

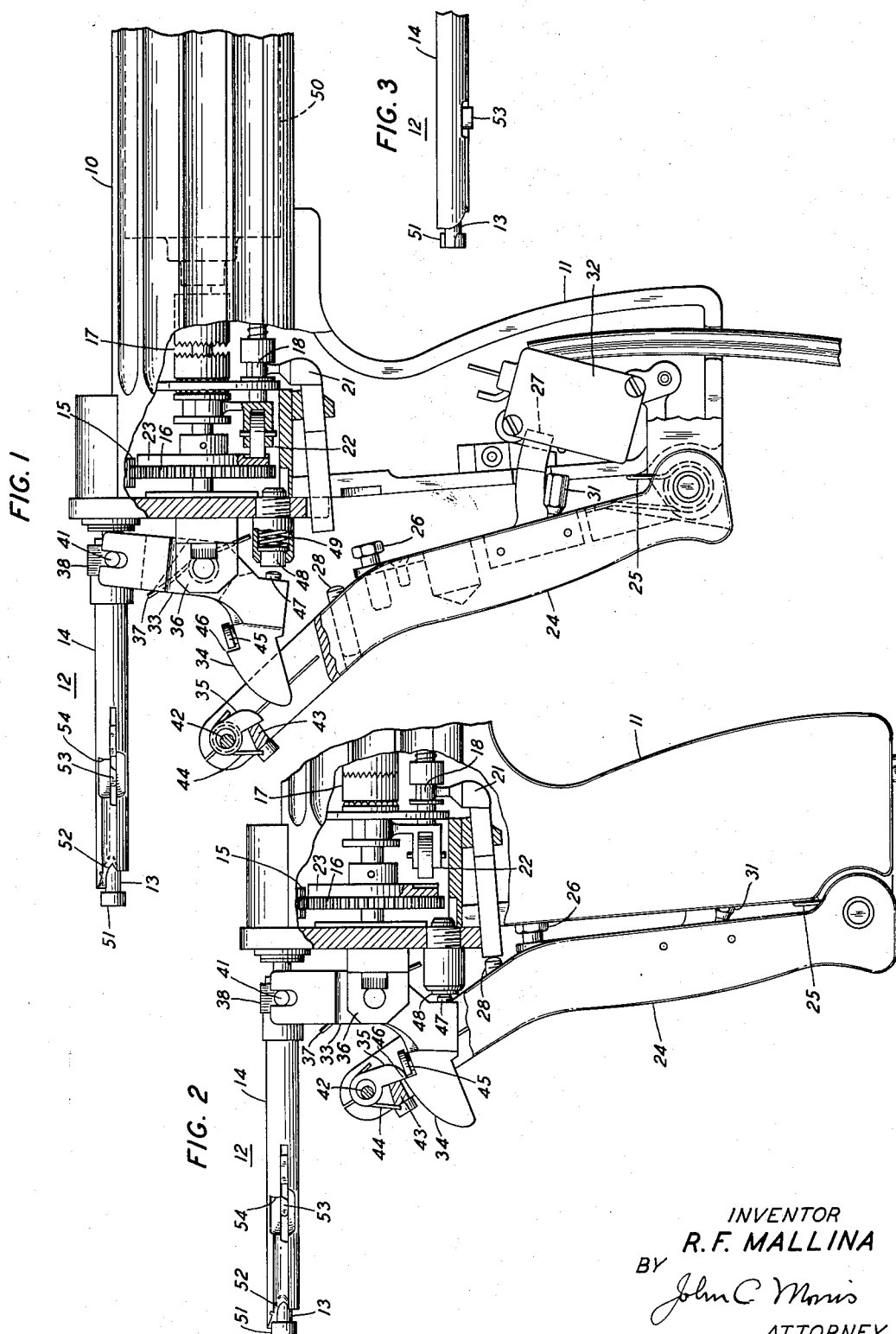
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R. F. MALLINA

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WIRE CONNECTING TOOL

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INVENTOR
R. F. MALLINA
BY *John C. Morris*
ATTORNEY

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WIRE CONNECTING TOOL

Rudolph F. Mallina, Hastings on Hudson, N. Y., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

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3 Claims. (Cl. 29—33)

This invention relates to wiring tools and more particularly to such tools that are capable of cutting and stripping an insulated wire and wrapping a portion thereof on a terminal or the like.

Tools of the type herein contemplated are known in the wiring art, for example the tool disclosed in the application of Frank Reck, Serial No. 234,643, filed June 30, 1951. The tool of the noted Reck application cuts an insulated wire to length and mutilates the insulation in response to manual operation of a lever and then wraps and simultaneously strips the insulation from the wire under motor power in response to manual operation of another lever or trigger.

It is an object of this invention to facilitate the operation of a combined cutting, stripping and wire wrapping tool. More specifically, it is an object of this invention to effect these operations in a manner which requires the manual operation of only one control element.

