Feb. 2, 1932. J. A. McKAY 1,843,618

GRAPPLE

Filed May 23, 1931 2 Sheets-Sheet 1

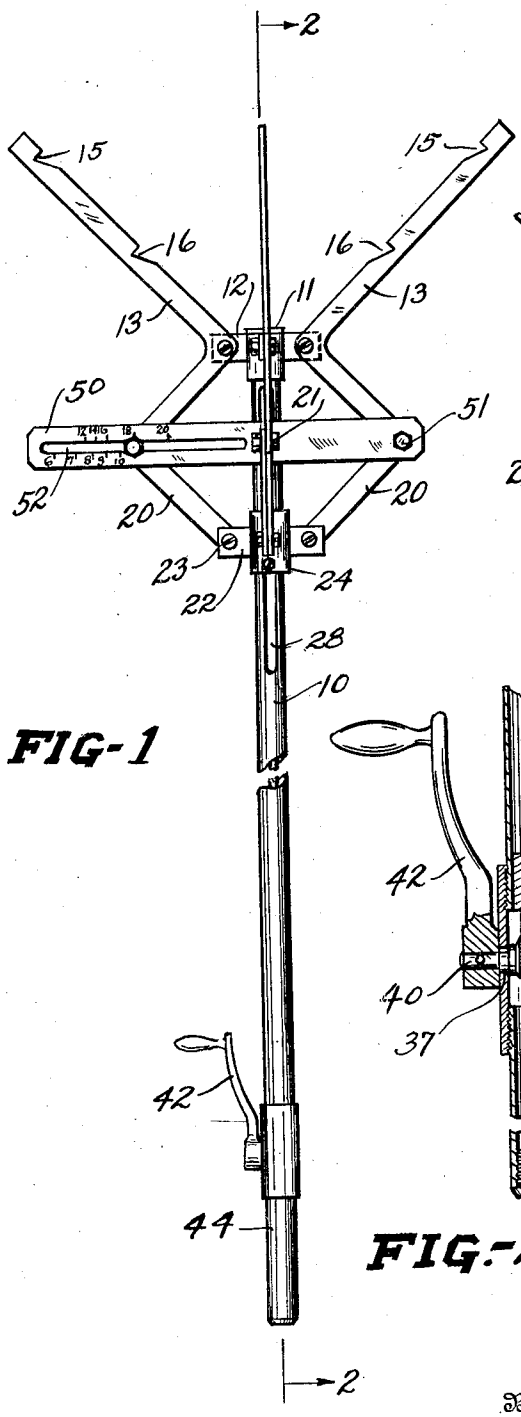


FIG-1

FIG.-2a

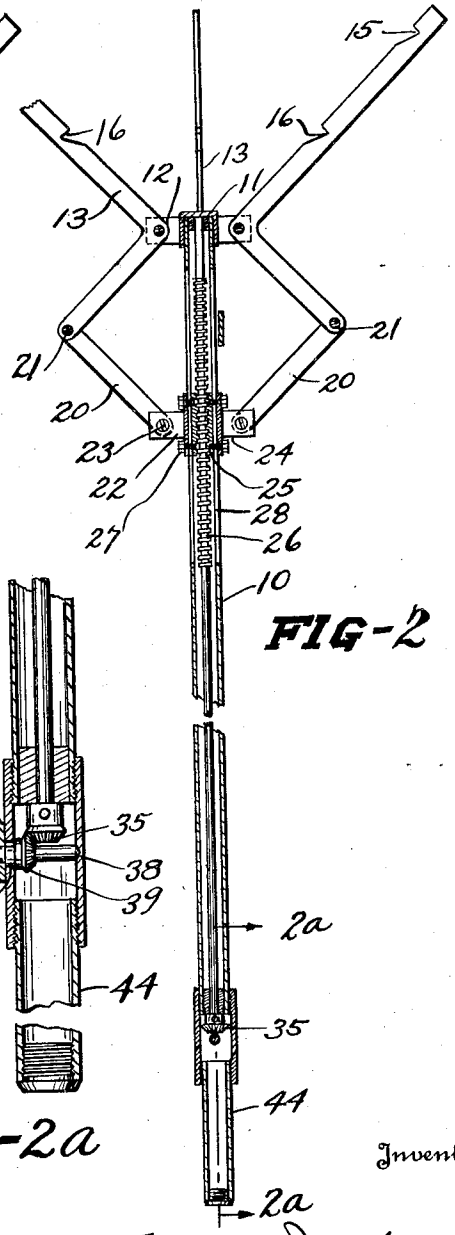


FIG-2

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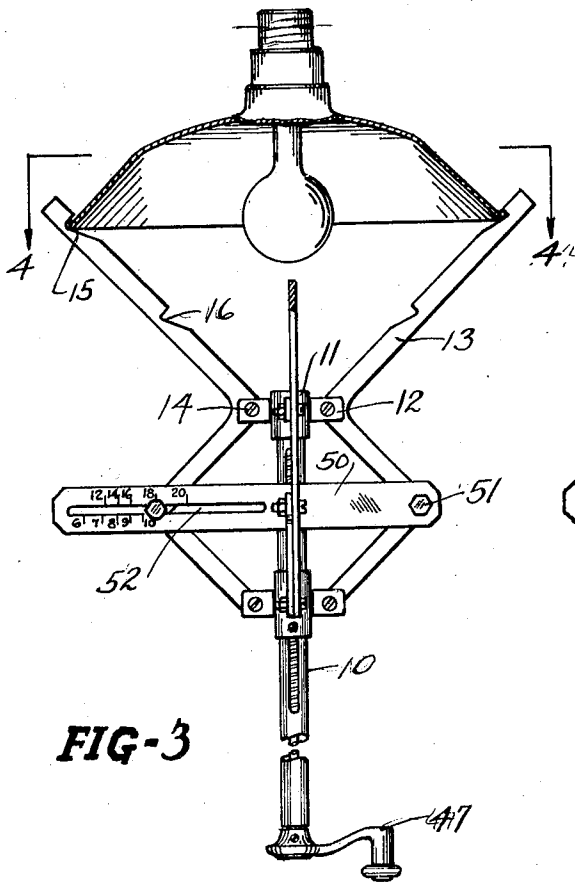


FIG-3

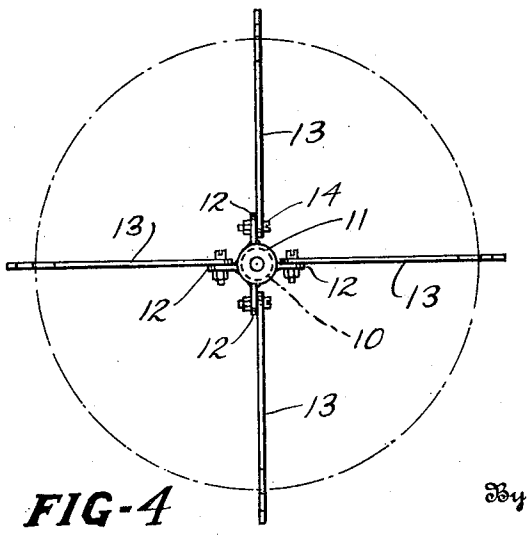


