

Aug. 27, 1963

J. H. THOMAS ETAL  
LAMP TUBE HANDLING DEVICE

3,101,966

Filed May 24, 1961

3 Sheets-Sheet 1

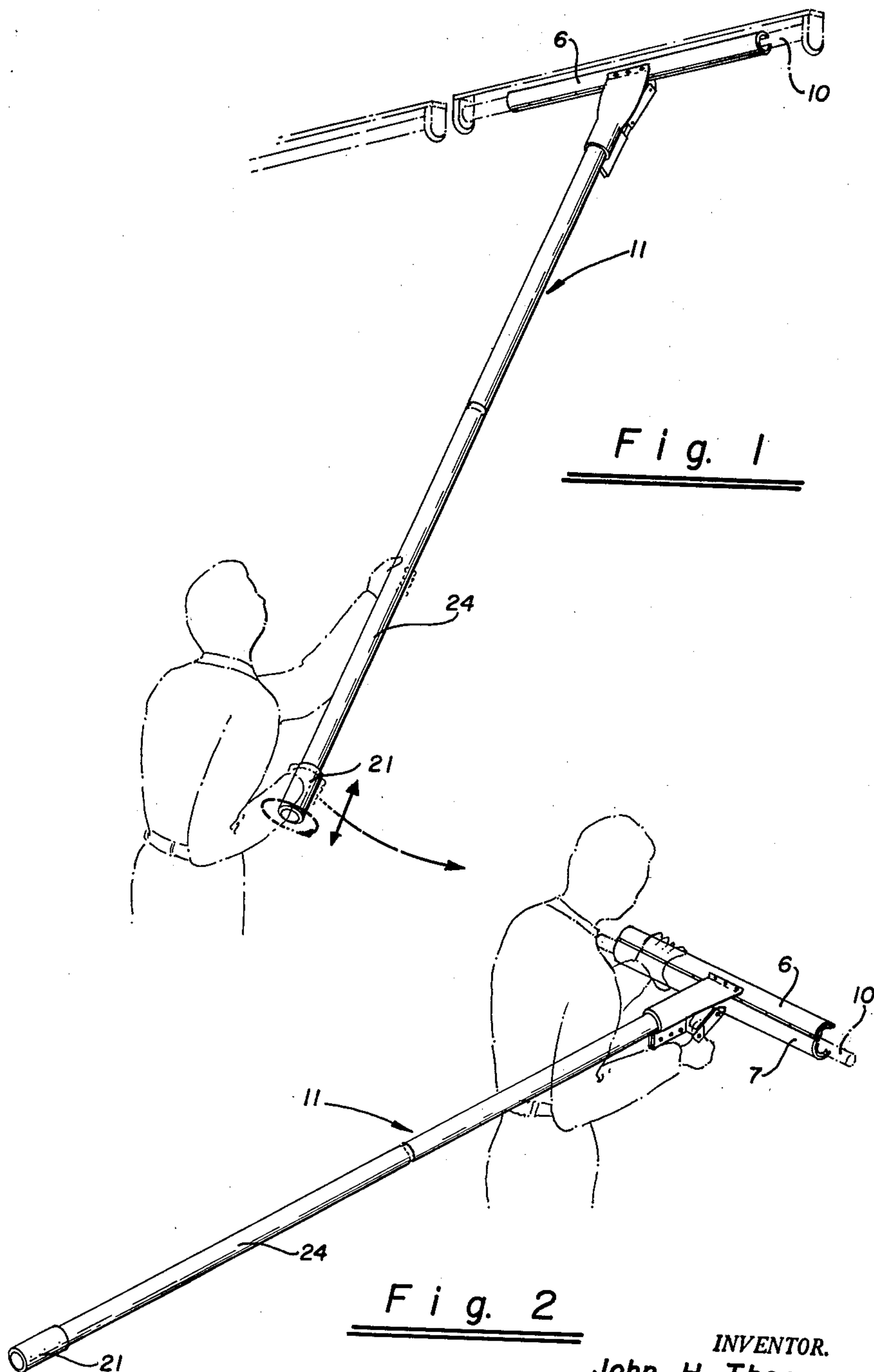


Fig. 2

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Fig. 3

