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Title: WIRE CHANGING DEVICE INSIDE OF ELECTRIC POLE AND NON-POWER FAILURE POWER DISTRIBUTION METHOD

Abstract: The present invention discloses a wire transfer mechanism and a direct power transmission type uninterruptible distributing method using the same, in constructions of removal and relocation of wires connected and distributed to each pole and charging of passing wire, which is capable of replacement of wires and poles, relocation of poles and charging of passing wire uninterruptibly by means of sequential separation and connection of electricity by a bypass between a new wire and a removed wire using the wire transfer mechanism mounted at each pole without using a bypass cable of the existing temporary power transmission method. Moreover, the present invention relates to a direct power transmission type uninterruptible distributing method using a wire transfer mechanism which comprises the steps of: mounting the wire transfer mechanism in a pole for fixing it to a cross arm; transferring wires; mounting a wire connecting mechanism; mounting the wires, mounting a space maintainer; separating an uninterruptible electricity; and removing the wires.
WIRE-CHANGING DEVICE INSIDE OF ELECTRIC POLE AND NON-
POWER-FAILRE POWER DISTRIBUTION METHOD

Field of the Invention

The present invention relates to a direct power transmission type interruptible
routing method using a wire transfer mechanism which is capable of securing a safe
work space by transferring an existing wire by the wire transfer mechanism mounted on
poles of a distributing line, which is capable of sequentially separating electricity of a
removed wire by a bypass between a new wire and a removed wire using the direct
transfer mechanism, and which is capable of carrying out a variety of distribution works
without using a bypass cable of the existing temporary power transmission method.

Background of the Invention

With rapid increase of power demand, power facilities to satisfy this demand
are being expanded continuously. As the level of user needs for the quality of electricity
increases, even an instantaneous service interruption becomes the target of a civil
application and electricity users’ group activities and judicial cases including are being
increased. To supply a power of good quality in a power distribution work, the
uninterruptible method in which the distribution work is performed in the state where a
power is not interrupted.

The previous distribution works using the uninterruptible method include a
movable transformer truck type construction method, a bypass cable method and a
breaking switch method for construction. In the bypass cable method, one of temporary
power transmission methods, a cable car, a distribution work is completed by having a
cable required for a work area, a construction breaking switch, a movable transformer
truck, a hot line bucket truck and a set of pneumatic actuator for a hot line work, bypassing the supplied power using a bypass cable on the ground, performing removal and relocation works of a distribution line and then removing the bypass cable.

Moreover, in case of the distribution line having an electric capacity of more than 5,000 KW, since the permissible capacity of a cable in the previous bypass cable method is under 5,000 KW, this wastes a lot of time and a labor cost for switching a power load to another distribution line in order to reduce the capacity of the distribution line to less than 5,000 KW. Because a large capacity distributing method is used commonly, a load is switched and only the load of 5,000 KW is put into work uninterruptibly. This results in an insufficient effect of investment money and there occurs a serious problem in effectively operating the system of the distribution line. Particularly, it is impossible to construct a distribution line with more than two lines, i.e. upper and lower lines, per one pole by the existing temporary power transmission type interruptible method.

Therefore, in the above-described previous distribution work using the uninterruptible method, a lot of construction workers are required. Also, a large number of temporary connection points of an extra high voltage, which are very dangerous, are made in order to install a bypass cable with a specified length of 50m. This requires the use of protective equipment for connection failures and connection points. Because installation and removal works have to be repeated often, a lot of labor cost is required and the damage of the bypass cable is accelerated, thus threatening safety. If there occurs a safety accident or unexpected interruption, this costs a great deal, thus making it difficult to secure a good electricity quality. Also, this may cause more civil applications, economic losses and life losses. Moreover, an excessive load switching
work makes the operation of the distribution line system unstable and the upper end line of the distribution line with more than two lines makes the uninterruptible method impossible.

SUMMARY OF THE INVENTION

It would be desirable for the present invention to provide direct power transmission type uninterruptible distributing method which is capable of replacement of wires and poles and relocation of poles uninterruptibly.

