

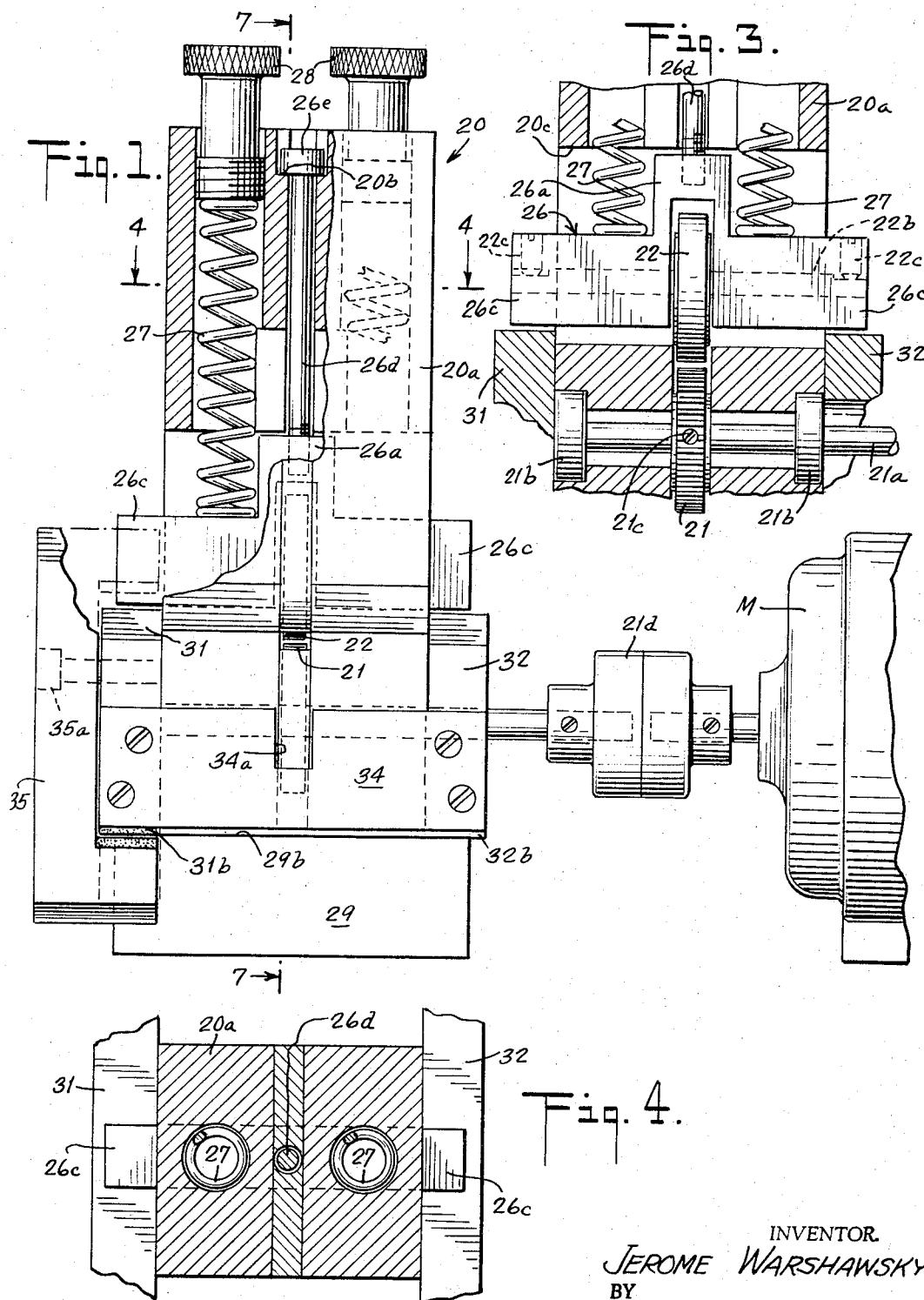
Nov. 21, 1967

J. WARSHAWSKY
ELECTRIC WIRE THREADING APPARATUS FOR LAMP
ARMS AND LIKE CONDUITS

3,353,791

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5 Sheets-Sheet 1



