H. B. BUSH.

APPARATUS FOR CONNECTING SERVICE WIRES TO CHARGED MAIN WIRES.

APPLICATION FILED AUG. 14, 1916.

1,249,898.

Patented Dec. 11, 1917.

2 SHEETS—SHEET 1.

Fig. 2.

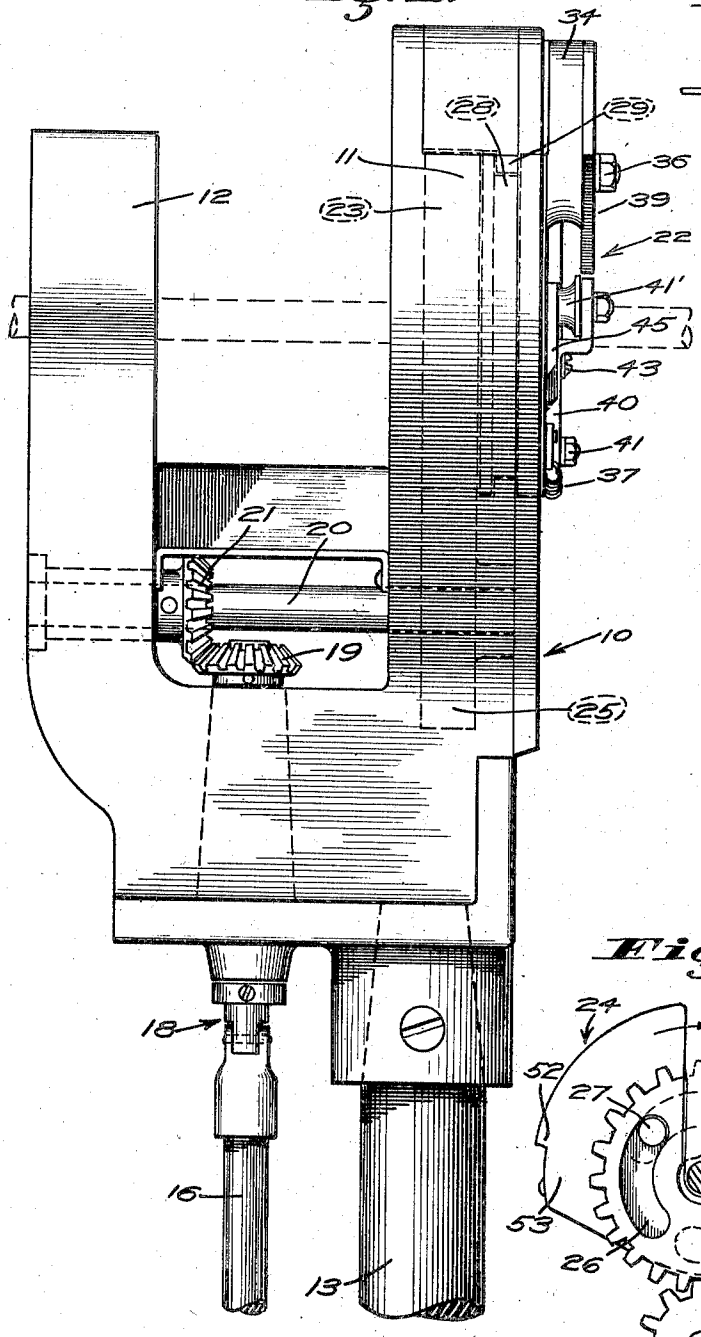


Fig. 1.