A feature of this invention resides in a wiring tool having a mechanical linkage interconnecting the operating or hand lever, the sleeve of the wire handling head, the clutch, and the motor control; whereby after insertion of a wire, a continuous movement in one direction of the hand lever will cause the tool to perform all of the operations incident to cutting, stripping and wrapping the wire on a terminal.

Other and further objects and features of this invention will appear more fully and clearly from the following description of an illustrative embodiment thereof taken in connection with the appended drawing in which:

Fig. 1 is a side view with parts broken away to show internal structure, of a tool illustrative of this invention with the hand lever and associated elements in the initial or unoperated condition;

Fig. 2 is a fractional side view similar to Fig. 1 with the parts in operated condition; and

Fig. 3 is a top view of the wire handling head.

As is shown in Fig. 1, the tool comprises a housing 10 containing a motor 50, and provided with a handle portion 11. A wiring or wire handling head 12 mounted on the housing includes a rotatable spindle 13 and a rotatable and reciprocable sleeve 14.

The spindle and sleeve are connected to a pinion 15, which is driven by a gear 16 connectable to the motor by means of a clutch 17. The clutch is operated by a shifting means 18 controlled by a connecting member 21. The shifting means 18 is also connected to a detent roller 22, which cooperates with a notch in the plate 23 on the gear 16. These elements are essentially the same as those disclosed and more fully described in the application of Frank Reck, Serial No. 15,834, filed March 19, 1948, now Patent 2,649,121, issued August 18, 1953.

An operating or hand lever 24 is pivoted to the handle 11 and biased to the non-operated or initial position by a spring 25. An adjustable stop 26 and a stop 27 are secured to the lever 24 for respectively limiting the inward and outward movements of said lever. An adjustable stud 28 on the lever 24 cooperates with the connecting

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member 21 to operate the clutch and detent means. The adjustable projection 31, also on the lever 24, operates the motor control switch 32 housed in the handle 11.

The linkage connecting the hand lever 24 with the sleeve 14 comprises a bellcrank lever 33 mounted on the housing and having a cam portion 34 for cooperation with a cam follower 35 mounted on the outer end of the lever 24. The bellcrank lever 33 is pivoted on the bracket 36 and biased to the unoperated position shown in Fig. 1 by the spring 37. The slotted upper end of the lever 33 embraces a cross-head 38 secured to the sleeve 14 but in which the sleeve is free to rotate. The lever 33 reciprocates the cross-head and thus the sleeve by way of pins on the cross-head, one of which is shown at 41.

The cam follower 35 is adjustably mounted on the hand lever 24 by an eccentric means 42 and is biased against a stop 43 by a spring 44. The bellcrank lever 33 has a detent for the cam follower comprising an adjusting screw 45 adjacent a shoulder 46 of the cam portion 34.

An adjustable pin 47 on the lever 33 cooperates with a plunger 48 mounted on the housing 10 and biased toward said pin by a spring 49.

The wire handling head 12 is provided with insulation mutilating and wire guiding jaws 51 and 52 on the spindle and the sleeve respectively. A wire cutting means comprises a projection 53 on the spindle and a shoulder 54 on the sleeve.

The operation of the wire handling part of this tool is similar to that described in the noted application, Serial No. 234,643, of Frank Reck. With the tool applied to a terminal, an insulating wire is placed between the jaws 51 and 52 and hand pressure is applied to the hand lever 24 to operate it just enough to close the jaws without gripping the insulation. The wire is dressed by sliding it between the jaws and inserted between the members 53 and 54 of the wire cutter. The hand lever 24 is then fully operated to the limit imposed by the stop 26.

The cam follower 35 having been brought into contact with the surface of the cam portion 34 by the initial operation of the lever 24, rides along this surface, rotating the bellcrank lever 33 counterclockwise as seen in Fig. 1. The lever 33, through the cross-head 38, moves the sleeve 14 to the left, crushing the insulation between jaws 51 and 52 and cutting the wire between members 53 and 54. When the follower 35 enters the detent beyond the cam shoulder 46 the bellcrank lever is given a slight retrograde (clockwise in Fig. 1) movement under the influence of the spring 49 which has been compressed by the pressure of the pin 47 against the plunger 48 until the screw 45 comes to rest against the cam follower. This movement is enough to relax the jaws 51 and 52 sufficiently to retain a grip on the insulation but not on the enclosed wire. The stud 28 then makes contact with the connecting member 21, engaging the clutch 17 and removing the detent roller 22 from its notch in the plate 23. The projection 31 operates the switch 32 to energize the motor, thereby rotating the spindle 13 and the sleeve 14 to wrap the connection, simultaneously stripping the insulation from the wire. The parts, except the spindle 13 and the sleeve 14, which are rotating, are in the condition shown in Fig. 2 during the wrapping operation.

