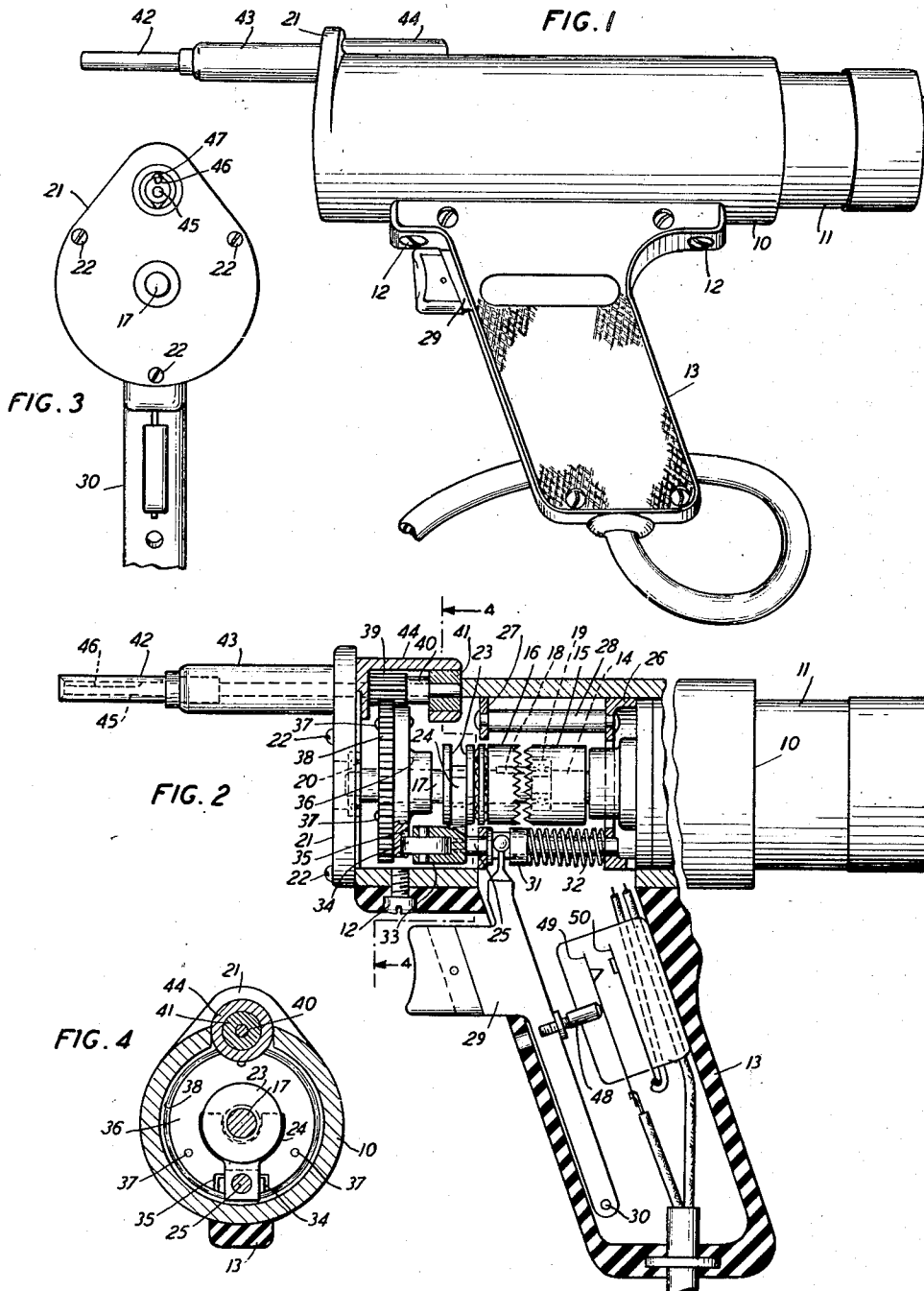


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TOOL FOR EFFECTING SOLDERLESS CONNECTIONS  
BETWEEN A WIRE AND A TERMINAL  
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## TOOL FOR EFFECTING SOLDERLESS CONNECTIONS BETWEEN A WIRE AND A TERMINAL

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This invention relates to wiring tools and more specifically to a tool for effecting solderless connections between connecting wires and terminals of the type used, for example, in electrical apparatus.

It is an improvement over the wiring tool disclosed in Hickman-Mallina-Reck copending application Serial No. 753,066, filed June 6, 1947, now Patent No. 2,585,010.