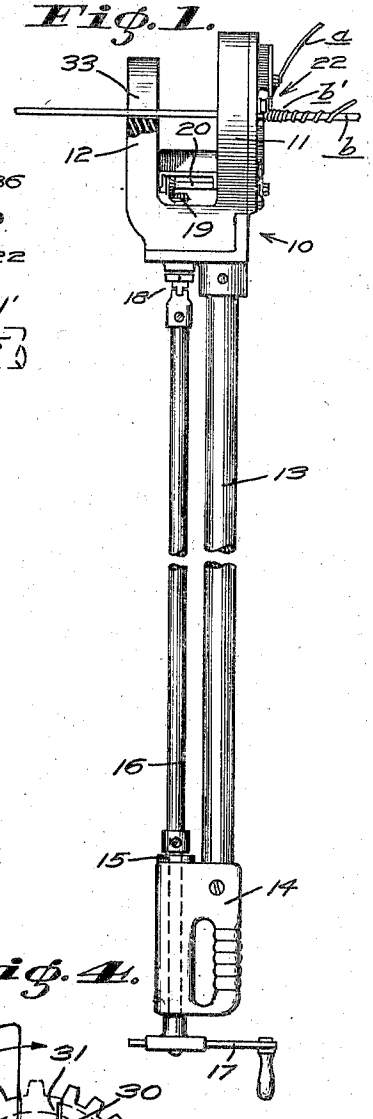
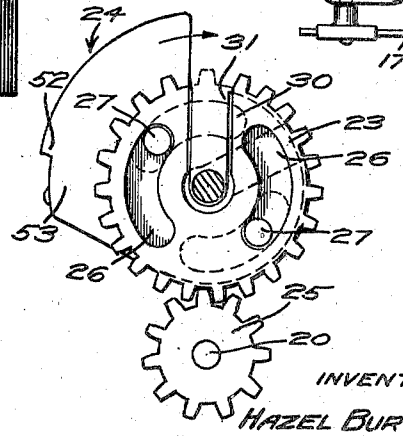


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 3.

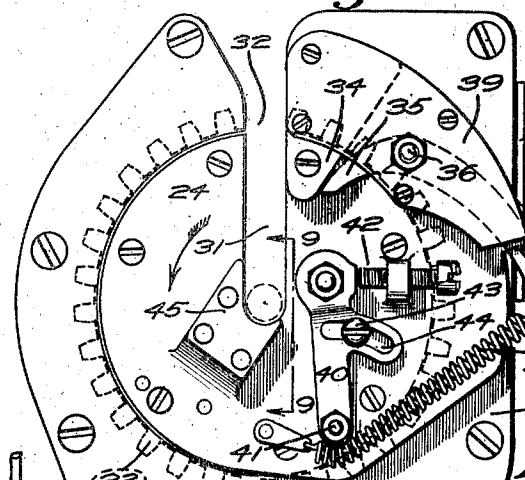


Fig. 10.

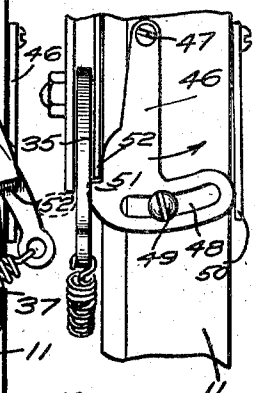


Fig. 5.

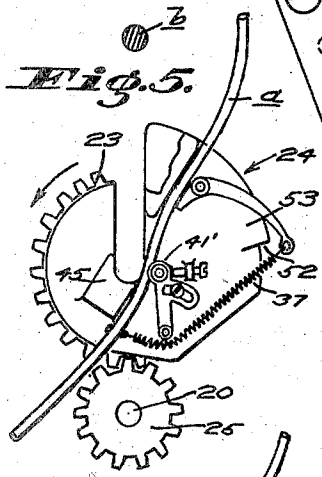


Fig. 7.

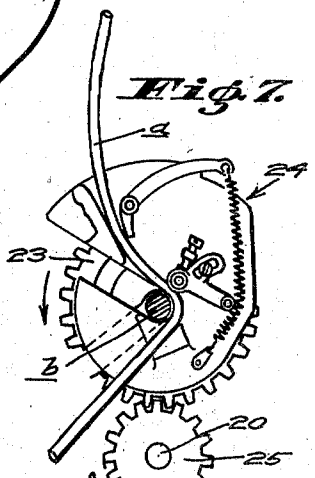


Fig. 6.

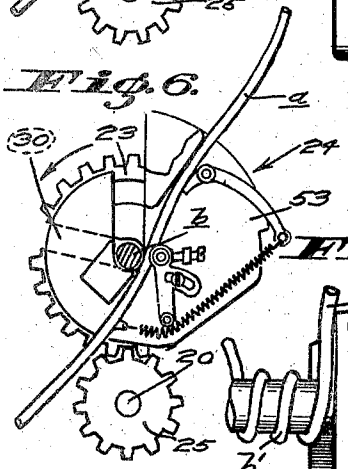


Fig. 9.