FIG-4

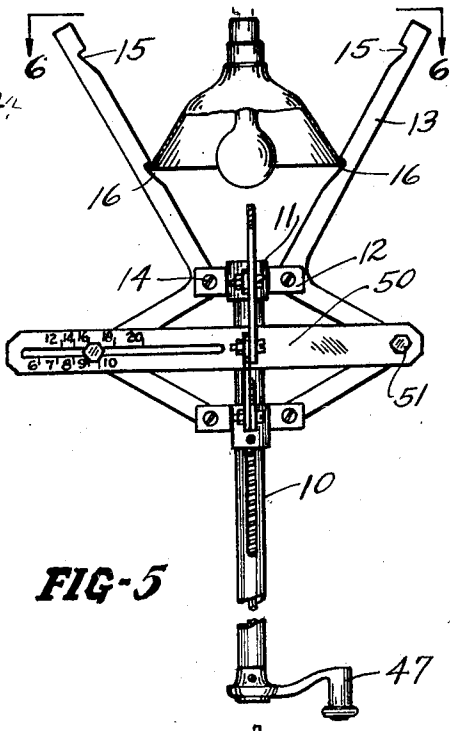


FIG-5

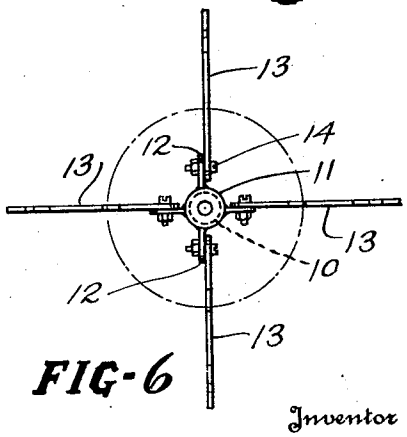


FIG-6

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UNITED STATES PATENT OFFICE

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GRAPPLE

Application filed May 23, 1931. Serial No. 539,524.