In one aspect the present invention provides a wire transfer mechanism in a pole, comprising:

a cross arm fixing means having supporting plates to be fixed to a cross arm and a clamping bolt;

a wire transfer means having wire transfer rollers and an arm body; and

an axial rotating means having an arm fixture for axially mounting the wire transfer means to the cross arm fixing means to allow the arm body to be rotate, an axial bar and, an axial pipe, an axial supporting clamp and a position fixture

In a second aspect the present invention provides an uninterruptible distributing method using a wire transfer mechanism in a pole, comprising the steps of:

mounting wire transfer mechanisms for terminal poles, strain poles and pin long columns respectively to a cross arm of terminal poles, strain poles and pin long columns;

transferring a removed wire to other spaces of a cross arm and cross arm extension means and securing a mounting space of replaced and transferred wires;

protecting a hot line of a transferred wire and mounting a wire transfer mechanism to an LP insulator of pin long column;
mounting a new wire by performing stranding and pulling works of the new wire to a hot line protected and secured wire mounting space and the stranding mechanism mounted to the upper potion of the LP insulator;

maintaining a wire with a space maintainer for securing a safety by preventing a contact between a new wire and a removed wire in a wire stranding work;

separating electricity from the removed wire with the uninterruptible electricity manner by connecting between a new wire and the removed wire and then bypassing it; and

removing the electricity-separated wire

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is a view showing a work sate of an uninterruptible distributing method according to the present invention;

Fig. 2 is a view illustrating a wire transfer mechanism for terminal poles and strain poles according to one embodiment of the present invention;
Fig. 3 is a view illustrating a wire transfer mechanism for pin long columns according to another embodiment of the present invention;

Fig. 4 is a view illustrating a wire transfer mechanism for cross arm extension according to another embodiment of the present invention;

Fig. 5 is a view illustrating a wire transfer mechanism for an LP insulator according to another embodiment of the present invention;

Fig. 6 is a view illustrating a wire space maintainer according to the present invention;

Fig. 7a is a view illustrating a wire transferring of a suspension insulator according to the present invention;

Fig. 7b is a view illustrating a wire transferring of an LP insulator according to the present invention;

Fig. 7c is a view illustrating a wire transferring by an auxiliary arm according to the present invention;

Fig. 7d is a view illustrating a wire stranding by a wire stranding mechanism;

Fig. 8 is a view illustrating a wire relaying of a wire transfer mechanism according to the present invention;

Fig. 9 is a view illustrating an auxiliary cross arm fixing device according to the present invention;

Fig. 10 is a view illustrating the connection of an auxiliary cross arm for a pin long column with respect to the auxiliary cross arm fixing device according to the present invention;

Fig. 11 is a view illustrating the connection of an auxiliary cross arm for terminal poles and strain poles with respect to the auxiliary cross arm fixing device.
according to the present invention;

Fig. 12 is a view of an embodiment of the auxiliary cross arm fixing device according to the present invention when it is used for the cross arm for the pin long column;

Fig. 13 is a view of another embodiment of the auxiliary cross arm fixing device according to the present invention when it is used for terminal poles and strain poles;

Fig. 14a is a view illustrating the operation of a clamping tub of the clamping means according to the present invention when it is in the backward state;

Fig. 14b is a view illustrating the operation of the clamping tub of the clamping means according to the present invention when it is in the first forward state;

Fig. 14c is a view illustrating the operation of the clamping tub of the clamping means according to the present invention when it is in the second forward state;

Fig. 15 is a detailed view illustrating an auxiliary cross arm fixture according to the present invention; and

Fig. 16 is a view illustrating a conventional uninterruptible distributing method.