Upon release of hand pressure thereon, the hand lever 24 returns to its initial position under the influence of the spring 25. The cam follower 35 rotates against the bias of the spring 44 sufficiently to allow said follower to ride out of the detent over the cam shoulder 46 and then returns to its position against the stop 43. The bellcrank lever 33 is returned to its initial position by the spring 37.

During the backward movement of the hand lever 24, the connecting member 21 is released allowing the de-

tent roller 22 to enter its notch in the plate 23 when they are in register. The clutch is disengaged and the motor is de-energized. The tool is now ready for the next operation with the jaws 51 and 52 in the initial position due to the indexing action of the detent means.

If upon operation of the tool it is found that the pressure of the jaws 51 and 52 during the wrapping and stripping phase is sufficient to cause wire breakage or insufficient to strip the insulation, an adjustment of the retrograde movement of the bellcrank lever 33 may be made with the screw 45. If it is found that the insulation crushing pressure is incorrect, adjustment may be made by changing the position of the cam follower 35 on the hand lever 24 by means of the eccentric pin 42. The other adjustable members such as 26, 28, etc. may also be changed if necessary.

What is claimed is:

1. A wiring tool for connecting an insulated wire to a terminal that comprises a housing, a wiring head including a rotatable spindle and a rotatable sleeve longitudinally movable on said spindle, the spindle and the sleeve having cooperating portions for receiving a wire when the sleeve is in one extreme longitudinal position, for cutting the wire to length and for mutilating a portion of the insulation when the sleeve is in the other extreme longitudinal position, and for wrapping a stripped portion of the wire on a terminal while simultaneously stripping the insulating therefrom when the sleeve is in an intermediate longitudinal position, a motor, a clutch for connecting the motor to the spindle and the sleeve, an operating lever pivoted to the housing and biased away from said housing, and a linkage between the lever and the sleeve including a bellcrank pivoted to the housing and having at one end a connection to the sleeve and at the other end a cam surface, a follower on the operating lever for contacting said cam surface to rotate the bellcrank in one direction and thus move the sleeve from said one to said other extreme position upon movement of the lever toward the housing, biasing springs on the housing for resisting rotation of the bellcrank, a depression on the bellcrank adjacent the cam surface for receiving the follower to allow slight retrograde rotation of the bellcrank by the biasing springs to move the sleeve to said intermediate position, and means on the lever for making contact with means on the housing to initiate operation of the clutch and the motor to rotate the spindle and the sleeve.

2. A wire wrapping tool for connecting an insulated wire to a terminal that comprises a housing, a wire handling head including a rotatable spindle and a rotatable

and reciprocable sleeve thereon, the spindle and sleeve having cooperating portions for receiving a wire, cutting the wire to length, mutilating a portion of the insulation, and wrapping a stripped portion of the wire on a terminal while simultaneously stripping the insulation therefrom, a motor, a clutch for connecting the motor to the spindle and the sleeve, an operating lever pivoted to the housing, and a linkage between the operating lever and the sleeve including a bellcrank lever pivoted to the housing and having at one end a connection to the sleeve and at the other end a cam surface, a follower on the operating lever for contacting said cam surface to rotate the bellcrank lever and thus reciprocate the sleeve upon movement of the operating lever toward the housing, biasing means on the housing for resisting rotation of the bellcrank lever, a depression on the bellcrank adjacent the cam surface for receiving the follower to allow slight retrograde rotation of the bellcrank lever, and means on the operating lever for making contact with means on the housing to initiate operation of the clutch and the motor to rotate the spindle and the sleeve.

3. A wire wrapping tool for connecting an insulated wire to a terminal that comprises a housing, a wire handling head including a rotatable spindle and a rotatable and reciprocable sleeve thereon, the spindle and sleeve having cooperating portions for receiving a wire, cutting the wire to length, mutilating a portion of the insulation, and wrapping a stripped portion of the wire on a terminal while simultaneously stripping the insulation therefrom, a motor, a clutch for connecting the motor to the spindle and the sleeve, means on the housing for respectively controlling the motor and the clutch, an operating lever pivoted to the housing, and a linkage between said lever and the sleeve including a bellcrank pivoted to the housing and having at one end a connection to the sleeve and at the other end a cam surface, a spring biased cam follower on the operating lever for riding upon said cam surface to rotate the bellcrank in one direction and thus reciprocate the sleeve, upon movement of the operating lever toward the housing, biasing means on the housing for resisting rotation of the bellcrank, a depression on the bellcrank adjacent the cam surface for receiving said cam follower to allow slight rotation of the bellcrank in the opposite direction, and means on the lever for operating the motor and the clutch controlling means to initiate operation of the clutch and the motor to rotate the spindle and the sleeve.

No references cited.