In the tool disclosed in the above-mentioned copending application a mounting is formed with a pistol-shaped barrel and handle, the barrel serving for securing a bushing at one end thereof for rotatably receiving a spindle having a pinion keyed at one end thereof for rotating the spindle by the operation of a gear sector formed with a trigger portion serving to manually operate the gear sector and thereby rotate the spindle which winds or wraps the wire around the terminal, a spring-pressed plunger being provided for returning the gear sector to normal position following each winding or wrapping operation.

The object of the present invention is the provision of a motor operated wiring tool which will be simple in construction, convenient in use and which will effect electrical connection between a wire and a connecting terminal in a positive manner.

In the drawing,

Fig. 1 is a side assembly view of the wiring tool;

Fig. 2 is a view similar to that of Fig. 1 shown partly in vertical section and with portions broken away;

Fig. 3 is a front view shown with the handle for the tool with portions broken away; and

Fig. 4 is a cross-sectional view taken along the line 4—4 of Fig. 2.

According to the construction of the wiring tool of this invention a cylindrically-shaped casing 10 serves for housing a motor 11 and to the casing 10 is secured, as by a plurality of screws 12, a hollow handle 13 preferably constructed of insulating material. On the armature shaft 14 of motor 11 as best seen in Fig. 2 is keyed a clutch member 15 disposed in engageable relation with a clutch member 16 mounted for sliding movement on a shaft 17 but prevented from free rotation thereon by a key 18. Shaft 17 is journaled at one end in a ball bearing fitted in a bore in clutch member 15 while the clutch member 16 may be moved in operative relation with clutch member 15 by the movement of an independent collar member 23 engaged by a fork-shaped arm 24 secured at one end of a rod 25 movable longitudi-

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nally in bearings formed in rings 26 and 27 fitted closely in the casing 10 and held in spaced relation to each other by a plurality of studs 28.

The rod 25 and the forked arm 24 carried thereby are moved for engaging the clutch member 16 with clutch member 15 by the manual operation of a trigger member 29 fitted in the handle 13 and pivoted on a stud 30. The free end portion of trigger 29 bears against a collar 31 carried by rod 25 for moving the latter longitudinally against the tension of a retractile spring 32 having its opposite end bearing against the ring 26.

The forked arm 24 is formed with lug portions 33 at right angles thereto serving for pivotally mounting a roller 34 provided for normally engaging a recess 35, Figs. 2 and 4, in the side of a disc member 36 keyed on the shaft 17, the roller and the recess comprising a detent means. Secured to the disc 36, as by a plurality of rivets 37 is a gear 38 disposed in engageable relation with the pinion 39 keyed on or formed with the end of a spindle 40 having one end journaled in a bushing 41 fitted in a projection 44 formed with a cover member 21, and its other end in a sleeve 42 screw-threaded in the end of a second projection 43 formed with the cover 21 in axial relation to projection 44.

The spindle 40 is provided at its free end portion with an opening such as the drilled hole 45, Figs. 2 and 3, longitudinally thereof for receiving the terminal of an electrical device as that of a relay for example, and at its periphery with a groove or orifice 46 longitudinally thereof for receiving the end of the wire to be wound or wrapped around the terminal, the sleeve 42 having a chamfered portion as 47 serving for facilitating the insertion of the wire in the groove 46 at the periphery of the spindle, the sleeve 42 assisting in maintaining the wire in the groove 46 as fully described in the copending application above mentioned. Since the detent means will stop the gear 38 in the same position, when the trigger 29 is unoperated, the spindle 42 may be made to stop in the same position by selection of a suitable ratio between gear 38 and pinion 39. Thus, the groove 46 will always have the same starting or normal position.

The trigger member 29 is provided with a stud 48 of insulating material disposed in engageable relation with a contact spring 49 movable for engaging a cooperating spring 50 for starting the operation of motor 11 following the engagement of clutch member 16 with clutch member 15 in turn followed by the disengagement of roller 34 from the recess 35 in the disc 36 which is followed

by the operation of contact 49—50 as will be hereinafter described in detail.

