom wall of the duct. Third, there is a tool-support which is suspended from that portion of the carriage which rides in the slot; the tool-support rides outside of the duct and is provided with tool-supporting means, circuit protective and switching means, and cable clamp means, and it is intended that the collector as a whole be moved along the duct by a pull on the tool-support exercised by movement of the tool or by pull upon the conductor cable leading to the branch load supplied from the collector.

The present application relates particularly to improvements in that part of the collector which rides within the duct, namely in the carriage and in the head of the collector, and except insofar as the tool-support forms part of the combination disclosed herein and to be considered as encompassed within this application, the tool-support per se forms no part of the present invention.

The principal object is to provide a sturdier and more satisfactory carriage and head construction for trolleys or collectors than what is now known.

For an understanding of the details of construction of the carriage and the head of the collector, which forms the basis for the present application, reference should be had to the accompanying drawings disclosing a collector provided with the novel carriage and head of the instant application. In these drawings,

Fig. 1 shows in side view a collector of the invention provided with a novel carriage and a novel head; a tool-support is shown in phantom;

Fig. 2 is a top plan view of Fig. 1;

Fig. 3 is a view as if in the direction of the arrow 3 of Fig. 1 showing the collector in place in a duct;

Figs. 4 and 5 are sections through the carriage as if on lines 4—4 and 5—5 of Fig. 1;

Fig. 6 is a section through the head as if on the line 6—6 of Fig. 2;

Figs. 7 and 8 are section and elevation views, with duct shown in phantom, of the collector of the invention equipped with rollers for engaging the under surface of the duct and the slot flanges.

The collector as a whole

The collector as a whole comprises a carriage, a head, and a tool-support, and these parts in general resemble the corresponding parts of the collector of application Serial No. 674,182.

The carriage rides within and rolls along the duct and for this reason is provide with support and thrust rollers and bumpers. Disposed upon the carriage and carried thereby is the head which is provided with resilient roller contacts for riding and rolling along the bus bars of the duct to create electrical connection between these bus bars and the branch circuit conductors whose terminals are electrically connected to the roller contacts through appropriate means. Depending from the carriage is the tool support which need not be specifically described here inasmuch as the tool-support here shown is intended to be like the one shown in application Serial No. 674,182, and it will be sufficient to state that the tool support here shown, like the one of that application, is pivotally suspended from that part of the carriage which rides within the bottom wall slot of the duct on a pivotal axis adjacent to the slot and parallel to the run of the duct.

The duct

The duct with which the collector here shown is to be used is the duct of application Serial No. 674,182 and includes a sheet metal tube or duct 10 upon whose side walls are bus bars 11, upon whose top wall is a bus bar 12, and whose bottom wall is provided with a slot 14 dividing the bottom wall into sections 15, each of which forms a track for the supporting rollers of the carriage, a depending portion of which rides in the slot 14. The live part of the duct, namely the part where are grouped the bus bars, is suitably insulated, and suitable means are provided for mounting the bus bars.

The carriage

The carriage here shown, while in general resembling the carriage of application Serial No. 674,182, differs therefrom in details of construc-

tion. The carriage here shown comprises an elongated sheet metal plate 20 (Figs. 4 and 5), bent in the form of a double-walled T to provide a vertical portion 21 which rides within the slot 14 of the duct, and a horizontal portion 22 which rides within the duct above the tracks 15. These portions may be integral with each other or not as preferred.

At the ends of the elongated carriage 20 are thrust collectors 24 (Fig. 4), and these are supported on vertical axle pins 25 passing through upper and lower horizontal walls of the portion 22 of the carriage. The axle pins may be supported in these walls in any suitable manner and one manner is shown in Fig. 4, and since this manner of supporting is within the purview of any skilled mechanic, it will not be specifically described. Suffice it to say that the axle pins are stationary, that the thrust rollers 24 rotate thereon, and that portions of the thrust rollers project through slots 26 of the vertical edges of the portion 22 to engage the side walls of the duct 10 and restrain side-wise shifting of the carriage as the collector rolls along the duct.