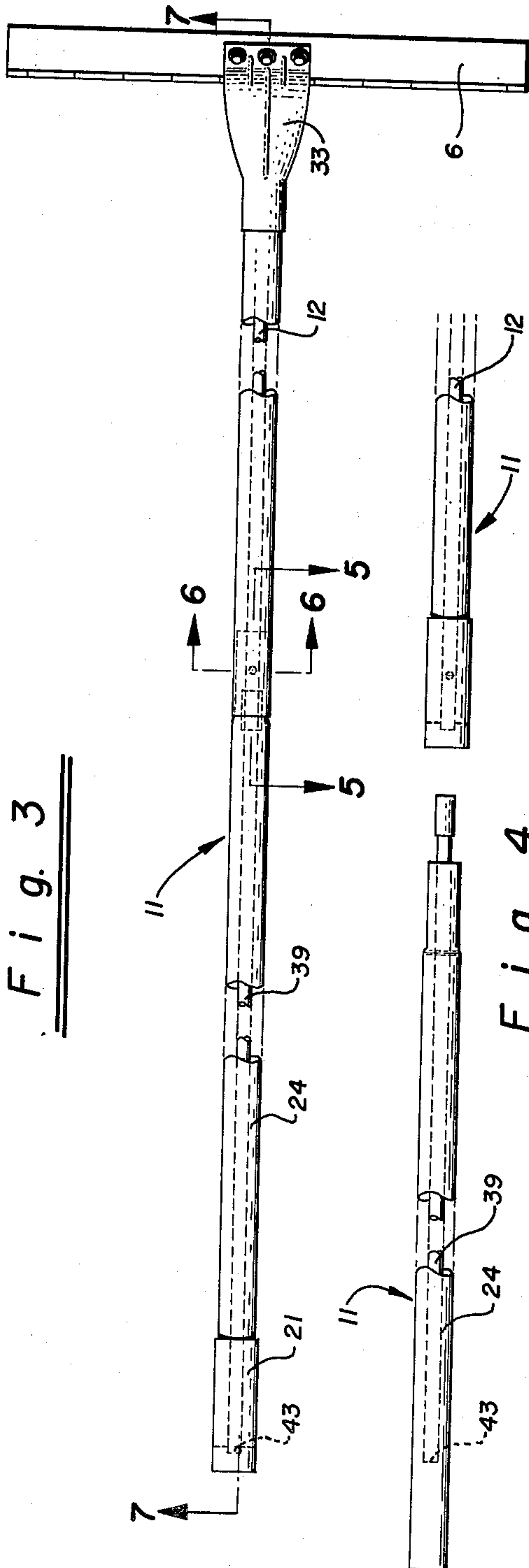


Fig. 4

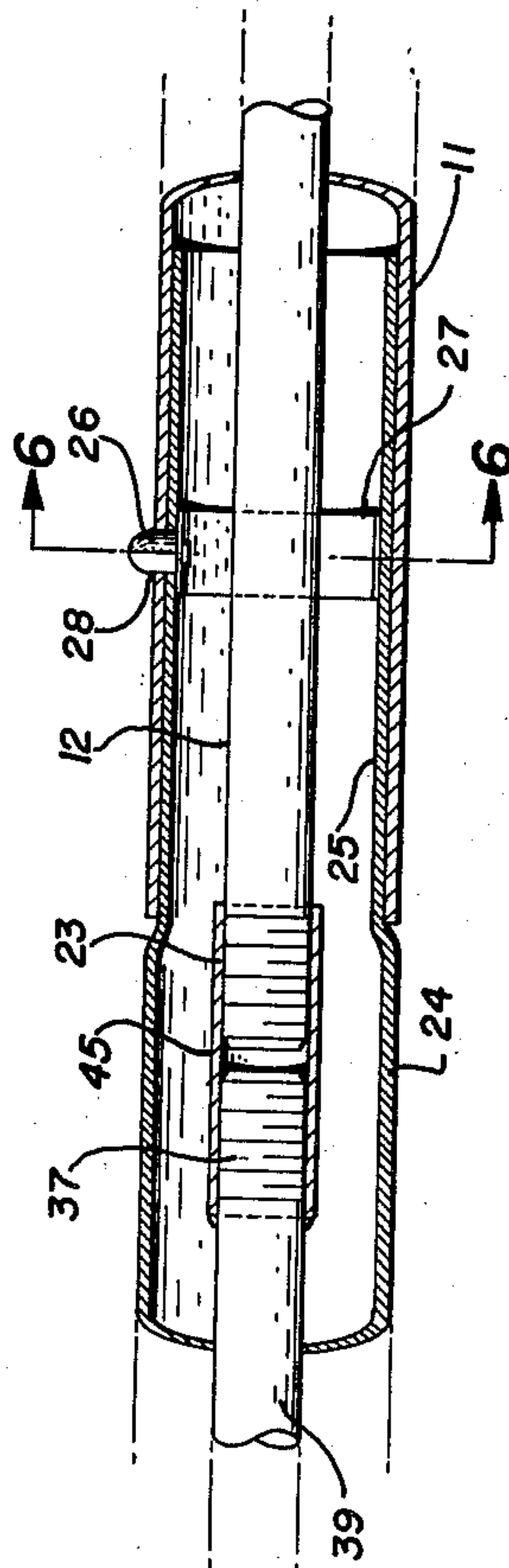
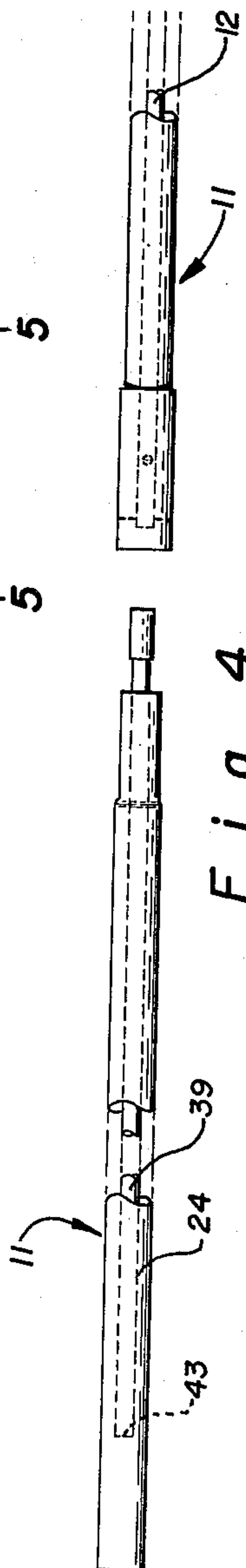