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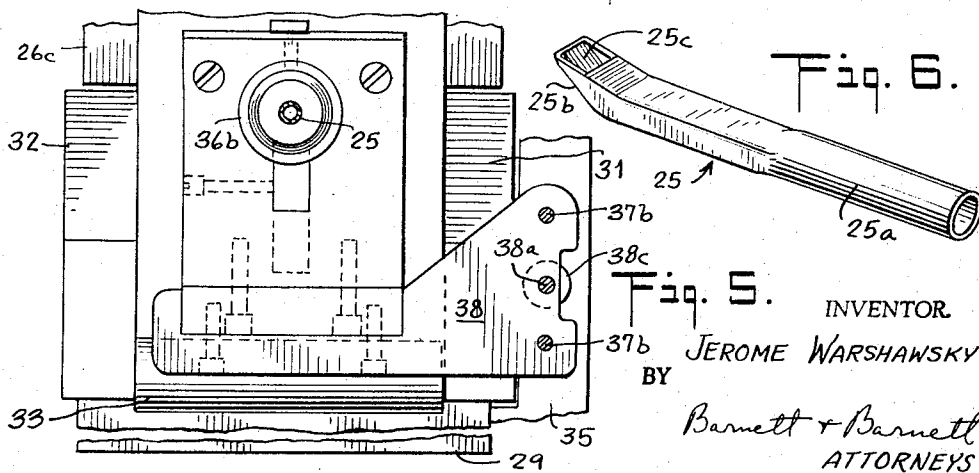
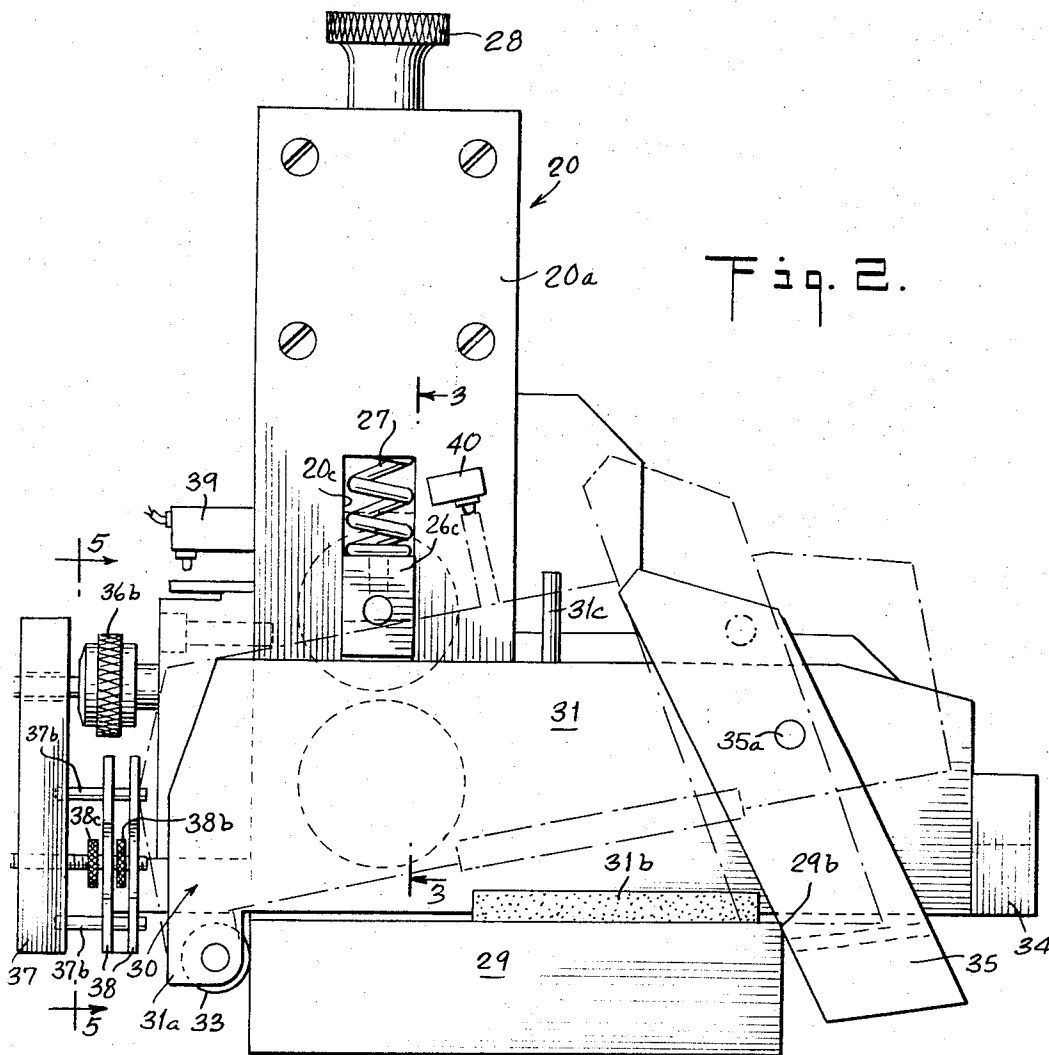
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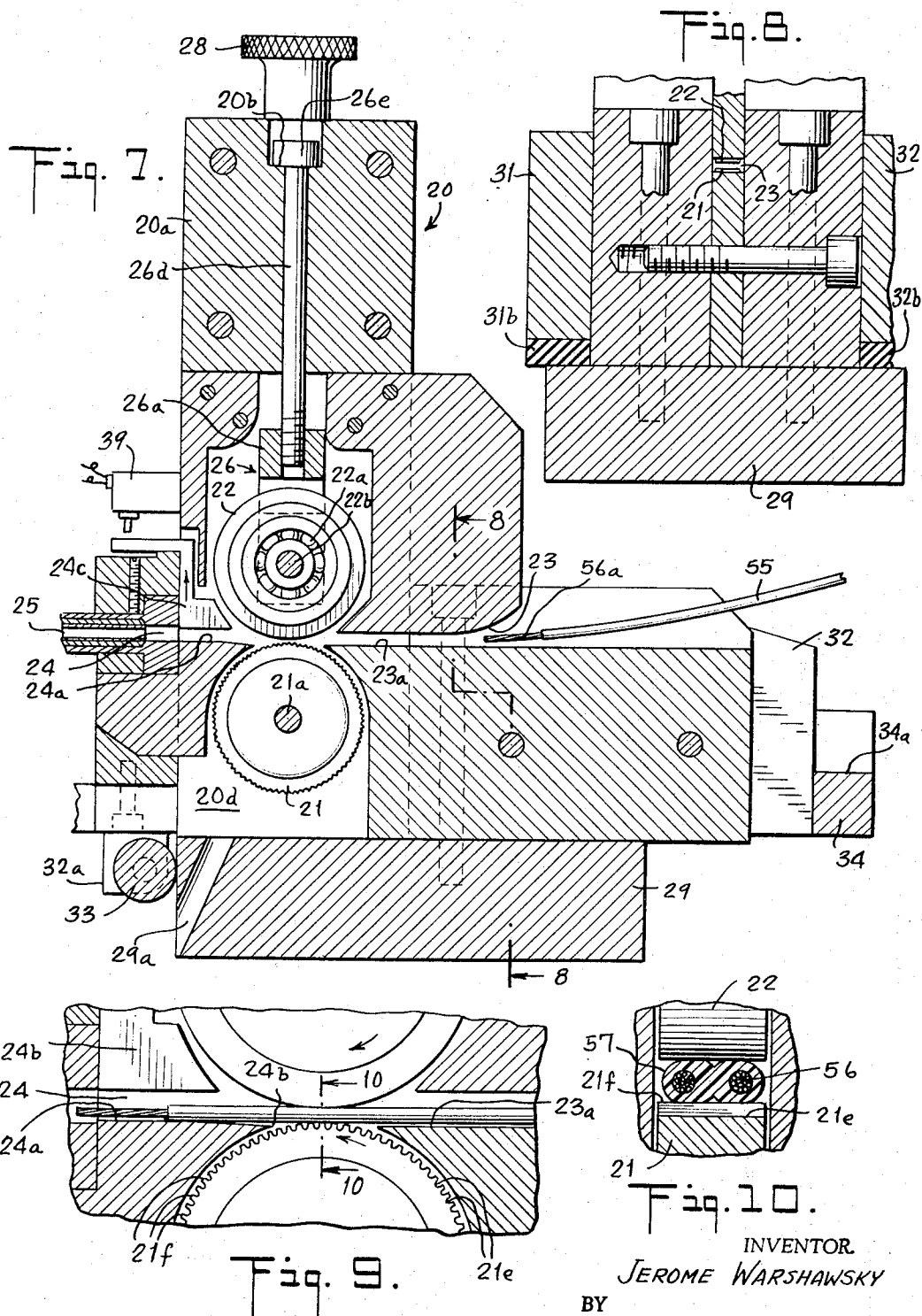
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