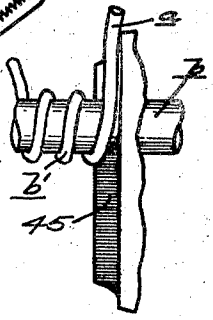
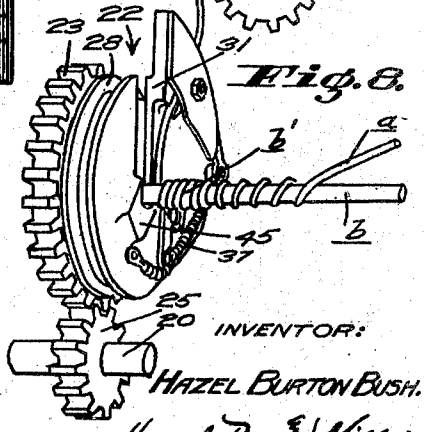


Fig. 8.



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APPARATUS FOR CONNECTING SERVICE-WIRES TO CHARGED MAIN WIRES.

1,249,898. Specification of Letters Patent. Patented Dec. 11, 1917.

Application filed August 14, 1916. Serial No. 114,876.

To all whom it may concern:

Be it known that I, HAZEL BURTON BUSH, a citizen of the United States, residing at Redlands, in the county of San Bernardino and State of California, have invented new and useful Improvements in Apparatus for Connecting Service-Wires to Charged Main Wires, of which the following is a specification.

My invention relates to an apparatus for connecting service wires to charged high voltage main wires, although my invention is of general application and may be used for connecting new wires to charged wires of all kinds.

The principal object of my invention is to construct an apparatus which may be manipulated by one operator and which enables him to connect service wires to charged high voltage main wires by winding the service wire on the main wire and forming therewith a tight coil of any desired length. The apparatus is provided with means whereby the main wire may be easily engaged and confined within said means to hold the latter against transverse movement in relation thereto while the service wire is quickly and easily wound on the main wire. Means are also provided for instantly releasing the apparatus from the main wire as soon as the winding operation is finished.

It is another object of my invention to construct an apparatus enabling the operator to connect service wires to the main wire at a considerable distance therefrom and without any danger to the operator.

With the above and other objects in view which will appear as the description proceeds, my invention consists in the construction, combination and arrangement of parts hereinafter claimed and described.

In the accompanying drawings which form a part of this specification, I have illustrated a convenient and practical embodiment of my invention and in which:

Figure 1 is a side elevation of my apparatus, showing the same in the operation of winding a service wire upon a charged high voltage main wire.

Fig. 2 is an enlarged side elevation of the head frame and the mechanism mounted thereon.

Fig. 3 is a front elevation of the winding head.

Fig. 4 is a rear elevation showing the floating gear with its driving gear and the winding disk connected to the floating gear.

Fig. 5 shows a front elevation of the operating parts of the winding head preparatory to engaging the main wire.

Fig. 6 is a similar view showing the main wire engaged by the winding head preparatory to the winding movement thereof.

Fig. 7 is a similar view showing the position of the parts after the rotation of the winding head has started.

Fig. 8 is a perspective view of the winding head and accessories showing the manner in which the service wire is wound upon the main wire.

Fig. 9 is a detail view on an enlarged scale, taken on line 9—9, Fig. 3.

Fig. 10 is a detail view showing the slot registering mechanism allowing the release of the main wire and the removal of the apparatus from the main wire after the service wire has been wound thereon.

My apparatus comprises a winding head frame 10 which may be of any preferred construction, but which I have shown as being U-shaped, consisting of a front leg 11 and a rear leg 12, the front leg being somewhat longer than the rear leg. Securely fastened to the winding head frame 10 is a supporting handle 13. Secured thereto is a hand grip 14 which is provided with a bearing 15 in which a winding shaft 16 is journaled. 17 designates a suitable crank whereby the shaft 16 may be rotated. The winding shaft 16 extends parallel to the handle 13 and is connected by a suitable shaft coupling 18 to a beveled gear 19 mounted on the base of the frame 10. A gear shaft 20 journaled in the leg members 11 and 12 of the frame, has thereon a beveled gear 21 in mesh with gear 19. The leg member 11 forms a housing in which a winding head 22 is mounted. The winding head comprises a floating gear 23 and a winding disk 24 coöperating therewith. The floating gear 23 is driven by a driving gear 25 fast to shaft 20.