Fig. 5

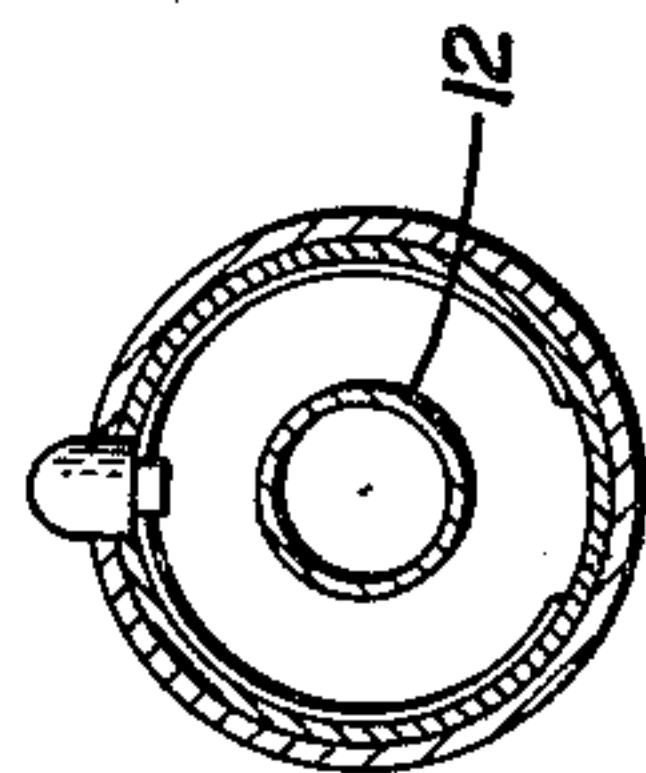


Fig. 6

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3 Sheets-Sheet 3

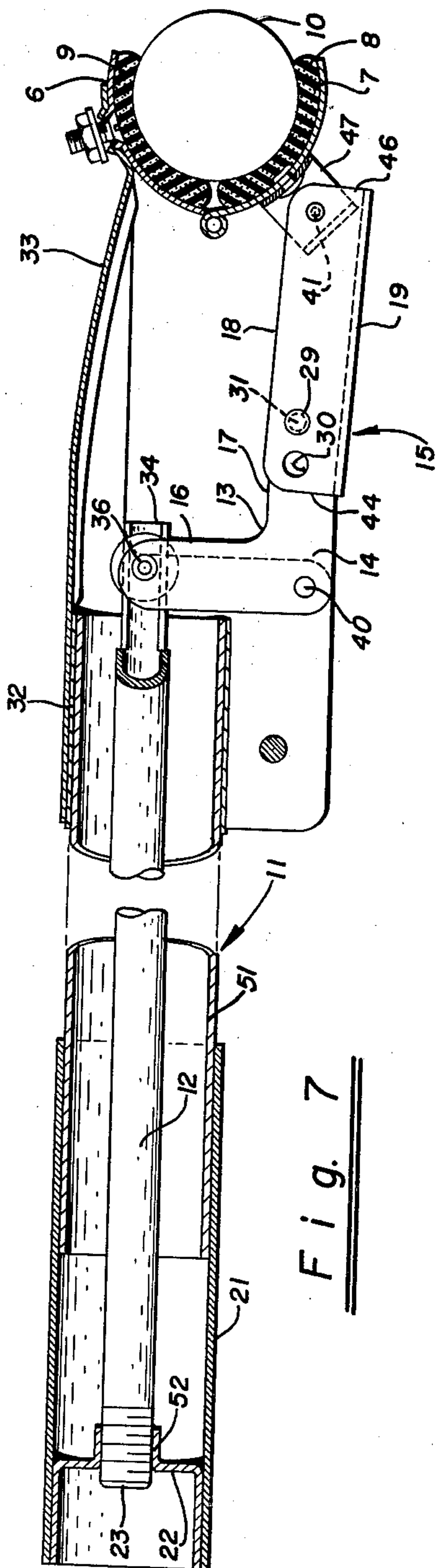


Fig. 7

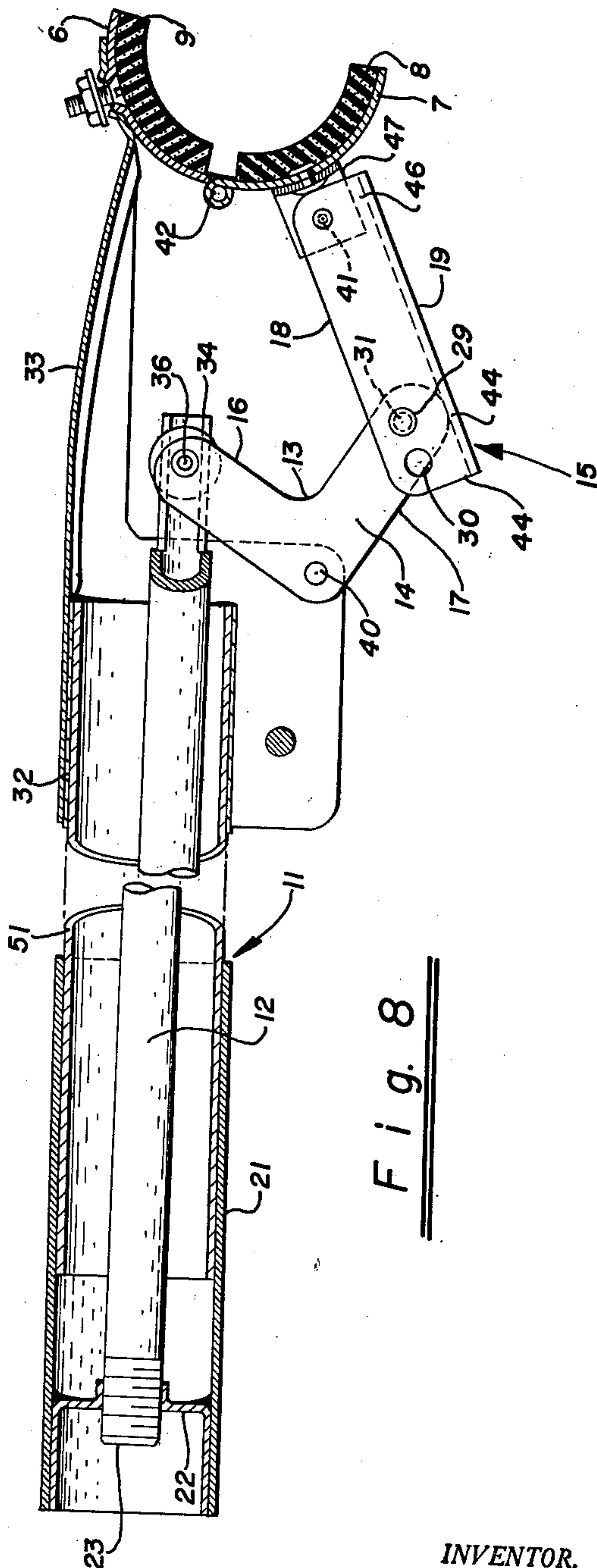


Fig. 8

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3,101,966

## LAMP TUBE HANDLING DEVICE

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Filed May 24, 1961, Ser. No. 112,332  
3 Claims. (Cl. 294-20)

The invention relates to devices for removing and replacing fluorescent lamp tubes in electrical fixtures which cannot be reached except by a ladder or other elevating means.

An object of the present invention is to provide a lamp tube handling device of the character described which will enable a person standing safely and securely at floor level to reach lamp tubes in fixtures at high positions which are frequently relatively inaccessible with a ladder or the like, particularly when located over counters or display areas, and which will provide an improved positive grip of much greater security than devices heretofore available whereby the user may with a minimum of special knowledge or skill easily handle and properly manipulate and position long fluorescent lamp tubes for insertion into or removal from remote elevated lamp fixtures.

Another object of the present invention is to provide a lamp tube handling device of the character above which may be easily and conveniently extended in length to reach lamp tubes at different heights above the floor and which may also be simply and quickly adjusted to properly engage and handle lamp tubes of different sizes.

A further object of the present invention is to provide a lamp tube handling device of the character above which is formed of a minimum number of sturdy parts to provide a durable and trouble-free device and which are constructed and assembled in a manner providing protection from the hazard of electrical shock.

