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Norskog

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[54] **WIRE WRAP QUALIFICATION TEST FIXTURE**

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[52] **U.S. Cl.** ..... **73/88 B,** 29/203 J, 73/103, 269/321 WE

[51] **Int. Cl.** **G01n 3/02**

[58] **Field of Search** ..... 73/88 B, 103; 29/203 J, 29/203 P; 269/321 WE, 55; 324/158 F; 108/142; 248/418, 425

[56] **References Cited**

UNITED STATES PATENTS

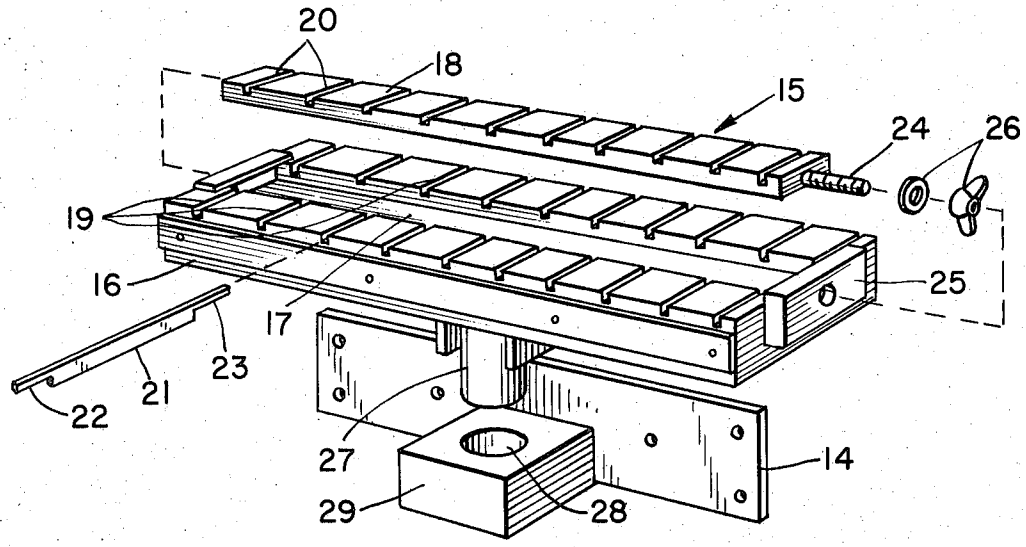
1,666,392	4/1928	Masury	248/418
3,098,378	7/1963	Marsh	73/103
3,232,101	2/1966	Siegler	73/134
3,312,460	4/1967	Kaufman	269/321 WE
3,354,708	11/1967	Joron	73/88 B
3,743,270	7/1973	Kaufman	29/203 J X

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Attorney, Agent, or Firm—Pastoriza & Kelly

[57] **ABSTRACT**

A mounting plate is designed to be secured to the front of a cross-connect frame in a telephone facility and to rotatably support a test terminal holding block. The arrangement is such that test terminals may be clamped transversely in the block with their opposite ends extending from the opposite sides of the block for testing the quality of wire wrapping tool bits used at the facility for making electrical connections. The fixture is characterized in that the terminal ends of the test terminals on one side of the fixture can be wire wrapped and then the terminal holder rotated 180° to position the opposite terminal ends on the same one side for wire wrapping and testing. Qualification tests of wire wrap tool bits can thus be made on the spot rather than having to deliver the wire wrap tool bits to a remote testing area.