*Description of the Reference Numerals of the Drawings*

1: cross arm  
3: LP insulator  
10: cross arm fixing means  
11, 11': supporting plate  
11a: position fixture supporting means  
12: clamping bolt  
20: wire transfer means  
21, 21': roller  
22, 22': ring for a hot line wire grip  
23, 23': arm body  
24: height adjust clamp  
30: axial rotating means
31: base
32: axial bar
33: spline
35: position fixture
5 35c, 35e': hole
36: supporting bracket
38: axial bar
39: pad
41: supporting plate for cross arm
10 43: extension arm
45, 45': cross arm fixing pin
60: upper supporting means
62: upper roller
64: coupling groove
15 66: vertical supporting means
71: pad
80: open-and-shut means
82: longitudinal roller
84: lower roller
20 91: stranding roller
93: plastic bolt
110: beam
112: connecting rod
114: spring
31c: arm fixing clamp
33: axial pipe
34: clamp
35s: spline
35f: flange
37: stopper
39: clamp
40: cross arm extension means
42: insert end
44, 44': ring for hot line wire grip
46: LP insulator fixing hole
61, 61': supporting bracket
63: handle
65: vertical roller
70: insulator coupling means
72: screw-type clamp
81: L-shaped roller supporting bar
83: locking portion
90: spacing bar
92: wire clamp
94: wire
111, 111': supporting bracket
113: clamping tub
115: locking device
116: screw bar  117: clamp
118: chain 119: safety pin
120: hanger 121: chain hanging groove
122: pin insert hole 141: supporting arm
5 140: auxiliary cross arm for terminal poles and strain poles
142: vertical support 143: auxiliary supporting means

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A technical construction for achieving the above object will now be described
with reference to the accompanying drawings.

As shown in Fig. 1, a distributing method using the uninterruptible method
according to the present invention is a new technique that uses only a wire transfer
mechanism without using the movable transformer truck type construction method, the
bypass cable method and the breaking switch method for construction.

The mechanism for transferring a wire in a pole includes: a cross arm fixing
means having supporting plates to be fixed to a cross arm and a clamping bolt, a wire
transfer means having wire transfer rollers and an arm body; and an axial rotating means
having an arm fixture for axially mounting the wire transfer means to the cross arm
fixing means to allow the arm body to be rotate, an axial bar and an axial pipe, an axial
supporting clamp and a position fixture.

The thusly-constructed wire transfer mechanism will now be described in detail
by specific uses.

Fig. 2 is a view of an embodiment of a wire transfer mechanism for a terminal
pole and strain pole at which a suspension insulator is mounted.
c-shaped supporting plates 11 and 11' of a cross arm fixing means 10 are formed at both sides, and a clamping bolt 12 is screwed into the lower side of the plates.

The wire transfer means 20 includes two-stage telescopic arm bodies 23 and 23' of insulating material, a plurality of rollers 21 and 21' whose one end can be fully opened at the upper end of the arm bodies 23 and 23', a height adjust clamp 24 mounted of the connection portion between the two arm bodies 23 and 23', and hot-line wire grips 22 and 22' being formed at opposite sides of the height adjust clamp 24.

The axial rotating means 30 includes an axial bar 32 mounted on one side of the arm body 23 by a clamp 31c at base 31 which is welded to one end of the axial bar 32, an axial pipe 33 mounted on the other side of the arm body 23' by a clamp 31c at base 31 which is welded to one end of the axial pipe 33 and having a spline 33s formed at inner surface and a flange of the other end of the axial pipe 33, clamps 34 mounted on the axial bar 32 and the axial pipe 33 to connect the cross arm fixing means 10 to the axial bar 32 and the axial pipe 33 respectively, and a position fixture 35 having a spline 35s meshed with the spline 33s of the axial pipe 33 and a flange 35f coupled to the one end of the axial pipe 33. Both of the flange of the axial pipe 33 and the flange 35f have a plurality of 35' hole 35e and 35c' respectively for inserting and fixing bolts and nuts.

In addition, the supporting plates 11 have a supporting means 11s and a position fixture safety pin 11b mounted at sides of a supporting plate 11.

Fig. 3 is a view illustrating a wire transfer mechanism for pin long columns according to another embodiment of the present invention.

In this embodiment, the cross arm fixing means 10 consists of a c-shaped supporting plate 11 formed only at one side thereof. In addition, the axial rotating means 30 formed at the upper portion of the supporting plate 11 has an axial bar 38 with a
spring capable of rotating for a predetermined interval by a stopper 37 being inserted into an axial supporting bar 36 and a clamp 39 with a pad 39p for coupling the arm body 23 of insulating material being mounted to the front end of the axial bar 38.