In a typical example of operation of the tool for the winding of the end of a wire on a support for effecting a solderless connection therebetween, the end of the wire is first inserted in the groove 46 and the tool placed in position for engaging the support which may be in the form of a terminal in the drilled hole 45 in the spindle 40 which is followed by the manual operation of trigger member 29 for moving the rod 25 longitudinally against the tension of spring 32. The movement of rod 25 is effective, first, to disengage the roller 34 from recess 35 in disc 36; second, to engage the clutch member 16 with the clutch member 15; and, third, to operate the contact spring 49 for engaging the latter with its cooperative contact 50 to close the energizing circuit of motor 11. The operation of the motor is effective to rotate the shaft 17 and thereby the disc and gear unit 36—38, the gear 38 rotating the pinion 39 and its supporting spindle 40 for winding the wire around the terminal a number of times dependent upon the length of wire inserted in the groove 46, the diameter of the terminal and the speed ratio between gear 38 and pinion 39. After rotation of shaft 17 and thereby disc 36 a small angular movement from its starting position, the rod 25, the clutch member 16 and the contact spring 49 are held in the operated position and the retractile spring 32 is tensioned because of the roller 34 riding on the face of disc 36. Upon a complete turn of gear 38, the tension of retractile spring 32 causes the longitudinal movement of rod 25 for reengaging the roller 34 in the recess 35 in disc 36 while the forked arm 24 imparts a movement to collar 23 for permitting the automatic disengagement of clutch member 16 from its complement clutch member 15 and the opening of contacts 49—50 for deenergizing the motor 11 provided the operator has released the trigger 29 prior to the reengagement of roller 34 in the recess 35 and the tool is now ready for another wire winding operation.

What is claimed is:

1. A wiring tool comprising a motor, a clutch element keyed on the armature shaft of said motor, a cylindrical housing for said motor having a handle, a disc-shaped cover member secured to said housing at one end thereof, a shaft journaled at one end into said clutch element and its opposite end into said cover member in coaxial relation to the armature shaft of said motor, a clutch element mounted for sliding movement on said shaft for rotating the latter upon its engagement with the first-mentioned clutch member; a gear keyed on said shaft having a recess therein, a hub portion formed with said cover member, a spindle mounted for rotation in said hub portion and having means for receiving the end of a wire and a terminal, a pinion keyed to one end of said spindle operatively engaging said gear, and means manually operable for engaging said clutch elements and starting

the operation of said motor for rotating said spindle for winding the wire around the terminal for effecting a connection therebetween, said means including a spring pressed roller removed from said recess on operation of said manually operable means and returned to said recess upon one complete turn of said gear, whereby said clutch elements are disengaged and said spindle is returned to its initial position.

2. A wiring tool for effecting a wrapped electrical connection between a wire and a terminal, said tool comprising a motor, a cylindrically-shaped casing for said motor, a handle secured to said casing, a trigger member mounted for movement in said handle, a cover element secured to said casing at one end thereof, said element having a hub portion, a clutch member keyed on the armature shaft of said motor, a shaft disposed in coaxial relation to the armature shaft of said motor having its ends supported by said clutch member and said cover element, a clutch member slidably mounted on one end of said shaft in engageable relation with the first-mentioned clutch member; a gear keyed on the opposite end of said shaft and having a recess in the surface thereof towards said motor, a spindle mounted for rotation in said hub portion having, adjacent one end, a pinion meshing with said gear and at the other end terminal and wire engaging orifices, a support mounted in said casing, a rod mounted for sliding movement on said support, means carried by said rod engaging means mounted on said shaft for moving the second-mentioned clutch member in engaged relation with the first-mentioned clutch member by the operation of said trigger member for rotating said spindle to wrap a wire on a terminal upon the operation of said motor, a roller carried by said rod resting in said recess, when said clutch members are disengaged, for holding the spindle in a starting position, and rolling on the surface of said gear when said clutch members are engaged, and a normally open contact in said handle operable by the operation of said trigger member following the engagement of said clutch members for controlling the operation of said motor.

FRANK RECK.

#### References Cited in the file of this patent UNITED STATES PATENTS

| Number    | Name           | Date           |
|-----------|----------------|----------------|
| 866,146   | Langer         | Sept. 17, 1907 |
| 854,050   | Marx           | May 21, 1907   |
| 963,138   | Golden         | July 5, 1910   |
| 1,238,445 | Scholl         | Aug. 28, 1917  |
| 1,214,680 | Hochriem       | Feb. 6, 1917   |
| 1,583,321 | Smith          | May 4, 1926    |
| 1,607,242 | De Bold        | Nov. 16, 1926  |
| 1,634,801 | Schneider      | July 5, 1927   |
| 1,786,118 | Lansing        | Dec. 23, 1930  |
| 1,881,728 | Leyedahl       | Oct. 11, 1932  |
| 2,054,479 | Hoddy          | Sept. 15, 1936 |
| 2,242,928 | Taigman        | May 20, 1941   |
| 2,585,010 | Hickman et al. | Feb. 12, 1952  |