The floating gear 23 is provided with a pair of arcuate slots 26, 26 oppositely disposed for the reception of a pair of studs 27, 27 fast to the winding disk 24. The winding disk 24 is provided on its periphery with a groove 28 engaging a circular bearing flange 29 formed integral with the body of the leg 11, said groove and flange

constituting a bearing for said winding disk. The floating gear and the winding disk are each provided with a radial slot 30 and 31 which slots extend from a point beyond the centers thereof and which are adapted to register with each other and also with a slot 32 in the rear face of leg 11 and slot 33 in leg 12 of the winding head frame 10.

As clearly shown in Fig. 3, the winding disk 24 has its outer face uncovered by the body of the leg 11. On the outer face of winding disk 24, a service-wire holding and guiding mechanism is provided comprising a stationary jaw member 34 securely fastened to said disk. Coöperating therewith is a pivoted jaw member 35 in the shape of a lever, the short arm coöperating with the stationary jaw member 34 and the long arm attached to a coiled tension spring 37 fastened to the winding disk 24. A cover and a service-wire retaining plate 39 is bolted to the stationary jaw member 34 by the bolt 36 which also serves as a fulcrum for the pivoted jaw member 35. A service-wire tensioning device mechanism is provided which comprises an arm 40 pivoted at 41 to the winding disk near the periphery thereof. Its inner end carries an anti-friction roller 41′. An adjusting screw 42 in connection with a screw 43 disposed in an arcuate slot 44 in arm 40 serves to adjust the tension arm and to lock it in adjusted position.

An important element of my winding head is a wire coil spacing plate 45 securely bolted to the outer face of the winding disk. It extends to the radial slot thereof, and its wall adjacent thereto conforms to the shape of the wall of slot 31. Said plate 45, as clearly shown in Fig. 3, is oppositely disposed to the service wire holding and guiding jaws 34 and 35.

Provision is made for quickly and easily releasing the main wire and removing the apparatus therefrom after the winding operation is completed. This is effected by reversing the direction of rotation of crank 17 which causes the winding head to rotate in an opposite direction. The releasing mechanism consists of a release lever 46 pivoted at 47 to the side of leg 11. On the free end of the lever 46, an arcuate portion with a slot 48 is provided in which a retaining pin 49 is disposed. A leaf spring 50 mounted on the inner face of leg 11 engages the arcuate portion 48 and tends to press the same outwardly toward the winding disk 24. The lever 46 is provided with a dog 51 adapted to engage a stop 52 on a lateral disk extension 53 which is slightly offset from the face of the body of the leg 11 to permit free rotation of said disk 24. During the wire winding rotation of the winding head, the stop 52 will slide over the dog 51 pressing the same inwardly against the tension of spring 50. On the rotation of the winding head in the opposite direction, the stop 52 will engage the dog 51 and prevent further rotation of the winding head. When the head is in this position, the wire engaging slots 30 and 31 are in registry with each other and also with the slots 32 and 33 of the head frame 10, thus allowing the main wire to be released as the apparatus is withdrawn therefrom, the main wire sliding out through said slots.

In the operation of my apparatus, the end of a service wire *a* is attached to the winding head by passing it between the service-wire holding and guiding jaws 34 and 35 so that a length thereof will project beyond said jaws as shown in Fig. 5. The radial slots 30 and 31 of the winding disk and the floating gear are in registry with the slots 32 and 33 of the frame 10 and constitute a guideway for the reception of the stationary main wire *b* as shown in Fig. 5. With the slots 30 and 31 in registry, the studs 27 occupy the position shown in slots 26 of said floating gear (see Fig. 4). The apparatus is lifted and the main wire *b* is engaged therewith and caused to slip down the guideway formed by said slots until it rests at the lower end thereof as shown in Fig. 6. On the rotation of the crank 17, motion is transmitted through shaft 16 and gears 19, 21 and 25 to the floating gear 23 rotating the same in the direction indicated by the arrow in Fig. 4. It will be noted that the floating gear will rotate about a quarter of a revolution before imparting motion to the winding disk by reason of the arcuate slots 26, 26, the studs 27, 27 being engaged for rotary movement only after they have been engaged by the farther end of the arcuate slots 26, indicated in dotted lines on Fig. 4. The slots 26 and studs 27 constitute a lost motion device retarding the initial motion of the winding disk 24 on the rotation of the floating gear 23 in either direction. The winding disk 24 on further rotation of the floating gear is caused to rotate therewith in unison, but it should be noted that the main wire *b* is now firmly locked in position in the winding head as the slot 30 and the slot 31 of the floating gear and the winding disk do no longer register. Rotation of the winding disk and the guiding jaws and the service wire *a* carried thereby will wind the wire *a* about the main wire *b* (see Fig. 7), the tension roller 41′ pressing the wire *a* against the main wire *b*. An important function is performed by the wire coil spacing plate 45, the outer face of which is spaced farther away from the winding disk than the wire *a* and the guiding jaws 34 and 35, thereby causing the coils *b*′ wound about the main wire *b* to form a closely coiled helix as shown in Fig. 8. The wire *a* is coiled upon the wire *b* on the side opposite to said spacer 45, the spacer serving to push the coils away from the

