

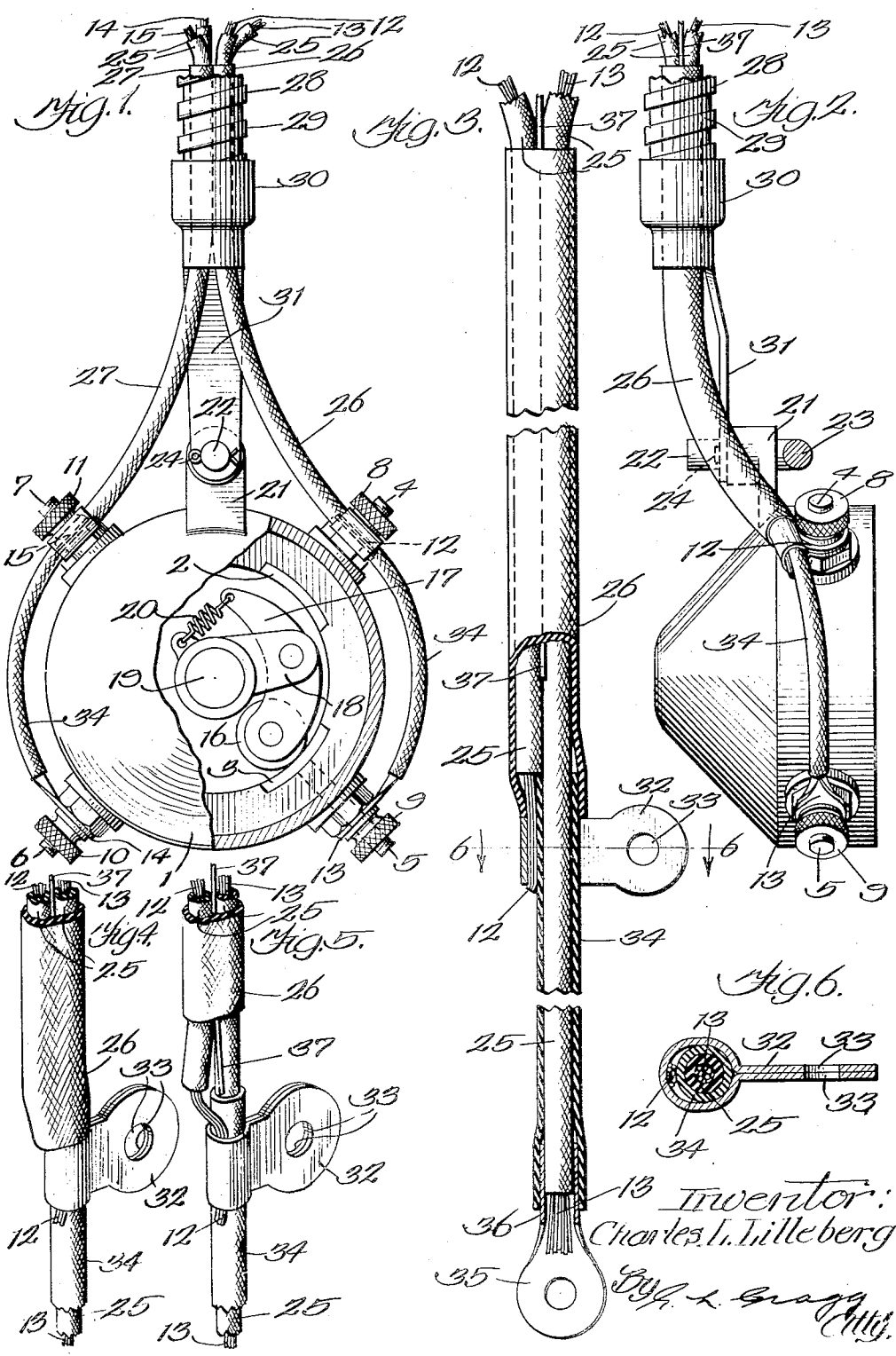
Aug. 12, 1924.

C. L. LILLEBERG

1,504,630

WIRE CABLE

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Inventor:
Charles L. Lilleberg
By *[Signature]*
Att.

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UNITED STATES PATENT OFFICE.

CHARLES L. LILLEBERG, OF CHICAGO, ILLINOIS.

WIRE CABLE.

Application filed November 22, 1922. Serial No. 602,667.

To all whom it may concern:

Be it known that I, CHARLES L. LILLEBERG, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Wire Cables, of which the following is a full, clear, concise, and exact description.

My invention relates to circuit wiring and has for its object the provision of improved means for making connections from wires that are included in a cable and resides, broadly speaking, in the employment of two circuit conductors, one extending longitudinally of and beyond the other and a circuit connecting clamp surrounding and gripping both conductors at the end of the latter with which it has electrical connection. In one embodiment of the invention each of two conductors is surrounded by an insulating sleeve individual thereto and both sleeves of insulation and the conductors therein are, in turn, enclosed by a third sleeve of insulation. The number of conductors that are arranged and distributed in accordance with my invention may of course be enlarged without departing from the spirit thereof.

The invention finds one important use in wiring timing switches, though it is not to be limited to such use.

The invention will be more fully explained by reference to the accompanying drawing in which Fig. 1 is a front view illustrating a timer and circuit connections therewith, a portion of the timer being shown in section; Fig. 2 is a side elevation of the structure shown in Fig. 1; Fig. 3 is a view in elevation, partially in section, of a cable composed and arranged in accordance with the preferred embodiment of the invention; Fig. 4 is a perspective view illustrating the invention; Fig. 5 is a view similar to Fig. 4 with the outermost sleeve of insulation slightly withdrawn; and Fig. 6 is a sectional view on line 6—6 of Fig. 3.