4 Claims, 4 Drawing Figures



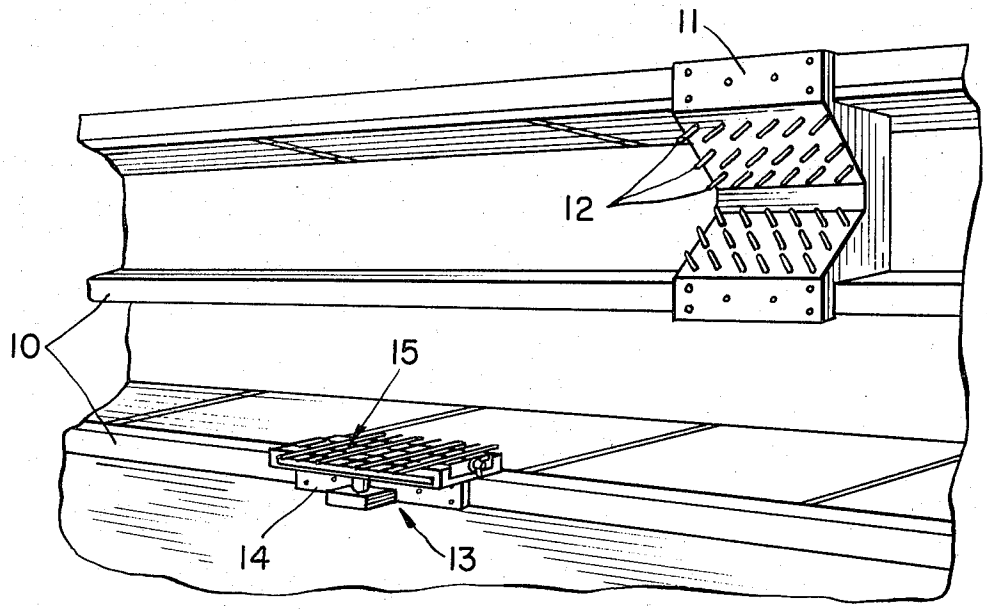


FIG. 1.

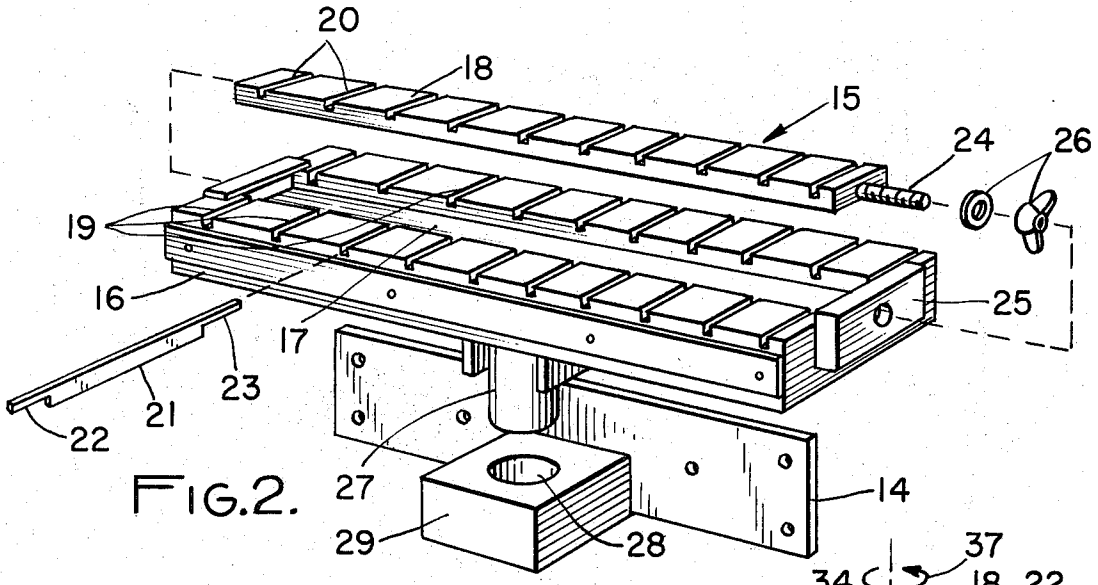


FIG. 2.

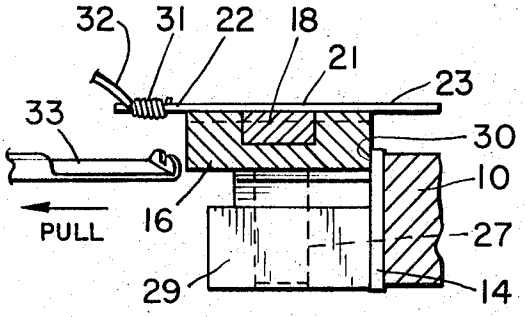


FIG. 3.

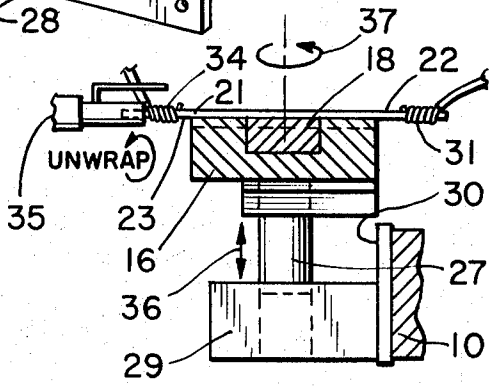


FIG. 4.