The invention possesses other objects and features of advantage, some of which of the foregoing will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of this specification. It is to be understood, however, that variations in the showing made by the said drawings and description may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawings (3 sheets):

FIGURE 1 is a perspective view of the lamp tube handling device constructed in accordance with the present invention and shown in operative relation with a lamp in a fixture.

FIGURE 2 is a perspective view of the lamp tube handling device in position for releasing a tube.

FIGURE 3 is a plan view of the device with portions broken away.

FIGURE 4 is a partial plan view of the device shown in FIGURE 3.

FIGURE 5 is a partial cross sectional view on an enlarged scale taken substantially on the plane of line 5-5.

FIGURE 6 is a cross section of the device as taken substantially on the planes of lines 6-6 in FIGURES 3 and 5.

FIGURE 7 is a fragmentary cross section of the device shown in FIGURE 3 taken at line 7-7 in the closed position.

FIGURE 8 is a fragmentary cross section of the device shown in FIGURE 7 but with jaws in the open position.

The lamp tube handling device of the present invention consists briefly of a pair of jaws 6 and 7 pivotally attached at hinge 42 which carry resilient linings 8 and 9 arranged for closure upon a lamp tube 10, an elongated handle 11 secured to jaw 6, an elongated actuating rod 12 carried by the handle 11, and a leverage assembly 15

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connecting rod 12 to jaw 7 whereby on reciprocation of rod 12 opening and closing of jaws 6 and 7 will be effected. It is to be noted, and see FIGURE 7, that the leverage assembly 15 is especially constructed to move to an over-center stopped position upon movement of jaws 6 and 7 to a closed position. When the leverage assembly is in the over-center position, and the bulb 10 is clasped by jaws 6 and 7, a force applied to jaws 6 and 7 will not open the jaws so as to release bulb 10. Force applied to the actuating rod, however, will always open or close jaws 6 and 7.