Between the thrust rollers but adjacent thereto so as to be spaced apart a substantial distance and thus inhibit rocking of the elongated carriage in the duct as it rolls along the duct are supporting rollers 30 (Fig. 5) and these, like the thrust rollers 24, are supported in the portion 22 of the carriage. The supporting rollers 30 are journalled on horizontal axle pins 31 which connect the vertical side edges of the portion 22 of the carriage. The upper and lower horizontal walls of the portion 22 of the carriage are slotted to permit portions of the supporting rollers 30 to project therethrough so that the rollers 30 may engage and ride along the tracks 15 of the duct and support the collector as it rolls along the duct.

In line with the supporting and thrust rollers and contained within the open ends of the carriage ar resilient rubber blocks 35, and these are firmly secured to the carriage by means of rivets or pins 36. The blocks project a substantial distance beyond the ends of the carriage so as to form bumpers for the latter, and by virtue of their being in line with the supporting and thrust rollers the bumping of one carriage against another in the duct will create no tendency for the carriages to rock or shift laterally or vertically in the duct as they bump; in this way the danger of injury to the contacts of the heads carried by the carriages is minimized.

The lower edge of the portion 21 of the carriage is cut away substantially as shown at 37 in Fig. 1 to provide clearance for a branch circuit cable to drop from the head through the space between the walls of the portion 21 to the tool or branch load to be supplied by the collector, and in order to eliminate snagging or injuring such cable or conductor the clearance provided by the opening at 37 is of substantial length.

The portion 21 is provided with bight portions 38—39 and these are substantially in vertical alignment with the supporting rollers 30 for reasons that will be apparent. Removably disposed within and journalled in the bight portions 38—39 are axle pins 40 passed through lugs 41 integrally secured to the tool-support, and the engagement of these lugs with the axle pins 40 and the supporting and journalling of these axle pins within the bight portions 38—39 provides a pivotal suspension for the tool support of such a character as to have the axes of the pins adjacent the slot 14 and parallel to the run of the duct.

Since the axle pins 40 which are engaged by the lugs 41 of the tool-support are directly below the supporting rollers 30, the load lines of the tool-support are directly in line with the supporting rollers and thus the possibility of rocking of the carriage in the duct is minimized.

The head

Mounted on the upper horizontal wall of the portion 22 of the carriage are blocks 50, 51, and 50 of insulation, and these blocks form supports and mountings for the collector contacts of the collector. The blocks 50 have the collector contacts mounted on their sides and the arrangement of the contacts is such that they face towards opposite side walls of the duct so as to engage side buses of the duct. The contact that is mounted on the block 51 is mounted on the top surface thereof so as to engage the top bus bar of the duct, and this contact projects through a slot 52 of a sheet of insulation 53 which is disposed upon the blocks 50 and is secured thereto in a manner to bridge the space between the blocks 50 and to prevent sparks from the top bus bar 12 dropping into the duct or the collector parts. For similar purposes there is provided between the blocks and the upper surface of the portion 22 of the carriage an insulation shield 54, and the latter is formed as illustrated in Fig. 1 to clear the supporting rollers 30 and the heads of the pins 25 of the thrust rollers.

It will be observed that the insulation 54, cooperating with other parts of the collector, isolates the bus bars and the contacts from the slot 14. The barrier thus provided prevents sparks from dropping from the duct through the slot 14.

Collector contacts

The collector contacts are standard and interchangeable, and each is in the nature of a substantially frictionless roller 60 journalled on a pin 61 connecting opposite parts of a U-shaped strap 62 pivotally mounted on a pedestal 63 so that its roller 60 may be urged towards a bus bar by means of a coiled compression spring 64 reacting against the insulation block which supports the contact. The pin 66 which mounts the part 62 is engaged by a spring leaf 67 clamped in place against the lower surface of the pedestal 63 by means of a nut 68 threaded on a screw 69 secured to the block which mounts the pedestal, and this nut and screw combination forms a binding post for a branch circuit terminal.