Like parts are indicated by similar characters of reference throughout the different figures.

The oscillatable member of the timing switch is in the form of a circular casing 1 carrying and enclosing four contacts equally distributed around its axis, two of such contacts being indicated at 2 and 3. These contacts are respectively provided with threaded binding posts 4, 5, 6 and 7 which extend through the casing member 1 and are pro-

vided with clamping nuts 8, 9, 10 and 11 by which the conductors 12, 13, 14 and 15 are respectively connected with the contacts 2, 3, etc. to which they are individual. The contact 16 is carried upon an arm 17 pivoted upon an arm 18 which is mounted upon and turns with an engine driven shaft 19. A spring 20 maintains the roller 16 in its outermost position whereby the contacts 2, 3, etc. are successively included in circuit. The timing switch illustrated is well known to those skilled in the art and is merely selected to illustrate the adaptability of my invention.

In accordance with common practice the oscillatable casing member 1 carries an arm 21 which is formed with an opening there-through through which the angular end 22 of a lever 23 is passed, a cotter pin 24 serving to maintain the assembly of said lever and arm. The conductors 12, 13, 14 and 15 are individually insulated by means of insulating sleeves 25 surrounding the same. The conductors 12 and 13 are desirably assembled in one pair by means of a sleeve of insulation 26 in which these conductors and their sleeves 25 are contained. The conductors 14 and 15 are, likewise, desirably assembled in another pair by means of a sleeve of insulation 27 in which these conductors and their sleeves 25 are contained. All of the conductors and the insulating sleeves in which they are contained and distributed are directed toward the timing switch by being passed through a flexible conduit which is preferably formed of spirals 28, 29 having inter-engaging spiral flanges at their spiral edges. The ends of the conduit are equipped with ferrules 30. The end of the conduit adjacent the timer casing element 1 has a rigid continuation 31, here shown as being made integral with the ferrule. This extension has a hole through which the lever end 22 passes, the extension being confined between the cotter pin 24 and the arm 21. The wires of each pair are similarly distributed in the manner which will be described more particularly in connection with Figs. 3, 4, 5 and 6.

The insulating sleeve 25 surrounding the shorter conductor 12 is cut away to bare the end of this conductor. A metallic clip 32 is formed with two symmetrically related contact ends formed with aligned binding post receiving holes 33. The clip sides are spread apart at their joining ends to form

a tubular or hollow portion through which the bared end of the shorter conductor and the longer conductor with its sleeve of insulation are passed, the portion of the clip receiving these cable parts being thereafter sufficiently collapsed to place the bare end of the shorter conductor and the insulating sleeve of the longer conductor in firm assembly with each other, and also with the clip and the longer conductor.

A sleeve 34 desirably surrounds the sleeve 25 which encloses the longer conductor, the added sleeve 34 being telescopically received within the adjacent end of the sleeve 26, to which latter end a space intervenes between the clip 32 and the sleeve about the shorter conductor. The longer conductor is attached to a binding post connector 35 which has a tubular portion 36 which receives the corresponding insulating sleeve 25 and which is received in the adjacent end of the added sleeve 34.

Two stiff wires 37 are desirably inserted in the triangular spaces which intervene between the sleeve 25 and the sleeve 26. These wires 37 may be given a substantially fixed shape to which the flexible conductors 12, 13, etc. will conform.

When the wiring of my invention is applied to a timing switch relative movement between the conduit which encloses the wiring and the portions of the wiring adjacent the conduit is practically eliminated so that the wiring and its insulating coverings will not be impaired in the portions thereof which are upon the exterior of the conductors. This result is largely contributed to apart from the stiffening wires 37 by reason of the described assembly of the tags 32 with the short and long wires.

While I have herein shown and particularly described the preferred embodiment of my invention I do not wish to be limited to the precise details of construction shown as changes may readily be made without departing from the spirit of my invention,

but having thus described my invention I claim as new and desire to secure by Letters Patent the following:—

1. The combination with two conductors, one extending longitudinally of and beyond the other and which latter is bare where it terminates; of a circuit connecting clip surrounding and gripping both conductors at the bare end of the latter.

2. The combination with two conductors, one extending longitudinally of and beyond the other and which latter is bare where it terminates; of a sleeve of insulation surrounding the former conductor; and a circuit connecting clip surrounding both conductors and gripping the bare end of the second aforesaid conductor and the insulating sleeve of the first.

3. The combination with two conductors, one extending longitudinally of and beyond the other; of a sleeve of insulation surrounding each conductor and which terminates short of the end of the second aforesaid conductor to leave this end bare; and a circuit connecting clip surrounding and gripping the bare end of the second aforesaid conductor and the insulating sleeve of the first.

4. The combination with two conductors, one extending longitudinally of and beyond the other and which latter is bare where it terminates; of a sleeve of insulation surrounding the former conductor; a circuit connecting clip surrounding both conductors and gripping the bare end of the second aforesaid conductor and the insulating sleeve of the first; and a sleeve of insulation surrounding both of said conductors upon one side of the clip; and a stiffening wire within the latter sleeve between it and the wiring enclosed by this sleeve.

In witness whereof, I hereunto subscribe my name this 20th day of November A. D., 1922.

CHARLES L. LILLEBERG.