The over center stopped and non-reversible operating characteristic of the present invention as noted above is provided by the unique construction of the leverage assembly 15 which is shown in detail in FIGURES 7 and 8. The leverage assembly 15 is composed of a bell crank 13 having a mid-portion 14 pivotally supported at pin 40 by wing portion of bracket 33 on handle 11 and having a pair of arms 16 and 17. Arm 16 is pivoted by pin 36 to the normally upper end 34 of rod 12, arm 17 is pivoted by pin 31 to one end 44 of link 18 which is in turn pivotally secured by pin 41 at its opposite end 46 to bracket 47 connected to jaw 7. Stop means may be provided by forming link 18 in the shape of a channel with a bottom side 19 which is positioned to come in contact with arm 17 of the bell crank when jaws 6 and 7 are in the closed position and the leverage assembly has moved to an over-center position.

FIGURE 8 shows the position of the actuating rod 12, bell crank 13 and link 18 when the jaws 6 and 7 are in the open position. To close the jaws 6 and 7, rod 12 is moved in a relatively downward direction, bell crank 13 rotates counter-clockwise about pivot pin 39, link 18 rotates in a generally clockwise direction, and jaw 7 rotates in a counter clockwise direction about hinge 42. Movement of the parts continues as above until the leverage assembly 15 reaches an over-center stopped position as shown in FIGURE 7 wherein pivot pin 31 has swung past a straight line connecting pivot points 40 and 41.

In this position, jaws 6 and 7 are irreversible from closed position by an opening force applied to the jaws but are reversible upon longitudinal displacement of rod 12 because a force applied at the jaw 7 to impart clockwise or opening movement causes link 18 to rotate in a clockwise direction about pivot pin 31 against the stop 19 whereas an upward movement of rod 12 will open jaws 6 and 7 since bell crank 13 is caused to move in a clockwise direction about pivot pin 40, and link 18 moves in an unimpeded counter-clockwise direction until jaws 6 and 7 reach an opened position.

Manual reciprocation of rod 12 is most conveniently arranged to be effected from the normally lower end 51 of handle 11 so that the jaws may be readily opened and closed while the device is held in an upwardly reaching position as depicted in FIGURE 1. As here shown a manually engageable sleeve 21 is telescopically mounted around and for sliding reciprocal movement upon the tubular hand end 51 and is operatively connected to rod 12. With reference to FIGURES 7 and 8 it will be noted that sleeve 21 is provided with an internally and centrally extending part 22 formed with an axially threaded hub 52 which is threadably engaged with the lower end 23 of rod 12 which has a length extending beyond the lower end 51 of the handle.

The device constructed in accordance with the present invention may be provided with one or more elongated extension members 24 as best illustrated in FIGURES 3 to 6 which may be easily and quickly coupled to the standard length handle 11 to enable the operator to reach from floor level lamp tubes in fixtures at different heights up to about 24 feet or more.



To apply an extension member, sleeve 21 is first unthreaded from rod 12 and removed. Threaded end 37 of an extension rod 39 is then coupled to threaded end 23 of rod 12 by a threaded coupling 45. Extension 24 which is here formed with a reduced section 25 adapted for sliding inside tubular handle 11 is next locked into handle 11 by bringing a button 26 mounted on a spring 27 in reduced section 25 of extension 24, in registration with opening 28 positioned on handle 11. The procedure for adding an extension is completed by threading central part 22 of sleeve 21 onto threaded end 43 of extension rod 39.

Jaws 6 and 7 may be adjusted to handle tubes of various sizes by changing the effective length of link 19. Changing the effective length of link 19 may be easily effected by providing a plurality of holes 29 and 30 in link 19. Pin 31 is arranged for easy removal and may be used to secure link 19 to arm 17 of the bell crank in either of the openings 29 and 30.

The tube handling device of the present invention is preferably constructed to insulate the operator against electrical shock. Preferably both of the jaws 6 and 7 are insulated from the handle and rod actuator. As here shown, a sleeve 32 of insulation material is inserted between the tubular upper end of the handle and the surrounding clamp portion of bracket 33 so as to insulate jaw 6 from the handle. Jaw 7 may be insulated from rod 12 by forming one or more sections of the leverage assembly 15 of insulation material. As here shown, the bell crank is preferably made of pressed fiber insulation stock.

Jaws 6 and 7 are preferably arcuately formed from a light metal such as aluminum or magnesium and are lined with a resilient material 8 and 9, such as foam rubber for firmly gripping a lamp tube 10 which may be any elongated fluorescent tube. Preferably also other parts of the device are made of light weight metal to contribute to the over-all ease of handling.