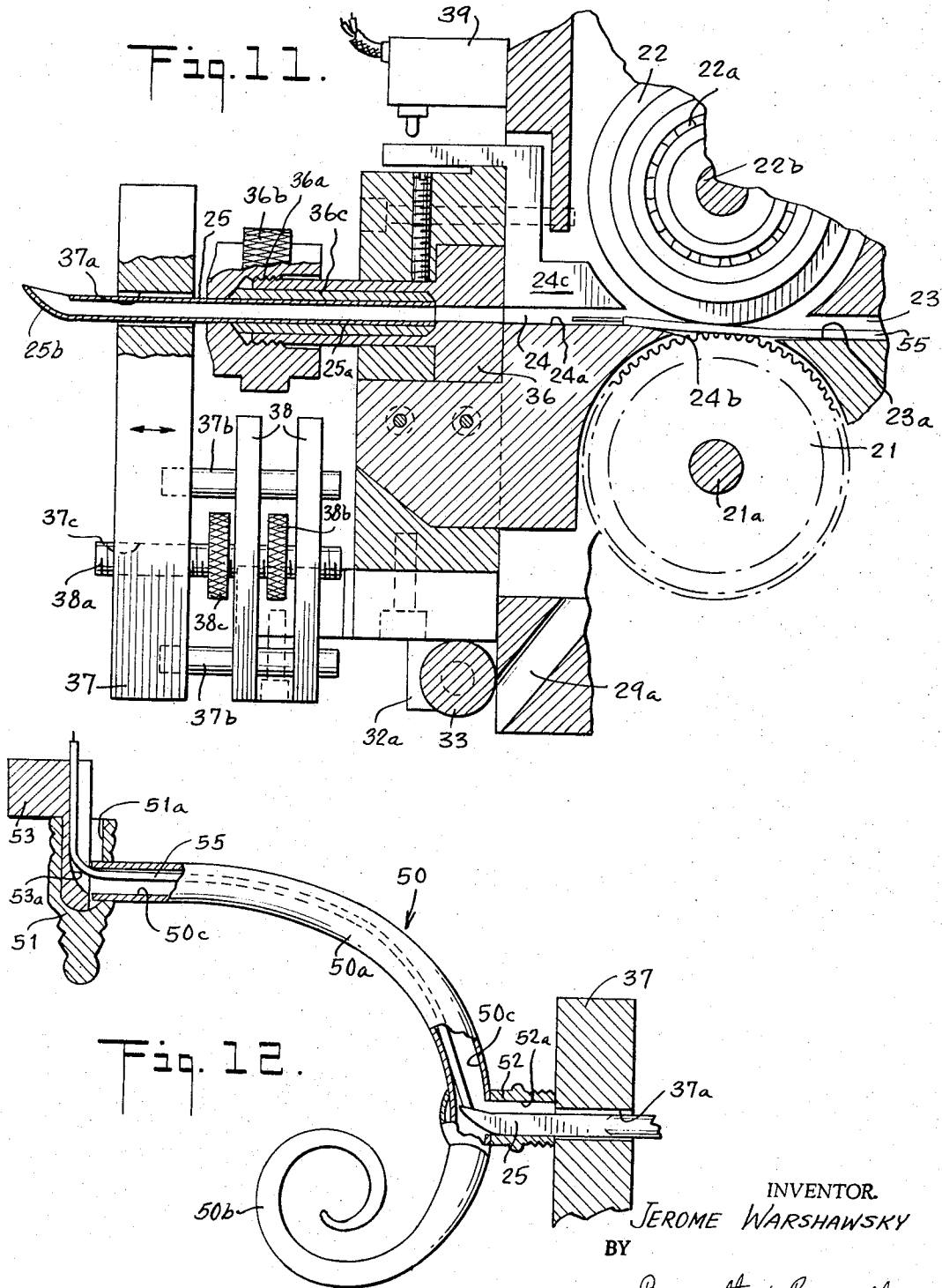
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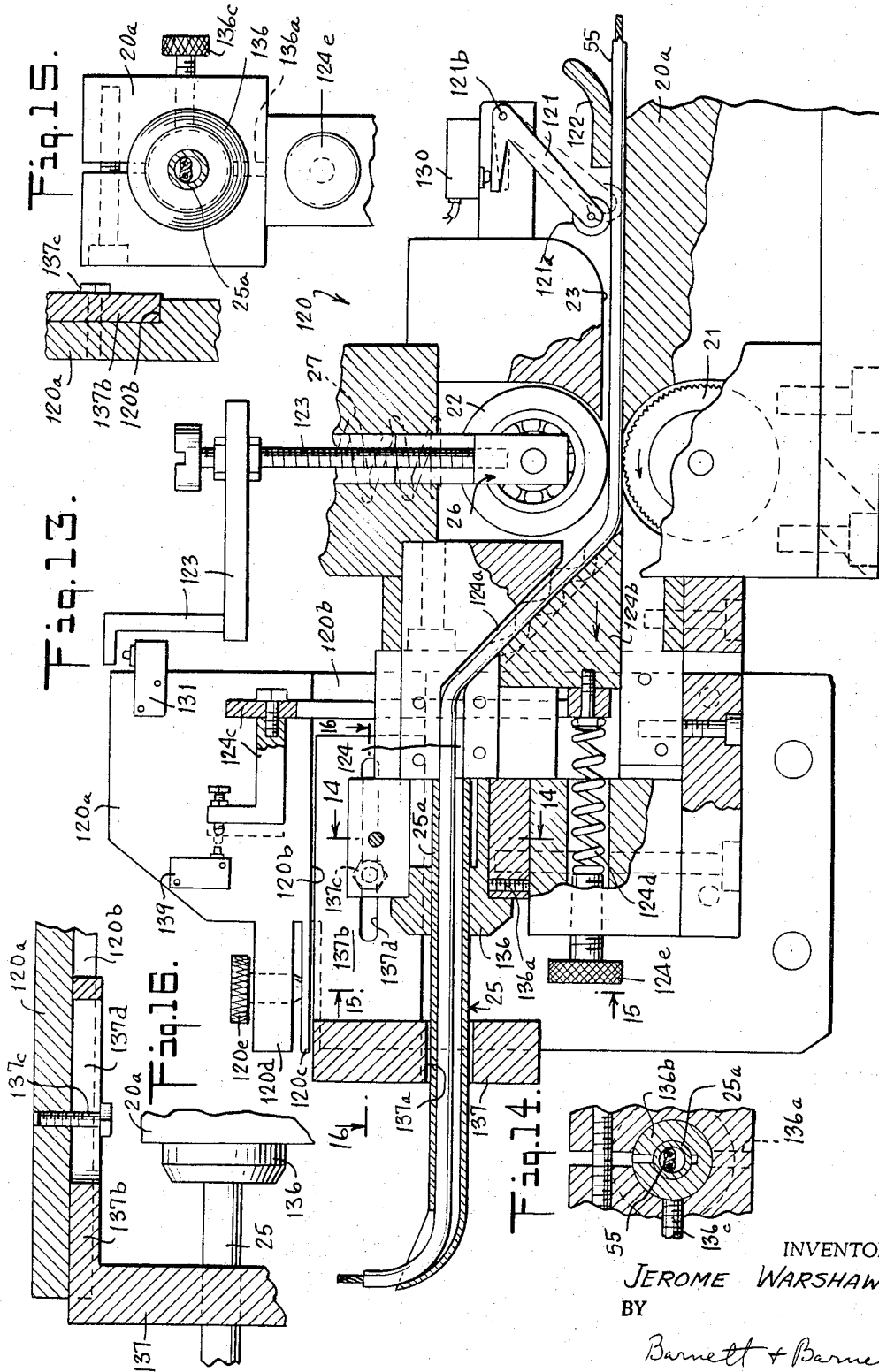
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ELECTRIC WIRE THREADING APPARATUS FOR LAMP ARMS AND LIKE CONDUITS