Fig. 4 a view illustrating a wire transfer mechanism formed as an auxiliary arm for extending the cross arm outwardly in order to use the wire transfer mechanism at the outside of the cross arm.

The cross arm extension means 40 includes a connecting portion having a supporting plate 41 for a cross arm, an insert end 42 and cross arm fixing pins 45 and 45' and an extension arm 43 of insulating material with a ring 44 for a hot line wire grip and a hole 46 for a LP insulator.

Fig. 5 is a view illustrating a wire transfer mechanism for an LP insulator according still another embodiment of the present invention.

The wire stranding mechanism includes: an upper supporting means 60 having front and rear supporting brackets 61 and 61', an upper roller 62 rotatably mounted on the low portion thereof with brackets, and a handle 63 fixed to the upper portion thereof; a vertical supporting means 66 being rotatably and axially mounted to the rear supporting bracket 61' at right angles and having a longitudinal roller 65 in the same direction; an insulator coupling means 70 having a pad 71 with a semicircular inner circumferential surface to be rotated coaxially with the vertical supporting means 66 and coupled to the upper portion of an insulator and a screw-type clamp72; and an open-and-shut means 80 having a L-shaped roller supporting bar 81 axially mounted in a horizontal direction to an outer side of the insulator coupling means 70, a longitudinal roller 82 to be inserted into a coupling groove 64 of the front supporting bracket 61 by a locking unit 83 with a spring at the front end and a lower roller 84 protruded more
upwardly than the upper surface of the pad 71.

Fig. 6 is a view illustrating an embodiment of a space maintaining mechanism between new and removed wires according to the present invention.

The space maintaining mechanism include a vertical spacing bar 90, an open-type stranding roller 91 formed at one end of the spacing bar 90, a wire clamp 92 formed at one end of the spacing bar 90, and a plastic bolt 93 for fixing a wire 94 against the clamp 92.

An uninterruptible distributing method of the present invention using the wire transfer mechanism will now be explained by steps.

Firstly, as illustrated in Fig. 1, the distributing method includes the steps of: mounting wire transfer mechanisms for terminal poles, strain poles and pin long columns respectively to a cross arm of terminal poles, strain poles and pin long columns; transferring a removed wire to other spaces of a cross arm and cross arm extension means by securing mounting space of replaced and transferred wires; protecting a hot line of a transferred wire and mounting a wire transfer mechanism to an LP insulator of pin long column; mounting a new wire by performing stranding and pulling works of the new wire to a hot line protected and secured wire mounting space and the stranding mechanism mounted to the upper potion of the LP insulator; maintaining a wire with a space maintainer for securing a safety by preventing a contact between a new wire and a removed wire in a wire stranding work; separating electricity from the removed wire with the uninterruptible electricity manner by connecting between a new wire and the removed wire and then bypassing it; and removing the electricity-separated wire.

At this time, like the case that no wire stranding step is required for a mounted
pole, for example, changing of passing area, unnecessary steps can be omitted.

Such a step will be explained in detail according to an embodiment of the present invention.

In the step of mounting a wire transfer mechanism, the wire transfer mechanism is mounted according to the shape of long column of each pole.

For example, at terminal poles and strain poles with a suspension insulator 2 connected with a wire, a wire transfer mechanism for terminal poles and strain poles as shown in Fig. 2 is fixed by a clamping bolt 12 by inserting the supporting plates 11 and 11' of the cross arm fixing means 10 into the cross arm 1.

The axial bar 32 and the axial pipe 33 supported by the clamp 34 are rotated with the center at an axial point when adjusting an angle require for a work by rotating in the other direction by the axial rotating means 30, and thereafter a position fixture 35 with a spline 35s and a flange 35f is fitted and engaged with an axial pipe spline 33s formed at an inner surface of the axial pipe 33, and the length (height) adjust of the upper and lower arm bodies 23 and 23' is carried out by fixing the lower arm body 23' by an arm fixing clamp 31c and fixing the upper arm body 23' by an arm fixing clamp 31c.