winding disk, thereby preventing the coils b' of the wire a from piling upon each other.

After the service wire has been completely coiled about the wire b, the rotation of the crank 17 is reversed causing the floating gear 23 to revolve in an opposite direction. It revolves for a quarter of a revolution freely without the winding disk 24 until studs 27 have reached the opposite ends of the arcuate slots 26 in said floating gear. In this position, the radial slots of the floating gear and the winding disk are in registry. On further rotation, the locking tooth 52 will engage the lug 51 on the release arm 46 preventing further rotation of the winding head. In this position of the winding head, the slots thereof are in registry with the slots of the frame 10, allowing the apparatus to be removed from the wire b by simply lowering the apparatus.

It is thus seen that I have devised an apparatus whereby one wire may be wound upon another at a distance by the operator and which, while capable of general application, is especially valuable for connecting service wires upon charged high voltage main wires.

Prior to the invention of my apparatus, it was necessary to discontinue the current of the main wire to enable the service wire to be connected. Such discontinuance and the consequent interruption of all the service stations caused great annoyance to the consumers. With my apparatus the service wires may be connected without any interruption of the service. It is understood that the handles and parts engaged by the operator in manipulating my apparatus are insulated. The handle, the grip and the shaft may be made of wood impregnated with oil of paraffin, or other safe insulating means may be provided.

While I have shown the preferred form of apparatus as now known to me, it will be understood that various changes in the construction and combination of parts may be made by those skilled in the art without departing from the spirit of my invention as defined in the appended claims.

I claim:

1. In an apparatus for connecting service wires to charged high voltage main wires, the combination of a U-shaped winding head frame, the legs of said frame being provided with a pair of parallel wire slots for the reception of the main wire, a handle for said frame, a winding shaft, a crank adjacent to the lower end of the handle for rotating said shaft, a beveled gear mounted in said frame and connected to said shaft, a shaft journaled in said frame having a gear in mesh with said first gear, a gear on said second shaft, a floating gear in mesh with said last-named gear, said floating gear having a pair of oppositely-disposed arcuate slots, a service-wire winding disk provided with a pair of studs disposed in said arcuate slots, a bearing mounted on said frame for engaging the periphery of said disk, said floating gear and said disk being each provided with a main wire receiving radial slot extending from the centers thereof and adapted to register with each other and with the slots of said frame, a spring-controlled pair of jaws fast to said disk for holding and guiding the free end of the service wire to be wound, an adjustable service-wire tension roller, a service-wire coil spacer fast to said disk, a spring-controlled slot registering device operable when the rotation of the winding shaft is reversed, whereby all of said main wire receiving slots may be brought into alinement and the apparatus may be released from the main wire.

2. In an apparatus for connecting service wires to charged high voltage main wires, the combination of a winding head frame, a handle for said frame, a winding shaft, a crank adjacent to the lower end of the handle for rotating said shaft, a rotatable floating gear in said frame operatively connected to said shaft, said floating gear having a pair of oppositely-disposed arcuate slots, a service-wire winding disk provided with a pair of studs disposed in said arcuate slots and adapted to be rotated by said floating gear, a peripheral bearing for said disk, said floating gear and said disk being each provided with a main wire receiving radial slot extending from the centers thereof and adapted to register with each other, a spring-controlled pair of jaws fast to said disk for holding and guiding the service wire to be wound, an adjustable service wire tension roller, a service wire coil spacer fast to said disk, a spring-controlled slot registering device and main wire releasing device operable when the rotation of the winding shaft is reversed, whereby the apparatus may be released from the main wire.