To remove a lamp tube 10 from a lighting fixture as shown in FIGURE 1, the operator pushes sleeve 21 toward the jaw end of the device to open the jaws 6 and 7 in position for clasp ing bulb 10. The operator next holds handle 24 in a fixed position and moves sleeve 21 in a direction away from the jaws 6 and 7. Because of the unique locking action of leverage assembly 15, the operator may remove his hand from sleeve 21 and bulb 10 will remain firmly gripped by jaws 6 and 7. To remove bulb 10 from an electrical fixture, the operator either moves the handle in an arc in a direction perpendicular to the longitudinal axis of bulb 10, or moves the handle in a direction parallel to the longitudinal axis of tube 10 depending upon the type of socket used in the electrical fixture. After the tube 10 is loosened from its socket in the fixture the operator lowers the device and tube 10 hand over hand until he reaches the jaw end of extension 11. Tube 10 may now be released safely from jaws 6 and 7 by moving arm 17 of bell crank 13 in a direction toward the right as the device is shown in FIGURE 8 to break the over center position.

A new lamp tube 10 may then be inserted between the jaws and locked in place by manually engaging the bell crank 13 and link 18 and moving the leverage assembly to its over-center locked up position. Thereupon the device may be elevated hand over hand to position the tube for insertion into a lighting fixture.

We claim:

1. A lamp tube handling device comprising, a pair of pivotally attached jaws and resilient lining means carried thereby arranged for pivotal closed movement upon a lamp tube and pivotal opening movement therefrom, an elongated handle secured to one of said jaws, an elongated actuating rod carried by said handle for longitudinal

dinal reciprocation, a leverage assembly connecting said rod to the other jaw for pivotal opening and closing of said jaws upon respective reciprocation of said rod to and from said jaws and composed of a bell crank having a mid portion offset from said actuating rod axis and pivotally supported by said handle and a pair of arms, one of said arms being pivotally attached to said rod, and a link pivotally connecting the other arm to said other jaw, said bell crank and link being constructed to move to an over center stopped position upon movement of said jaws to closed position and being irreversible from closed position by opening force applied to the jaws but being reversible upon longitudinal displacement of said rod.

2. A lamp tube handling device comprising, a pair of pivotally attached jaws and resilient lining means carried thereby arranged for pivotal closed movement upon a lamp tube and pivotal opening movement therefrom, an elongated tubular handle secured at one end to one of said jaws, an elongated actuating rod mounted for longitudinal reciprocation within said handle, a leverage assembly connecting the other end of said rod to the other jaw for pivotal opening and closing of said jaws upon respective reciprocation of said rod to and from said jaws and composed of a bell crank having a mid portion offset from said actuating rod axis and pivotally supported by said handle and a pair of arms, one of said arms being pivotally attached to said rod, and a link pivotally connecting the other arm to said other jaw, said other arm extending generally toward said jaws, said leverage assembly being constructed to move to an over center stopped position upon movement of said jaws to closed position and being irreversible from closed position by opening force applied to the jaws but being reversible upon longitudinal displacement of said rod, and a sleeve mounted in surrounding relation to said handle for reciprocal movement adjacent its other end and having a centrally extending part connected to the other end of said rod for effecting manual reciprocation thereof.

3. A lamp tube handling device comprising, a pair of pivotally attached jaws and resilient lining means carried thereby arranged for pivotal closed movement upon a lamp tube and pivotal opening movement therefrom, an elongated handle secured to one of said jaws, an elongated actuating rod carried by said handle for longitudinal reciprocation, a leverage assembly connecting said rod to the other jaw for pivotal opening and closing of said jaws upon respective reciprocation of said rod to and from said jaws and composed of a bell crank having a mid portion offset from said actuating rod axis and pivotally supported by said handle and a pair of arms, one of said arms being pivotally attached to said rod, and a link pivotally connecting the other arm to said other jaw, means for changing the effective length of said link for adapting said jaws to handle tubes of various diameters, said bell crank and link being constructed to move to an over center stopped position upon movement of said jaws to closed position and being irreversible from closed position by opening force applied to the jaws but being reversible upon longitudinal displacement of said rod.

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