In a pin long column that is mounted on the middle of a terminal pole and a strain pole and allows wires to be passed over an LP insulator 3 mounted to a cross arm 1, a wire transfer mechanism for a pin long column as shown in Fig. 3 is fixed at a cross arm by a supporting plate 11, the cross arm fixing means 10, and a clamping bolt 12.

Moreover, if there is a need for mounting the above wire transfer mechanism outside of a cross arm according to the location of wires and working conditions, a cross arm extension means 40 as shown in Fig. 4 is coupled to one end portion of the cross
arm by the supporting plate 41 for the cross arm, an insert end 42 and cross arm fixing pins 45 and 45' to make the wire transfer mechanism protrude outwardly of the cross arm 1 of the extension arm 43 and thereby mount the wire transfer mechanism. This enables a safe and convenient work by securing a wire mounting space.

In the wire transfer step performed after the wire transfer mechanism is mounted, a wire to be removed by releasing a dead-end clamp from a suspension insulator of terminal poles and strain poles is transferred by hanging a hot line wire grip on rings 22 and 22' for the hot line wire grip, and a jumper wire is fitted to insulation stranding rollers 21 and 21' and then is fixed in the state where a wire to be removed and transferred is moved to the other location as shown in Fig. 7a.

At this time, the axial bar 32 and the clamp 34 can be fixed to and separated from each other and thus the location thereof can be changed. The lateral length adjustment is enabled and applicable even if there is a little difference in the width of a cross arm. According to the distance between the axial rotating means 30 and the existing suspension insulator 2, the length adjustment of two arm bodies 23 and 23' are possible by moving the insertion length of the two arm bodies 23 and 23' and then fixing them by a jumper arm fixing clamp 24 and an arm fixing clamp 31c formed at the arm body of the rotary arm means.

In case of pin long columns, as shown in Fig. 7b, wires are contained in rollers 21 and 21' by the developable roller 21 at the upper end of the arm body 23' of the wire transfer mechanism fixed at sides of the LP insulator, and then the bind of the LP insulator is released and the axial rotating means 30 is rotated in the other direction. Then, the wire placed on the LP insulator is moved to the other side for thereby generating a mounting space for a new wire.
In addition, since the area where the wire at the center among three wires mounted at poles has a narrow workspace, it is necessary to move external wires to the outside of the cross arm to secure a workspace.

At this time, as shown in Fig. 7c, the cross arm extension means 40 is coupled to the end of the cross arm by the supporting plate 41 and the insert end 42 to make the extension arm 43 to be protruded outwardly of the cross arm. Thereafter, the wire transfer means is mounted in the same way that of the cross arm is mounted, and then the wire at the outer side can be moved outwardly of the cross arm in the same way.

As described above, after the wire transfer, a hot line protection cover is covered on a removed wire, a hot line. If there is a branch line or electric transformer at a working area, a wire to be removed is transferred by a bypass using a bypass cable for a jumper or a bypass cable for C.O.S and the hot line protection cover is mounted.

After the completion of the hot line protection step, a new wire is mounted at a wire mounting space that is secured by transferring a wire and located at the upper portion of a LP insulator of a pin long column using a wire stranding mechanism, a safety rope and distribution tensioner, winch, etc.

When installing the wire stranding mechanism to the LP insulator, the wire stranding roller can be coupled firmly to the upper portion of the LP insulator by expanding the pad 71, an insulator coupling means 70 at the lower portion, with a center of the rear axial point, inserting it into an upper groove of the LP insulator, folding the pad 71 again and clamping the clamp 72 at the front surface. Since the pad 71 is made of flexible plastic material, a kind of insulating material, it can cut off a current of a wire and prevent the damage of the LP insulator when it is coupled.