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13 Claims. (Cl. 254—134.3)

This invention relates to electric wire threading through hollow conduits and more particularly is directed to an apparatus for the wiring of bent and convoluted arms of lamps and lighting fixtures.

Among the objects of the invention is to provide a novel apparatus for use by lamp and lighting fixture manufacturers for threading electric wire through a wide variety of differently and oddly shaped tubular arms, conduits and the like, having sharp and irregular bends as customarily encountered in table and floor lamps and wall and ceiling lighting fixtures, which apparatus shall comprise means for propelling a precut length of insulated electric wire having stripped ends at a controlled velocity through a nozzle of special improved construction for inserting the propelled length of wire into such conduit beyond a sharp bend or corner of the bore thereof, which nozzle construction shall be readily interchangeable with other nozzles of different proportions and configuration to correspond to the particular configuration of the sharp bend or corner of the bore of the conduit to be threaded, which apparatus shall include a rapidly adjustable means coacting with the nozzle construction for controlling the depth of insertion of the nozzle into the conduit, which propelling means shall be controllable by means sensitive to buckling stress of the electric wire caused by obstruction to its forward movement to avoid damage to the wire and to serve as an aid in wiring, which apparatus shall include a readily accessible manually operable quick-acting mechanism for releasing a length of wire being fed by the propelling means for manual withdrawal when required by improper feeding, which apparatus may include a start and stop control sensitive to the presence of a length of wire to be propelled therethrough, which apparatus shall be foolproof and easy to operate by semi-skilled labor with a minimum of training, which shall be relatively inexpensive to operate and maintain, and which shall be practical and efficient to a high degree in use.

Other objects of the invention will in part be obvious and in part hereinafter pointed out. The invention accordingly consists of features of construction, combination of elements and arrangements of parts which will be exemplified in the apparatus hereinafter disclosed, the scope of the application of which will be indicated in the claims following.

In the accompanying drawing, in which illustrative embodiments of the invention are shown:

FIG. 1 is an elevational view of the inlet side of the apparatus constructed to embody the invention with parts being broken away to show interior construction.

FIG. 2 is a front elevational view of the apparatus shown in FIG. 1, the quick acting pressure release mechanism being shown in full lines in normal operative position and shown in broken lines in a raised position for spacing the pressure exerting idler out of operative engagement with the drive wheel to release the electric wire being fed in the event of jamming or other malfunction.

FIG. 3 is a fragmentary vertical section taken substantially on line 3—3 in FIG. 2 showing details of the pressure idler suspension and bearing mounted drive wheel.

FIG. 4 is a fragmentary sectional view taken on line 4—4 of FIG. 1.

FIG. 5 is a fragmentary elevational view of the outlet or delivery side of the apparatus as seen substantially on line 5—5 in FIG. 2.

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FIG. 6 is a perspective view of one of the interchangeable nozzles constructed in accordance with the invention removed from the apparatus.

FIG. 7 is a fragmentary vertical longitudinal section taken on line 7—7 in FIG. 1, a leading end of a length of electric wire being shown at the inlet gate.

FIG. 8 is a fragmentary transverse section taken on line 8—8 in FIG. 7 showing details of construction.

FIG. 9 is an enlarged fragmentary section taken similar to FIG. 7 showing the electric wire being fed through the apparatus by the coaction of the drive wheel and pressure exerting idler.

FIG. 10 is a fragmentary sectional view taken on line 10—10 in FIG. 9.

FIG. 11 is an enlarged fragmentary sectional view taken similar to FIG. 7 showing details of the mounting means for interchangeable nozzles and associated adjustable stop means for controlling the insertion depth of the nozzle into an end of a conduit to be wired.

FIG. 12 is an elevational view, partly in section, of a lamp arm being threaded by the apparatus, the lamp arm being shown abutting the stop means adjusted to position the nozzle for inserting the electric wiring beyond the obstructing sharp bend.

FIG. 13 is a fragmentary vertical longitudinal section taken similar to FIG. 7 showing a modified form of the invention.

FIG. 14 is a fragmentary vertical transverse section taken on line 14—14 in FIG. 13 showing details of the thumb screw operated releasable retaining means for the interchangeable nozzles.