WIRE WRAP QUALIFICATION TEST FIXTURE

This invention relates generally to telephone operations and more particularly to a test fixture for wire wrap tool bits used in effecting telephone wire connections to terminals.

BACKGROUND OF THE INVENTION

In telephone facilities incorporating cross-connect frames or bays, it is common practice to make wire connections to terminals by means of a wire wrap tool. This tool functions to effect a tight wrapping of an uninsulated portion of wire about a terminal pin, the terminal pin being usually of square or rectangular cross-section so that a good electrical connection is effected. The wire wrap connection if properly carried out does not require any solder, the wire being retained on the terminal simply by friction.

After extended use, the bit in the wire wrap gun can become worn or out of adjustment in such a manner that the wire wraps may not meet quality standards required to assure reliable connections. In this respect, the wire might be wrapped too loosely in which event it can easily be pulled off of the terminal pin or it might be wrapped too tightly in which event the wire may actually break. It is thus common practice to run tests on the quality of the wire wrap tool bits by sending the bit portion of the gun to a remote central station where testing facilities are provided. Normally, the wire wrap tool bits are tested every 5,000 wraps or once a month, whichever occurs sooner.

Considerable time is lost by a telephone worker when he must ship his wire wrap tool to the testing facility for qualification tests and then await its return. It would be far preferable if the worker himself could conduct the quality tests on his own wire wrap tool bits at the site where he is working.

BRIEF DESCRIPTION OF THE PRESENT INVENTION

With the foregoing in mind, the present invention contemplates the provision of a wire wrap qualification test fixture which is designed to be secured directly to a cross-connect frame where a telephone worker is making terminal connections. By means of this fixture together with suitable test terminals, the worker can periodically as required conduct a quality test on his wire wrap tool bits.

More particularly, the qualification test fixture comprises a mounting means and a test terminal holding means coupled to the mounting means for rotation of 180°. With this arrangement, the opposite ends of test terminals held in the holding means may be wire wrapped and tested from one side of the fixture by first wire wrapping the terminal ends on said one side and then rotating the holding means 180° to position the opposite terminal ends on said one side for wire wrapping and testing.

BRIEF DESCRIPTION OF THE DRAWINGS

A better understanding of the invention will be had by now referring to the accompanying drawings in which:

FIG. 1 is a fragmentary perspective view of a portion of a cross-connect frame to which the qualification test fixture of this invention is secured;

FIG. 2 is an exploded, perspective view of the basic components making up the test fixture of FIG. 1;

FIG. 3 is an end view of the fixture of FIG. 2 when in assembled relationship for making a test; and,

FIG. 4 is an end view similar to FIG. 3 but illustrating the manner in which the test terminal holder portion of the fixture may be rotated 180° to enable tests to be carried out on terminal ends extending from an opposite side.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1 there is shown the front of a cross-connect frame **10** which typically supports terminal blocks **11** supporting various terminals **12** in a telephone facility. Telephone workers will normally effect connection of telephone wires to the individual terminals **12** by means of a wire wrap gun. Essentially, the wire wrap gun includes a rotatable bit having a small groove for receiving an uninsulated end portion of a wire to be connected to a terminal. A sleeve surrounds the bit and the bit is caused to rotate within the sleeve, the terminal pin itself being received in a central opening in the bit. The action is such that the wire is tightly wrapped about the terminal to effect the desired electrical connection.

The quality of the wire wrap depends on maintaining the wire wrap tools, particularly the bit portions in proper condition. Therefore, as mentioned heretofore, it is normal practice to conduct a quality test on wire wraps effected by any one bit after the bit has been used for 5,000 wraps or for 1 month, whichever occurs sooner.

Normally, two tests are performed: first, a "pull" test and second, a "unwrap" test. Thus to test the quality of a particular bit, it is used to wrap wire around several test terminal pins. After the wire is wrapped, a "pull" test is effected to determine if the wrapping is too loose. Normally, such a "pull" test is conducted on ten test wire wraps and if all 10 wraps remain on the terminals under a given pull force, they pass the test. Ten more wire wraps on 10 additional test terminals are then tested by an unwrapping of the same to determine if any weakness or breakage has occurred in the wires. If these additional 10 wire wraps are all unwrapped with no evidence of weakening or breakage in the wires, they pass the test and it is known that the particular bit used to wrap the 20 test terminals is in proper working order.