All of the parts of the contact are of electrically conducting material and the path of conductivity from the roller 60 to the conductor terminal is a duplex path, there being a path independent of the spring leaf 67 and another path through the spring leaf.

The base of the pedestal may be extended to form a seat for the spring 64 and to be engaged thereby and this expedient will provide a third path from roller 60 to the conductor terminal.

The collector contacts on blocks 50 are between the thrust rollers and this is of advantage in that it eliminates rocking of the trolley in the duct. They might well be in line with the thrust rollers for further tending to eliminate rocking.

Figs. 7–8

In these figures there is shown a collector of the character described previously equipped with rollers 80 for riding along the under surface of the duct and thus cooperating with the supporting rollers 31 to limit vertical shifting of the collec-

tor and with rollers 81 for riding along the flanges of the duct slot 14 to aid in minimizing side sway of the collector as it rides along the duct. These rollers may be supported in the carriage on axle pins, as illustrated for rollers 31 and 24.

Summary

The collector here shown possesses many novel characteristics and these are of extreme value in connection with the use for which the collectors are designed.

It will be observed that the support and thrust rollers and the bumpers are all mounted on a rigid one-piece carriage with the mounting means comprising a relatively small number of parts which is of obvious advantage.

It will also be observed that the major parts of the collector are relatively interchangeable as is often desired for purposes of replacement and repair. The blocks and contacts comprising the head are detachably mounted upon the carriage, and the tool support is detachably connected to the carriage by means of the removable pins 40.

The registration of the support and thrust rollers with the bumper blocks in a single line parallel to the run of the duct has previously been mentioned as of advantage, and the registration of the points where the tool support depends from the carriage with the supporting rollers of the carriage has also previously been mentioned as of advantage.

The novel manner of mounting rollers in a carriage, namely the method illustrated wherein the axle pins for the rollers pass through opposite sides of the carriage portions, with the rollers themselves having portions exposed through slots of these sides, has previously been mentioned as of advantage.

The elimination of protruding parts and a multiplicity of details, such as screws, insulators, etc., is apparent and is of course of advantage.

Now having described the collector here shown, reference will be had to the claims which follow for a determination of the invention.

We claim:

1. In a trolley collector carriage, a T-shaped sheet metal, double walled member having in its double walled horizontal portion an axle pin supported in and connecting the opposite horizontal walls thereof, and a roller on said pin between said horizontal walls and projecting through an opening in a vertical edge wall thereof which connects the aforementioned horizonal walls.

2. In a trolley collector carriage, a T-shaped sheet metal, double walled member having in its double walled horizontal portion an axle pin supported in and connecting the opposite horizontal walls thereof, and a roller on said pin between said horizontal walls and projecting through an opening in a vertical edge wall thereof which connects the aforementioned horizontal walls, the member also having in its double walled horizontal portion an axle pin supported in and connecting the opposite vertical edge walls which connect the opposite horizontal walls thereof, and a roller on said pin between said vertical edge walls and projecting through an opening in one of said horizontal walls of the horizontal portion.

3. In a trolley collector carriage, a T-shaped sheet metal double walled member having in its double walled vertical portion an axle pin supported in and connecting and projecting through the opposite vertical walls thereof and vertical rollers on spaced parts of said pin separated by the vertical portion.

4. In a trolley collector carriage, a T-shaped sheet metal double walled member having in its double walled vertical portion an axle pin supported in and connecting and projecting through the opposite vertical walls thereof and vertical rollers on spaced parts of said pin separated by the vertical portion, the member having in its double walled horizontal portion, a horizontal axle pin supported in and connecting the opposite vertical edge walls which connect the opposite horizontal walls thereof, and vertical rollers on said pin, "registered vertically with the first mentioned rollers", projecting through at least one of said horizontal walls of the horizontal portion.

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