FIG. 15 is a fragmentary vertical transverse view taken on line 15—15 in FIG. 13, and

FIG. 16 is a fragmentary horizontal section taken on line 16—16 in FIG. 13 showing details of the adjustable stop means associated with the nozzle for controlling the insertion depth of the nozzle into an end of a conduit to be wired.

Referring in detail to the drawings, 20 generally denotes an apparatus constructed to embody the invention seen in FIGS. 1, 3 and 7 to comprise a housing generally designated 20a supporting therein a drive wheel 21 and a pressure exerting idler 22. The latter is mounted by a resilient and pressure adjustable yoke assembly in vertical alignment at a predetermined spaced distance above drive wheel 21 which is mounted to turn with a drive shaft 21a journaled in spaced bearings 21b secured in housing 20a. Drive wheel 21 may be secured to shaft 21a by a set screw 21c. Drive shaft 21a may project from a rear side of apparatus 20 and be joined by a connector 21d to a suitable prime mover, such as a speed adjustable electric motor M. As seen in FIGS. 7 and 9, drive wheel 21 projects upwardly into a guide passageway extending longitudinally through apparatus 20, which passageway has an inlet guide end 23 into which a precut length of electric cord 55 is fed for engagement between drive wheel 21 and pressure idler 22 for propulsion thereby through passageway outlet guide end 24 and nozzle 25 into a lamp arm 50 in the manner hereinafter more fully described.

As will be clear from FIGS. 3 and 7, pressure idler 22 is mounted by means of a ball bearing 22a for free rotation on a fixed shaft 22b extending through a supporting yoke 26 and secured thereto at opposite ends 26c by set screws 22c. Yoke 26, which has an offset midportion 26a providing a slot 26b sized to snugly accommodate pressure idler 22, is suspended for upward movement away from drive wheel 21 against resilient downward pressure exerted on opposite sides of yoke midportion 26a by a pair of compression springs 27 having pressure adjustment knobs 28. In order to space pressure idler 22 a predetermined distance from drive wheel 21 when

in its extreme downward position and to provide for relatively free upward movement thereof, yoke 26 may be suspended by a vertically disposed bolt 26d threaded into yoke midportion 26a and having a head 26e positioned in a counterbore formed in housing 20a to seat on shoulder 20b.

To quickly relieve pressure exerted by pressure idler 22, manually operable means may be provided for raising yoke 26 against the action of springs 27 thereby positioning pressure idler 22 out of operative engagement with drive wheel 21. To this end, as best seen in FIGS. 1, 2 and 5, a lift frame 30 is mounted on the exterior of housing 20a and comprises a pair of parallel arms 31 and 32 extending longitudinally along the front and rear, respectively, of housing 20a and being interconnected at one of the ends thereof by a transverse pivot rod 33 extending across the outlet side of housing 20a and being attached to downwardly projecting ears 31a and 32a to position rod 33 below the plane of the bottom edges of arms 31 and 32. The opposite ends of arms 31 and 32 are interconnected by a transverse lift handle 34 extending across the inlet side of housing 20a beneath longitudinal passageway inlet guide end 23 and may be formed with a clearance recess 34a aligned with passageway end 23. A support lever 35 for retaining lift frame 30 in a raised position may be freely pivoted to arm 31 adjacent lift handle 34 by a headed pin 35a. As shown in full lines in FIGS. 1, 2 and 3, when lift frame 30 is in lowered inoperative position, the upper edges of arms 31 and 32 are spaced below and out of contact with the opposite ends 26c of yoke 26 which project through lateral openings 20c in housing 20a, yoke 26 being in a lowermost position as limited by bolt head 26e seated on shoulder 20b. As will be clear from FIGS. 1, 2 and 7, a base plate 29 for housing 20a extends beyond the front and rear vertical surfaces thereof to also serve as a resting surface for arms 31 and 32 when in lowered inoperative position. Cushions 31b and 32b, made of suitable material, such as, foam rubber or the like, may be secured in recesses formed in the bottom edges of arms 31 and 32, respectively, for softening the impact of lift frame 30 against base plate 29.

Precut lengths of electric cord 55, which are to be fed by apparatus 20 may be of a wide variety of gauges and types, shown in the drawings as a conventional plastic insulated dual conductor electric cord, UL approved for intended household lamp use, which may comprise a pair of multi-strand wire conductors 56 extending in spaced parallel relation through plastic insulation 57 and having an overall substantially elliptical cross-sectional configuration as is clear from FIG. 10. The insulation 57 may be stripped from opposite ends of each precut length 55 to provide bare end portions 56a.

In order to insure proper presentation to drive wheel 21 of the bare end portion 56a of each electric cord length 55 to be fed by apparatus 20, as best seen in FIG. 9, longitudinal passageway at the inlet guide end 23 approaching drive wheel 21, has a bottom surface 23a extending in a plane parallel to the horizontal tangent to the top center of drive wheel 21 and may be spaced just below such horizontal tangent, for example, a distance on the order of .032 of an inch. Bottom surface 24a of outlet guide end 24 is substantially aligned with said horizontal tangent to the top center of drive wheel 21, but tapers downwardly adjacent the latter and terminates at edge 24b which clears the periphery of drive wheel 21 by about .002 of an inch. Any loose strand of the wire conductors 56 caught between edge 24b and drive wheel 21 will be clipped off and dropped into chamber 20d beneath drive wheel 21. A passageway 29a in base 29 communicates with the exterior of housing 20a for passing such wire strand clippings therethrough to prevent interference with the proper operation of drive wheel 21.

The top surface of passageway outlet guide end 24 may be defined by a movable member 24c which is

mounted to slide upwardly as indicated by the arrow shown in FIG. 7 to actuate a normally closed micro-switch 39.

Nozzle 25 may be removably mounted with its stem 25a in axial alignment with passageway outlet guide end 24 by any suitable means, such as sleeve member 36, shown in FIG. 11 as having a threaded end 36a receiving a manually adjustable compression nut 36b which tightens a collet or split sleeve 36c about nozzle stem 25a in the well understood manner.