The present invention provides a wire wrap qualification test fixture designated generally by the numeral **13** in FIG. 1 which may be secured directly to the front of the cross-connect frame **10**, as by means of a mounting plate **14**. A test terminal holding means **15** in turn is rotatably mounted to the plate **14**.

Referring specifically to FIG. **2**, details of the test fixture are shown. Thus, the test terminal holding means **15** includes an elongated horizontal block **16** having a central longitudinal channel **17** for slidably receiving an elongated horizontal bar **18** shown exploded above the block **16**. The tops of the block **16** and bar **18** include transverse slots **19** and **20** respectively. The arrangement is such that when the bar **18** is longitudinally positioned in the channel **17** the slots **19** and **20** can be transversely aligned.

The slots **19** and **20** are dimensioned to receive test terminals one of which is shown at **21**. Each of the test

terminals has oppositely extending terminals ends such as indicated at **22** and **23.**

In order to clamp the test terminals within the slots when the bar **18** is assembled in the channel **17,** there is provided a tightening means in the form of a threaded stud **24** at one end of the bar **18** as shown in FIG. **2.** This stud is arranged to pass through an opening in an end member **25** secured at one end of the channel **17.** A washer and nut assembly **26** is threadedly receivable on the extending end of the stud **24** and it will be evident that tightening of the nut assembly will move the bar **18** within the channel **17** towards a position in which the slots are misaligned. Thus, the slots may initially be aligned by longitudinal adjustment of the bar **18** and the various test terminals such as **21** inserted in the aligned slots. By then tightening on the nut assembly **26,** the movement of the bar **18** tending to misalign its slots **20** with the slots **19** on the block **16** thoroughly clamps the test terminals in place.

Still referring to FIG. **2,** there is provided a journalling shaft **27** vertically extending downwardly from the central underside of the block **16.** This shaft is arranged to be journalled in a journalling bore **28** in a flange structure **29** secured to the plate **14.**

The assembled relationship of the components is shown in the end view of FIG. **3.** It will be noted that the block **16** and bar **18** assembly is essentially keyed in one of its test positions by engagement of the upper area along the upper edge of the plate **14** with the juxtaposed side wall of the block **16** as indicated at **30.** In other words, the block **16** is prevented from rotation about the vertical journalling axis when in this position. In this respect, the vertical axis of the journalling bore in the flange **29** is at the same spacing from the plane of the plate **14** as the spacing of the axis of the shaft **27** from opposite longitudinal sides of the block **16.** Thus, one side or the other is in a flush engagement with the top edge area **30** of the plate **14.**

In FIG. **3,** extending ends of test terminals, such as the terminal **21,** on one side of the fixture are shown wire wrapped as at **31,** the insulation **32** of the wire being removed on that portion which wraps about the terminal end **22.** A "pull" test can be effected on the wire wrap as by a pull tool **33** which has a force measuring scale indicating the force of pulling on the winding **31.**

Referring now to FIG. **4,** the block and bar assembly **16** and **18** are shown pulled upwardly so that the side of the block **16** clears the upper edge **30** of the plate **14.** In this position, it will also be noted that the shaft **27** is still partially journalled in the bore of the flange **29** so that the assembly can be rotated 180° to bring the oppositely extending terminal ends to the same side formerly occupied by the first mentioned terminal ends.

Thus, as shown in FIG. **4,** the terminal end **23** of the test terminal **21** is in a position for testing wherein a wire wrap **34** has been formed thereon. An unwrap test may now be performed by means of an unwrap tool **35** so that the wire wrap **34** can be inspected to see if there is any breakage or weakening as would result if wound too tightly on the terminal end **23.** It will be understood, of course, that after rotation of the assembly 180° it is lowered into the position illustrated in FIG. **2** so that the opposite side of the block **16** is keyed against the upper edge area **30** to again secure the assembly against rotation during test.

OPERATION

The operation of the fixture will be evident from the foregoing description. As illustrated in FIG. **1,** the fixture mounting plate **14** is simply secured to a front portion of the cross-connect frame **10** and the block and bar assembly making up the test terminal holder coupled to the plate by insertion of the shaft **27** in the journalling bore **28.**

In the preferred embodiment and in accord with requirements of qualification tests, there are provided ten sets of transverse slots so that ten test terminals such as **21** indicated in FIG. **2** can be mounted in the slots and clamped by means of the tightening nut assembly **26.** Ten terminal ends will thus project from the front side of the fixture and ten terminal ends will project from the opposite side.