3. In an apparatus for connecting service wires to charged high voltage main wires, the combination of a frame, a floating gear mounted therein, a shaft operatively connected to said floating gear for rotating the same, said floating gear being provided with a pair of oppositely-disposed arcuate slots, a service-wire winding disk provided with a pair of studs disposed in said arcuate slots, said floating gear and said disk being each provided with a main wire receiving radial slot extending from the centers thereof and adapted to register with each other, a pair of jaws for guiding the wire to be wound, an adjustable service-wire tension roller, a member for spacing the coils of the service wire on the main wire, and means operable

when the rotation of the winding shaft is reversed for causing the slots of the floating gear and the winding disk to register and to move into main wire releasing position.

4. In an apparatus for connecting service wires to charged high voltage main wires, the combination of a winding head comprising a floating gear, means operable at a distance for rotating said gear, a winding disk rotated by said floating gear, means for producing lost motion of said winding disk on the initial rotation of said floating gear in either direction, said floating gear and said disk being each provided with a main wire receiving radial slot extending from the centers thereof, said slots being adapted to register when the winding head is in main wire receiving position and to be out of register and to cause said floating gear and said disk to confine the main wire against removal from said winding head during the winding operation, means for guiding the free end of the service wire to be wound, adjustable means for pressing said service wire against said main wire, means for evenly coiling the service wire upon the main wire, and means operable on the rotation of the floating gear in the opposite direction for causing said radial slots to register and to move into main wire releasing position.

5. An apparatus for connecting service wires to charged high voltage main wires, the combination of a winding head comprising a floating gear, means for rotating said gear, a winding disk rotated by said floating gear, means for retarding the motion of said winding disk on the initial rotation of said floating gear in either direction, said floating gear and said disk being each provided with a main wire receiving slot extending from the centers thereof, said slots being adapted to register when the winding head is in main wire receiving position and to be out of registry and to cause said floating gear and said disk to hold the main wire against removal during the winding operation, means for guiding the free end of the service wire to be wound, means for evenly coiling the service wire upon the main wire, and means operable on the rotation of the floating gear in the opposite direction for causing said radial slots to register to allow the release of the winding head from the main wire.

6. In an apparatus for connecting service wires to charged high voltage main wires, the combination of a winding head having a wire receiving slot extending to the center thereof, means for rotating said winding head, means operative on the initial rotation of said winding head to confine the main wire against removal from said winding head, means for guiding the service wire while it is wound, adjustable means for pressing said service wire against said main wire, means for evenly coiling the service wire upon the main wire, and means to allow the release of the winding head from the main wire.

7. In an apparatus for connecting service wires to main wires, a floating gear provided with a pair of oppositely disposed arcuate slots, a service wire winding disk provided with a pair of studs extending into the slots and forming a limited lost motion between the floating gear and the winding disk, means for operating the floating gear; there being radial slots extending from the centers of the floating gear and winding disk outwardly to the peripheries; and means for causing the slots to register when the floating gear is operated in one direction and to pass out of registration when the floating gear is operated in the other direction.

8. In an apparatus for connecting service wires to main line wires, means for winding service wires in helical coils upon main line wires so placed as to form cores for said helical coils; said means including two rotatable members having radial slots to receive the main line wires; and a lost motion device whereby said slots are adapted to register when the members are rotated one way and adapted to pass out of registration when the members are rotated the other way.

9. In an apparatus for connecting service wires to main line wires, means for winding a service wire in a helical coil tightly upon a main line wire; said means including a winding disk, a coil spacing plate bolted to the outer face of the winding disk, an arm pivoted to the outer face of the winding disk, an anti-friction roller carried by the inner end of the arm and adapted to engage the service wire, and an adjusting screw for regulating the pressure of the roller upon the service wire; said roller being in line with and opposed to the coil spacing plate.

10. In an apparatus for connecting service wires to main line wires, a winding disk, a stationary jaw member upon the winding disk, a pivoted jaw member upon the winding disk in opposition to the stationary jaw member, a spring for swinging the pivoted jaw member toward the stationary jaw member; said jaw members being adapted to have the service wire pass between them; means for holding the main line wire, and means for rotating the winding disk around the main line wire.

In testimony whereof I have signed my name to this specification.

HAZEL BURTON BUSH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."