The delivery end of nozzle 25 may be elongated and extend through an opening 37a in stop plate 37 which is suitably mounted for adjustability of movement along nozzle 25 as indicated by the double headed arrow in FIG. 11. Stop plate 37 carries a pair of parallel support shafts 37b which slidably engage registering openings in a pair of spaced bracket members 38, the latter being suitably attached to housing 20a. A threaded opening 37c in stop plate 37 receives threaded adjustment screw 38a which extends parallel to support shafts 37b and freely through openings in bracket members 38. A knurled wheel 38b is mounted to turn with adjustment screw 38a or may be integral therewith and is located between bracket members 38 serving both as a finger grip means for rotating adjustment screw 38a and for retaining the latter against axial movement with respect to bracket members 38. A knurled nut 38c may be threaded on adjustment screw 38a for tightening against one of the bracket members 38 for locking screw 38a in an adjusted position.

FIG. 6 shows one form of nozzle 25 removed from sleeve member 36 having a stem 25a for telescoping therein and a delivery end which is rectangular in cross-section providing an overall minimum size for fitting into the bore of a lamp arm yet itself having a bore conforming to the general contour of electric cord 55. The internal cross-section of nozzle 25 is sized to permit free movement of electric cord therethrough but is sufficiently snug to prevent undesirable bunching up or kinking. In order to facilitate the initial directing of the leading end of electric cord 55 at an angle to the path of insertion to clear a sharp bend or obstruction in the lamp arm or conduit being threaded, the delivery end of nozzle 25 is seen in FIGS. 6, 11 and 12 to terminate in a substantially right angular bend 25b with the mouth 25c miter cut to project a minimum distance from a plane tangent to the outside diameter of the delivery end.

The relative ease with which nozzle 25 may be removed from sleeve member 36 for interchange with other nozzles is in keeping with the intended use of apparatus 20 in threading a wide variety of differently shaped and proportioned lamp arms or conduits having differently located sharp bends requiring bypassing by the nozzle.

The operation of apparatus 20 will now be described illustrating the threading of lamp arm 50 shown in FIG. 12 to comprise a generally curved tubular portion 50a terminating at one end in a decorative spiral 50b and at the opposite end mounting a fitting 51 for an electric socket (not shown), the bore 51a of fitting 51 extending at right angles to the bore 50c of tubular portion 50a. A fitting 52 for mounting the lamp arm 50 is located above spiral 50b and likewise has a bore 52a which is substantially at right angles to bore 50c at the junction thereof. The junctions of bore 50c with bore 51a and bore 50c with bore 52a both offer an obstruction to the free threading of electric cord 55 through lamp arm 50. These obstructions are overcome, respectively, by a guide 53 which is temporarily inserted into bore 51a and has a smooth curved track 53a for directing the leading end of electric cord 55 through fitting 51 and by nozzle 25 which is inserted into bore 52a with its mouth 25c aligned to direct the leading end of electric cord 55 in an upward direction into bore 50c.

Electric motor M is first turned on and its speed adjusted by suitable means (not shown) to rotate drive

wheel 21 at a predetermined constant speed which is selected for feeding the length of electric cord 55 at a rate for optimum results taking into account such variables as the configuration and effective length of the lamp arm being threaded and the length of the electric cord. The latter may be considerably longer than the effective length of the lamp arm to meet requirements of the ultimate lamp assembly.

The operator then grasping lamp arm 50 in one hand places it onto nozzle 25 so that fitting 52 abuts stop plate 37 and tubular portion 50a and its bore 50c align with nozzle mouth 25c, stop plate 37 having been located in an adjusted position by means of threaded adjustment screw 38a to dispose mouth 25c beyond fitting 52, as will be clear from FIGS. 11 and 12. With the other hand, a pre-cut length of electric cord 55 is manually fed into passageway inlet guide end 23 and engages between rotating drive wheel 21 and pressure idler 22 for propulsion through nozzle 25, directly into and through bore 50c and out the upper end of bore 51a. After the trailing end of electric cord 55 clears drive wheel 21, the forward propulsion ceases and the operator removes lamp arm 50 from nozzle 25 pulling the remaining end portion of electric cord 55 therethrough. Apparatus 20 is now ready to repeat the operation on the next lamp arm.

Should it become desirable for any reason to release electric cord 55 from its operative engagement between drive wheel 21 and idler 22, manual upward pressure is exerted on traverse lift handle 34 to raise lift frame 30 sufficiently for the bottom edge of support arm 35 to clear the projecting top edge 29b of base plate 29 and pivot by its own weight in a clockwise direction, as seen in FIG. 2, to the broken line position standing on base plate 29 for supporting lift frame 30 in its raised position wherein yoke 26 is raised against springs 27 to bring idler 22 out of pressure engagement with electric cord 55. By providing a suitable switch, as for example, normally closed microswitch 40, seen in FIG. 2, mounted on housing 20a for engagement by a switch lever 31c carried by arm 31, the raising of lift frame 30 may also serve to shut off motor M. Microswitch 40 may be interposed in the control or power circuit to motor M and when actuated by switch lever 31c will deenergize motor M in the well understood manner.

While being propelled by apparatus 20, should electric cord 55 encounter an obstruction or excessive impediment to its proper feeding, it will tend to buckle or bunch up along its length behind the point of the obstruction. Such buckling may be utilized to shut off motor M thereby preventing damage to the insulation of electric cord 55 by the friction of rotating drive wheel 21 against a stationary portion of electric cord 55. As will be clear from FIG. 11, any buckling of electric cord 55 will occur in passageway outlet guide 24 and will raise movable member 24c to engage and open normally closed microswitch 39 which is interposed in the control or power circuit to motor M in the well understood manner.

The propulsion of electric cord 55 through apparatus 20 has been found to be satisfactorily accomplished by utilizing a non-resilient drive wheel preferably made of metal, such as steel, and having peripheral knurling in the form of parallel, spaced, transverse grooves 21e providing teeth-like projections therebetween which have flattened surfaces 21f for engaging the exterior of insulation 57 to frictionally grip and advance electric cord 55. The suspension of yoke 26 permitting upward movement of idler 22 against the compression of springs 27 accommodates lengths of electric cord 55 of various different thicknesses while the compression adjustability of springs 27 by knobs 28 provides control of the pressure exerted by idler 22 urging electric cord 55 against flattened surfaces 21f of drive wheel 21.

A modified and refined form of the invention is shown in FIGS. 13 to 16, inclusive, as apparatus 120 comprising the basic combination of elements and associated struc-

ture of apparatus 20 which, where shown, are designated by like numerals.