After a telephone worker has made 5,000 wire wraps or after one month has passed, and the time has arrived to conduct a qualification test on his wire wrap tool bit, he will simply insert test terminals such as indicated at **21** in the fixture as described and use his gun to wrap wire around the ten extending terminal ends facing him. The worker may then conduct a pull test by means of the tool **33** described in FIG. **3** to see if the wire wraps are sufficiently secure on the pins. If any one of the ten test sample wire wraps pulls off under a given force, then the wire wrap tool has failed the "pull" test.

Thereafter, or even before any testing, the operator may simply lift up the block and bar assembly to the position illustrated in FIG. **4** and rotate the entire assembly 180° and then drop it back in place so that it is securely keyed against rotation by engagement of the upper area of the plate with the side of the block as described. The opposite terminal ends are then facing the worker and he can wire wrap these ten pins and thereafter conduct the "unwrap" test with the unwrapping tool **35** of FIG. **4.** If any one of the wire wraps after unwrapping evidences any weakness or breakage, then the wire wrap tool bit has failed the "unwrap" test.

From the foregoing, it will be evident that the present invention has provided a very convenient qualification test fixture which can be conveniently located in the area where a worker is working and is so designed as to provide a total of 20 test terminals so that the specifications for proper qualification testing can be readily carried out.

While the invention has been described in conjunction with telephone operations, it will, of course, be understood that the wire wrap qualification test fixture may be used in other environments for testing the quality of a wire wrapping tool bit.

What is claimed is:

1. A wire wrap qualification test fixture comprising, in combination:

a. mounting means including a flat plate having a vertical journalling bore;

b. a test terminal holding means including an elongated horizontal block having a shaft extending vertically downwardly from its central underside to be received in said bore for rotation of 180°; and

c. keying means constituting an upper edge area of said flat plate and the juxtaposed lower side area of said block, lifting of said block above the level of said upper edge freeing the block for rotation, said

block still being rotationally coupled to said mounting means in its raised position but free to rotate 180° whereby the opposite ends of test terminals held in said holding means may be wire wrapped and tested from one side of said fixture by first wire wrapping the terminal ends on said one side and then rotating said holding means 180° to position the opposite terminal ends on said one side for wire wrapping and testing.

2. A wire wrap qualification text fixture comprising, in combination:

a. a mounting plate having means for securement to a cross-connect frame so as to lie in a vertical plane;

b. means on said mounting plate defining a journalling bore having a vertical axis in spaced parallel relationship to the plane of said mounting plate;

c. a test terminal holder in the form of an elongated horizontal block and bar assembly, said block having a longitudinal central channel slidably receiving said bar, said block and bar assembly having transverse slots across their tops which may be transversely aligned by adjusting the longitudinal position of said bar in said channel, said aligned slots being dimensioned to receive test terminals;

d. tightening means associated with said block and bar for moving said bar along said channel so that test terminals inserted in said slots may be clamped by the block and bar when the bar is moved towards a position in which said slots are out of alignment; and,

e. a shaft extending vertically from the central underside of said elongated block with its axis spaced equally from the opposite longitudinal side of the block, a distance corresponding to the spacing of the axis of the journalling bore from said mounting plate, said shaft being dimensioned to be journalled in said journalling bore on said mounting plate such that a lower area of one of the longitudinal sides of the block seats flush against the mounting plate so that the elongated block and bar assembly is securely held by said plate, the length of the shaft in said bore being greater than the vertical height of the lower area of the side seated against the plate, whereby the elongated block and bar assembly may be lifted vertically to free the side from the plate without completely removing the shaft from its journalling bore, and rotated 180° and lowered so that the opposite side of the block engages the plate to secure the assembly such that wire wrap tests can be performed on the oppositely extending ends of test terminals held in the slots from the same side of said cross-connect frame.

3. A test fixture according to claim **2,** in which said tightening means comprises a threaded stud extending from one end of said bar; an end member secured at one end of said channel to said block and having an opening through which said stud extends; and a nut threadedly received on said extending stud such that tightening of said nut slides said bar along said channel.

4. A test fixture according to claim **3,** in which there are provided ten transverse slots across the tops of said block and bar so that ten individual test terminals may be secured in said assembly, and wherein wire pull tests can be conducted on ten of the extending ends of the test terminals from one side of the assembly and wherein unwrap tests can be conducted on the ten extending opposite ends of the test terminals after rotating the assembly 180°.

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