In this way, with respect to the wire stranding roller installed at the upper
portion of the LP insulator, firstly, a L-shaped roller supporting bar 81, the open-and-shut means 80, is expanded bilaterally, to thus make an inner space open. In this state, a wire to be installed is inserted into the wire stranding roller and is coupled to the upper portion of the LP insulator by the insulator coupling means 70. Then, the upper portion of the longitudinal roller 82 is inserted into the coupling groove 64 of the front supporting bracket 61 by rotating the L-shaped roller supporting bar 81 inwardly, and thusly locking is supported by the spring force. Therefore, as shown in Fig. 7d, a wire is confined between rollers. At the same time, the lower roller 84 of the L-shaped roller supporting bar 81 rotates around the axial point and is protruded upwardly, thereby raising the wire 94 upwardly like a fever.

Therefore, as the wire is separated from the LP insulator, it is contacted to the roller to make it move freely and smoothly. Thus, when the wire is moved for wire stranding and pulling works, this becomes convenient and easy and prevents the damage of cables or insulator surfaces.

During the stranding work, since the tensile force of a wire has not been controlled, the gap between new and old wires is non-uniform. Thus, in an area with a narrow gap and an area with the danger of short circuit for each required site, a wire clamp 92 is hung over old wires, clamped and fixed by a wire space maintainer as shown in Fig. 6 and new wires are fitted into the stranding roller 91 to allow a wire space as long as a space bar 90, thus enabling a safe work.

In this way, a wire is fixed to a dead-end clamp of each suspension insulator by carrying out a pulling work for pulling a stranded wire from the suspension insulator by an appropriate tensile force. The wire stranding mechanism is removed from the LP insulator of a pin long column and is bound again, thereby completing a wire mounting.
process.

In this way, after completing the mounting of a new wire, a removed wire in a hot line state and the new wire are connected with each other by a bypass. Then, if there is a branch line or transformer mounted between the new and the removed wires, this is connected to the new wire to supply a power uninterruptibly and remove a jumper bypass cable and a COS bypass cable.

In this way, after a preparatory work is finished, the uninterruptible electricity separation process for separating a wire to be removed completely from the power source and interrupting electricity is carried out.

Because the wire from which electricity is separated is not live, a safe work is enabled. As illustrated in Fig. 8, the arm body 23 of the wire transfer mechanism is lowered by releasing the clamp 24 for thereby alleviating the tension state of the wire. Then, it is possible to remove the wire safely and easily by a safety rope and a tensioner for distribution at a position lower than the new wire in the hot line state.

After the wire removal is finished, wire transfer mechanisms mounted on poles are removed, for thereby finishing constructions of removal and relocation of wires connected and distributed to each pole and changing of passing area.

In addition, in a distribution work including cross arm replacement, a separated auxiliary cross arm is laid on poles. Then, a wire is directly transferred or the wire transfer mechanism and wire stranding mechanism are installed for transferring wires.

By this, when it is difficult to mount the wire transfer mechanism on the cross arm during the distribution work or when it is required to replace the cross arm along with the replacement and relocation of new and old wires, there is no fixture for mounting the above wire transfer mechanism and stranding mechanism or transferred wire, thus
enabling the relocation of the wire.

At this time, supporting brackets 111 and 111' are mounted at both ends of a sectionally T-shaped beam 110. A connecting rod 112 is axially mounted at the supporting bracket 111 at one end of the beam, a clamp tub 113 is fitted to the connecting rod 112, a spring 114 is elastically mounted for thereby supporting the connecting rod 112 by a locking device 115, and a clamp 117 is inserted into the connecting rod 112 with a screw bar 116.

At the supporting bracket 111' at the other end of the beam 110, a hanger 120, having a chain hanging groove 121 and a pin insert hole 122 as shown in Fig. 15 are axially mounted. An auxiliary cross arm means 100 connected and fixed to a chain 118 connected to the clamp tub 113 via the supporting bar 112 is to be used as shown in the view of the embodiment for coupling and an auxiliary cross arm used for a pin long column with respect to the fixing device of the present invention as shown in Fig. 10.

That is, a cross arm extension means 40 connected with an extension arm 43 having a ring 44 for a hot line wire grip is inserted into a cross arm supporting plate 41, and the beam 110 is inserted into the cross arm supporting plate 41.