The refinements and modifications embodied in apparatus 120 are shown in FIG. 13 to include microswitches 130 and 131 which may be interposed in parallel with each other in the electric power circuit to motor M or, where the latter is relay controlled, in the relay energizing circuit, as is well understood in the art of motor and motor controls. Thus, when either microswitch 130 or 131 is closed, motor M is energized. Microswitch 130 may be of the normally open type and is arranged to be closed by the insertion of the leading end of electric cord 55 into the apparatus. Microswitch 131 is arranged to be closed when electric cord 55 is present between drive wheel 21 and idler 22.

Microswitch 130 is seen in FIG. 13 to be actuated by projection 121c of a switch arm 121 which terminates in a roller 121a and is suspended from a pivot 121b in an inwardly inclined position at the entrance to passageway inlet guide end 23. Projection 121c closes microswitch 130 when switch arm 121 is rotated in a clockwise direction from the broken line position to the full line position by the insertion of the leading end of electric cord 55. A guide plate 122 for the leading end of electric cord 55 may be mounted on housing 20a by a suitable means (not shown) in advance of switch arm 121.

Microswitch 131 is made responsive to the position of yoke 26 by a suitable linkage, herein generally designated 123. Microswitch 131 may be of a normally closed type which is retained in open position by the downward pressure of springs 27 on yoke 26 and is released to close when an electric cord 55 passes beneath idler 22 moving yoke 26 upwardly. Thus, microswitch 131 serves to keep motor M running during the time interval between the clearance of roller 121a by the trailing end of electric cord 55, which releases microswitch 130 to its normally open position, and the clearance of drive wheel 21 by said trailing end, which permits idler 22 and yoke 26 under pressure of springs 27 to move downwardly so that linkage 123 actuates microswitch 131 to open position shutting off power to motor M.

It is contemplated that a single normally open microswitch may be substituted for the parallel arrangement of microswitches 130 and 131. Such single microswitch would be closed by a suitable linkage (not shown) from switch arm 121 and retained in closed position by another suitable linkage (not shown) from yoke 26 during the time the latter is in raised position by the presence of electric cord 55 under idler 22. Such single normally open microswitch would be in series circuit with microswitch 40.

In order to more accurately control the sensitivity of the apparatus to buckling of electric cord 55 when the latter encounters an obstruction to its smooth feeding through a lamp arm, passageway outlet guide 124 is formed with an inclined section 124a located between drive wheel 21 and nozzle 25. Section 124a is seen to be inclined upwardly in the direction of advancement of electric cord 55 and is provided with a movable wedge shaped member 124b defining the bottom inclined surface of section 124a. Wedge shaped member 124b, mounting a linkage 124c for actuating normally closed microswitch 139 which is identical in function to microswitch 39 in apparatus 20, is biased in a normal rest position by compression spring 124d which has a compression adjustment knob 124e.

The bend in electric cord 55 caused by inclined section 124a has been found to insure that buckling takes place in that area for actuation of microswitch 139, as shown in broken lines in FIG. 13. Since the force exerted by the buckling of electric cord 55 against movable wedge shaped member 124b will depend on the configuration of the lamp arm being threaded, that is, the impediment due to friction against the walls of the tube, and also on the flexibility of electric cord 55 being used, the provision for

adjustment of the compression force of spring 124d applied to retain wedge shaped member 124b in normal rest position by accessible knob 124e or other suitable device permits compensation for these variables, thereby greatly increasing the versatility of apparatus 120. For example, it may be desired to feed electric cord 55 into a lamp arm until it reaches a predetermined obstruction rather than until it emerges from the opposite end. The stopping of motor M by microswitch 139 due to buckling of electric cord 55 against movable member 124b may be used to signal the arrival of the leading end of electric cord 55 at such obstruction. Thus, spring 124d must be properly adjusted to avoid premature stopping of motor M by less intense buckling forces due to other causes, such as, friction in passing through bends in the lamp arm.

As shown in FIGS. 14 and 15, rapid removal and replacement of nozzle 25 may be readily accomplished by means of a sleeve fitting 136 for receiving stem 25a for alignment with passageway outlet guide end 124. Sleeve fitting 136 is fixedly mounted in housing 20a by a set screw 136a and is formed with a split end 136b which is engaged for tightening about stem 25a by a thumb screw 136c.

A vertical plate 120a is suitably mounted on housing 20a at the delivery side of apparatus 120. Vertical plate 120a may mount microswitches 131 and 139 and may be formed with a horizontal track 120b for receiving a slide portion 137b of stop plate 137. A bolt 137c extending through a slot 137d in slide portion 137b retains the latter in track 120b for adjustably positioning stop plate 137 along nozzle 25 which extends through opening 137a therein. For rapidly and conveniently securing stop plate 137 in adjusted position, vertical plate 120a may be provided with a flexible finger 120c formed as a portion of a side wall of track 120b which may be pressed against slide portion 137b by suitable means, such as, thumb screw 120e carried above finger 120c by a projecting portion 120d.

Nozzle 25 may be rotated axially in sleeve member 36 or fitting 136 to orientate mouth 25c for delivery of the leading end of electric cord 55 in any desired direction, such as, downwardly, forwardly or rearwardly, to meet requirements of the lamp arm or conduit being threaded. Replacement of nozzle 25 by others of different configuration, as for example, a nozzle having a bend in the elongated delivery end to conform to a bend in an end portion of the lamp arm being threaded where the sharp bend to be bypassed by the nozzle mouth is located beyond such bend, further contributes to the versatility of apparatus 20 and 120.

Apparatus 20 or 120 may also be utilized to feed electric cord from a reel source (not shown) into lamp arm 50 and to manually shut off motor M by a control switch (not shown) or by raising lift frame 30 to simultaneously release the electric cord from engagement between drive wheel 21 and idler 22 and shut off motor M by actuation of microswitch 40. Lamp arm 50 may then be removed from nozzle 25 and the electric cord severed at mouth 25c ready for feeding into the next lamp arm 50. Where the electric cord is not released for withdrawal through the passageway to enable lamp arm 50 to be removed from nozzle 25, an additional length of electric cord may be fed through lamp arm 50 along which the latter is then drawn to permit clearance of nozzle 25.