Fig. 11 is a view of an embodiment for coupling an auxiliary cross arm used for terminal poles and strain poles with respect to an auxiliary cross arm fixing device of the present invention.

At a T-shaped supporting arm 141 and the lower portion of a vertical support 142 at the center, an auxiliary cross arm 140 for terminal poles and strain poles, which is formed as the above-mentioned supporting means, that is, the auxiliary supporting means 143 having a clamp tub 113 elastically mounted with a connecting rod 112 and the spring 114, the screw bar 116, the clamp 117, the chain 118 and the hanger 120, is
coupled to the beam 110.

In addition, when relocating a wire to replace the wire mounted at the suspension insulator or I.P. insulator of the cross arm of terminal poles, strain poles and pin long columns by the uninterruptible electricity manner, the wire transfer mechanism is mounted to the cross arm, the existing wire is move to other places and a new wire is mounted thereon. From viewpoints of the conditions of the cross arm, if it is difficult to mount the wire transfer mechanism or if there is a need for placing the cross arm itself, the wire has to be transferred to other places or the wire transfer mechanism has to be, attached to a separate place.

Therefore, the problems of the auxiliary cross arm 100 according to the present invention can be solved by directly mounting the hanger to poles. Firstly, the beam 110 is located at a proper position. Then, the chain 118 coupled to the clamp tub 113 axially mounted at the axial mounting portion 111 at one end is fitted and fixed to the chain hanging groove 121 of the hanger 120, and the safety pin 119 of the front end is inserted into the pin insert hole 122, thus enabling the engagement of the chain 118.

At this time, as shown in Fig. 14a, the clamp tub 113 screwed with the supporting bar 112 is in the backward state near the clamp 117 while compressing the spring 114.

When the locking device 115 of the clamp tub 113 is pressed and released, as shown in Fig. 14b, the clamp tub 113 is forwarded firstly by the elastic force of the compressed spring 114, thereby pulling the chain 18 and thus making the chain 118 contacted to the periphery surface of a pole.

In the timely firstly contacted fixing device, as shown in Fig. 14c, when the clamp 117 at the rear side is clamped, the clamp 117 moves forward along the screw bar.
116, compresses the clamp tub 113 in the forward direction and moves it forward secondly against the spring 114, thus making the chain 118 more tensile and completely engaging the chain 118 to the periphery surface of the pole by the tensile force of the chain 118.

In the thusly mounted fixing device, as shown in Fig. 12, the auxiliary arm is coupled to the beam 110 by the cross arm supporting plate 41 of the cross arm extension means 40. The wire transfer mechanism is mounted to the auxiliary arm, thus transferring the wire at the upper portion of the cross arm by the stranding roller or directly transferring the wire by directly connecting the wire to hot line wire grip rings 44 and 44'.

In addition, in the case of the terminal pole and strain pole at which the suspension insulator is installed, as shown in Fig. 13, an auxiliary cross arm 140 of double row type is mounted. By coupling the auxiliary cross arm 140 to the beam 110 of the supporting arm 141, it is constructed in the direction parallel to an existing double row type cross arm for strain poles. Thus, it is possible to relocate a wire by mounting the wire transfer mechanism 20 on the conventional cross arm for strain poles. Particularly, a separate auxiliary supporting means 143 is additionally formed at the lower portion of the auxiliary cross arm 140 for strain poles. Even if the wire transfer means 20 mounted on the auxiliary cross arm 140 has a relatively large tensile force and is heavy, it can be supported without being deflected.

As described above, according to one embodiment of the present invention, constructions of removal and relocation of wires connected and distributed to each pole and changing of passing area, a wire to be removed and relocated are transferred using the wire transfer mechanism in poles, and a new wire is mounted on that site. Then, the removed wire
acts for a bypass cable of the conventional method for direct transfer, thereby enabling constructions of wire removal, pole removal and relocation and changing of passing area very safely and simply. Since no excessive load switching work of a large capacity distribution line is performed in order to apply the conventional cable method, an effective and stable distribution line system operation can be carried out corresponding to the large capacity distributing method. Particularly, as the uninterruptible work can be carried out with respect to the upper end of a distribution line of more than two stages, the quality of power can be improved. Moreover, as the movable transformer truck construction method can be applied, if necessary, only during a transformer replacement work, the construction cost can be reduced drastically and there is no inconvenience for pedestrians and transit cars due to the mounting of cables, thus minimizing civil applications.
The claims defining the invention are as follows:

1. A wire transfer mechanism in a pole, comprising:
   a cross arm fixing means having supporting plates to be fixed to a cross arm and a clamping bolt;
   a wire transfer means having wire transfer rollers and an arm body; and
   an axial rotating means having an arm fixture for axially mounting the wire transfer means to the cross arm fixing means to allow the arm body to be rotate, an axial bar and, an axial pipe, an axial supporting clamp and a position fixture.

2. The mechanism of claim 1, wherein the U-shaped supporting plates of a cross arm fixing means are formed at both sides and a clamping bolt is screwed into the lower side of the plates;
   the wire transfer means includes two-stage telescopic arm bodies of insulating material, a plurality of rollers whose one end can be fully opened at the upper end of the arm bodies, a height adjust clamp mounted of the connection portion between the two arm bodies, and hot line wire grips being formed at opposite sides of the height adjust clamp; and
   the axial rotating means includes an axial bar mounted on one side of the arm body by a clamp with base which is welded to one end of the axial bar, an axial pipe mounted on the other side of the arm body by a clamp with base which is welded to one end of the axial pipe and having a spline formed at inner surface and a flange of the other end of the axial pipe, clamps mounted on the axial bar and the axial pipe to connect the cross arm fixing means to the axial bar and the axial pipe respectively, and a position fixture having a spline meshed with the spline of the axial pipe and a flange coupled to the flange of the axial pipe.

3. The mechanism of claim 1, wherein the cross arm fixing means consists of a U-shaped supporting plate formed only at one side thereof, and the axial rotating means formed at the upper portion of the supporting plate has an axial bar with a spring capable of rotating for a predetermined interval by a stopper being inserted into an axial supporting bar and a clamp with a pad for coupling the arm body of insulating material being mounted at the front end of the axial bar.
4. The mechanism of claim 1, wherein the cross arm fixing means is coupled to the cross arm extension means including a connecting portion having a supporting plate for a cross arm, an insert end and cross arm fixing pins and an extension arm of insulating material with a ring for a hot line wire grip.

5. The mechanism of claim 4, wherein the cross arm extension means consists of supporting brackets mounted at both ends of a sectionally L-shaped beam, a connecting rod axially mounted to the supporting bracket at one end of the beam, a clamp tub fitted to the connecting rod, a spring elastically mounted for thereby supporting the connecting rod by a locking device, and a clamp inserted into the connecting rod with a screw bar; and a hanger having a chain hanging groove and a pin insert hole axially mounted at the supporting bracket at the other end of the beam and connected to an auxiliary cross arm means connected and fixed to a chain connected to the clamp tub.

6. An uninterruptible distributing method using a wire transfer mechanism in a pole, comprising the steps of:

   mounting wire transfer mechanisms for terminal poles, strain poles and pin long columns respectively to a cross arm of terminal poles, strain poles and pin long columns;

   transferring a removed wire to other spaces of a cross arm and cross arm extension means and securing a mounting space of replaced and transferred wires;

   protecting a hot line of a transferred wire and mounting a wire transfer mechanism to an LP insulator of pin long column;

   mounting a new wire by performing stranding and pulling works of the new wire to a hot line protected and secured wire mounting space and the stranding mechanism mounted to the upper portion of the LP insulator;

   maintaining a wire with a space maintainer for securing a safety by preventing a contact between a new wire and a removed wire in a wire stranding work;

   separating electricity from the removed wire with the uninterruptible electricity manner by connecting between a new wire and the removed wire and then bypassing it; and
removing the electricity-separated wire.

7. A wire transfer mechanism in a pole substantially as hereinbefore described with reference to the accompanying drawings.

8. An uninterruptible distributing method having the steps substantially as hereinbefore described.

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Fig. 3
Fig. 4
Fig. 5
Fig. 7d