The improved apparatus herein disclosed is seen to achieve the several objects of the invention and to be well adapted to meet conditions of practical use. As various possible embodiments might be made in the above invention, and as various changes might be made in the disclosed constructions, it is to be understood that all matters herein set forth or shown in the accompanying drawings are to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. An apparatus of the character described for threading relatively flexible wire through a conduit having a bend spaced from one end thereof, a nozzle having an elongated delivery end for inserting into said conduit end to reach said conduit bend, said nozzle delivery end terminating in a mouth, power driven means for gripping and propelling said wire through said nozzle, said mouth being constructed and arranged to direct a leading end of said wire at an angle to the feeding direction of the latter in passing through said elongated delivery end to clear said conduit bend, and means interposed between said power driven means and said nozzle for deenergizing said power driven means, said deenergizing means being responsive to buckling of said wire.

2. The apparatus defined in claim 1, adjustable stop means coaxing with said nozzle delivery end for engaging said conduit end to control the distance of insertion of the nozzle and locate said mouth in bend passing position.

3. The apparatus defined in claim 1, in which said nozzle is rotatable on its longitudinal axis for varying the direction of said mouth and is interchangeable with other nozzles having different delivery ends of different configurations.

4. An apparatus of the character described for threading relatively flexible, insulated electric cord in precut lengths through conduits, comprising a passageway for said length of electric cord, a driven wheel and coaxing idler wheel having surfaces spaced from and resiliently urged toward each other positioned in a midportion of said passageway for receiving said length of electric cord therebetween for propulsion through said passageway, power means for rotating said driven wheel, an inlet guide end for said passageway having means responsive to the presence of said length of electric cord for actuating said power means, and means responsive to the presence of said length of electric cord between said driven wheel and coaxing idler for maintaining said power means in operation until the trailing end of the length of electric cord clears said driven wheel.

5. An apparatus of the character described for threading relatively flexible, insulated electric cord in precut lengths through conduits, comprising a passageway for said length of electric cord, a driven wheel and coaxing idler wheel having surfaces spaced from and resiliently urged toward each other positioned in a midportion of said passageway for receiving said length of electric cord therebetween for propulsion through said passageway, power means for rotating said driven wheel, an outlet guide end for said passageway terminating in a nozzle through which said length of electric cord is inserted into a conduit to be threaded, and means for deenergizing said power means responsive to buckling in said outlet guide end of said length of electric cord being propelled by said driven wheel upon the electric cord meeting with impediment to its forward movement.

6. The apparatus defined in claim 5, including means for adjusting the buckling pressure requirements to vary said responsiveness of the deenergizing means.

7. The apparatus defined in claim 5 in which said buckling responsive means includes a change in direction of said passageway for initiating the buckling of the electric cord in said outlet guide end for actuating said responsive means.

8. An apparatus of the character described for threading relatively flexible, insulated electric cord in precut lengths through lamp arm conduits, comprising a passageway for said length of electric cord, a driven wheel and coaxing idler wheel having surfaces spaced from and resiliently urged toward each other positioned in a midportion of said passageway for receiving said length of electric cord therebetween for propulsion through said passageway, power means for rotating said driven wheel, an inlet guide end for said passageway having means responsive to the presence of said length of electric cord

for actuating said power means, means responsive to the presence of said length of electric cord between said driven wheel and coacting idler for maintaining said power means in operation until the trailing end of the length of electric cord clears said driven wheel, a quick acting manual means for separating the driven wheel and coacting idler wheel for release of the length of electric cord from operative engagement therebetween, said passageway terminating in a nozzle through which said length of electric cord is inserted into a lamp arm conduit to be threaded.

9. The apparatus defined in claim 8 in which said quick acting manual means upon operation simultaneously actuates a means for stopping the rotation of said driven wheel.

10. The apparatus defined in claim 8, in which said passageway includes an outlet guide end between said driven wheel and nozzle, and means for deenergizing said power means responsive to buckling in said outlet guide end of said length of electric cord being propelled by said driven wheel upon the electric cord meeting with impediment to its forward movement.

11. The apparatus defined in claim 8, in which said passageway includes an outlet guide end between said driven wheel and nozzle, and means for deenergizing said power means responsive to buckling in said outlet guide end of said length of electric cord being propelled by said driven wheel upon the electric cord meeting with impediment to its forward movement, means for adjusting the buckling pressure requirements to vary said responsiveness of the deenergizing means, said buckling responsive means including a change in direction of said passageway for initiating the buckling of the electric cord in said outlet guide end for actuating said responsive means.

12. An apparatus for threading a relatively flexible, insulated electric cord in precut lengths through portable lamp conduits in the wiring of lamps, comprising a base supporting the apparatus for access by an operator, a passageway through said apparatus for said length of electric cord, an inlet guide end for said passageway

positioned for access by a first hand of said operator for the feeding of a leading end of said length of electric cord into said passageway, the latter extending between spaced surfaces of a driven wheel and a coacting idler wheel, said driven wheel being mounted on a relatively fixed axis, power means for rotating said driven wheel, means mounting the idler wheel for resilient movement away from a predetermined spaced relation to the driven wheel for receiving said length of electric cord therebetween for propulsion through said passageway, an outlet guide end for said passageway leading from between said wheels, a nozzle terminating said outlet guide end and having an elongated delivery end terminating in a mouth, said nozzle being positioned for access by a second hand of the operator for manually fitting an end of a lamp conduit onto said delivery end for retention thereon while the length of electric cord is fed by said first hand into the inlet guide end and propelled by said wheels into and through said lamp conduit.

13. The apparatus defined in claim 12 including quick acting manual means positioned for access by said first hand of the operator and coacting with said idler wheel mounting means to move and releasably retain the idler wheel out of operative engagement with said length of electric cord and driven wheel releasing said length of electric cord for withdrawal from said passageway.

References Cited

UNITED STATES PATENTS

293,632	2/1884	Cobb	254—134.3
321,363	6/1885	Hurlbut	254—134.3
1,118,270	11/1914	Dahl	254—134.3
1,761,592	6/1930	Seidel	254—134.3
1,982,402	11/1934	Shade	15—104.3
2,325,063	7/1943	Krueger	226—193 X
2,930,584	3/1960	Hensley et al.	254—134.3
3,145,972	8/1964	Sweeney	254—134.3
3,258,246	6/1966	Turk et al.	254—134.3

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