This invention relates to grapples, and more particularly to a device for removing and replacing large reflectors or shades, in overhead electric light installations, such as are employed in factories or in connection with out-door advertising signs.

Ordinarily, overhead lamps and reflectors in factories and in electric sign installations are suspended from the ceiling or from a bracket attached to a sign at such a height as to be out of reach of a man working on the floor or ground level. In order to change or remove the reflector for cleaning or replacement, it has been necessary to employ a step-ladder which must be set up beneath each lighting fixture and thus a considerable amount of time is required to remove or replace each reflector. Accordingly, a general object of my invention is to provide a simple and effective device, by means of which an operator standing at the floor or ground level can remove or replace overhead reflectors or globes.

Another object is to provide such a device which is adapted for use in connection with reflectors or globes of any ordinary size. Another object is to provide a grapple embodying a gauge, whereby the clamping members can be easily set to engage reflectors of a particular size. A further object is to provide a reflector removing device embodying a simple operating mechanism for the clamping jaws in order that the clamping jaws may be operated without wobbling the entire mechanism.

Briefly, the device comprises a pole, on the upper end of which are pivoted a plurality of bell cranks having jaws on the upper arms. The lower arms of the bell cranks are connected by links to a collar which is slidably mounted on the pole, and which may be actuated by a nut mounted on a longitudinal screw disposed within the pole and operated by a crank, either directly connected to the screw or connected thereto by means of bevelled gears. The jaws are provided with notches for engaging reflectors of different sizes, and a gauge is provided which may be read by the operator while the grapple is in any position, to indicate the width of reflector which may be engaged by the jaws. The clamping jaws grasp the reflector firmly so that it may be rotated or moved bodily in any direction, and the grapple can be used with reflectors equipped with screw heels or separable sockets of any type.

Referring now to the drawings, Fig. 1 is an elevation of a preferred form of grapple; Fig. 2 is a vertical section taken along the line 2—2 of Fig. 1; Fig. 2*a* is a section on an enlarged scale taken along line 2*a*—2*a* of Fig. 2; Fig. 3 is an elevation of a grapple having a modified form of operating mechanism, in engagement with a relatively large reflector; Fig. 4 is a section along the lines 4—4 of Fig. 3; Fig. 5 is an elevation similar to Fig. 3, but showing the grapple in engagement with a relatively small reflector; and Fig. 6 is a section along the line 6—6 of Fig. 5.

Referring now to Figs. 1 and 2 of the drawings, 10 indicates the hollow tubular pole which forms the shank of the grapple and which is long enough to enable a man working at the floor level to easily reach reflectors suspended from the ceiling with the clamping mechanism. A cap 11 may be threaded or otherwise suitably secured to the top of the pole. This cap is provided with a plurality of radially extending ears 12, to which bell cranks 13 are pivoted, as by means of bolts or pins 14. In order to provide for a wide range of sizes or reflectors, the upper arms of the bell crank levers, which constitute the reflector engaging jaws, are provided with a plurality of sets of reflector engaging notches, as at 15 and 16, two sets being shown in the present instance. When it is desired to remove relatively large reflectors, the upper set of notches is employed, and to engage smaller reflectors, the lower set of notches is employed. By reason of this arrangement it is possible to firmly hold reflectors of almost any standard size.

In order to operate the bell crank levers to clamp or release a reflector, links 20 may be pivoted to the lower arms of the bell crank as at 21. The links are pivoted to projecting lugs or ears 22, as by pins 23, the ears being secured to a collar 24, which

is slidably mounted on the tubular pole or shank 10. The collar is moved along the shank by means of a nut 25, which is actuated by a screw 26 and which is connected to the collar by means of bolts 27 extending through slots 28 in the wall of the tubular pole. It will be seen that when the nut and collar are moved upwardly along the pole, the clamping jaws of the bell crank lever will be moved inwardly to clamp a reflector and when the collar is moved downwardly the clamping jaws will be released. In order to rotate the screw 26, we preferably attach a bevel gear 35 to the end thereof (see Fig. 2*a*), and the end of the pole 10 is provided with a collar 36, having bearing portions 37 and 38 therein. The bevelled gear 39 is adapted to mesh with the gear 35, and is mounted on a shaft 40, one end of which is supported by the bearing recess 38 of the collar and the other end is connected to the hand crank 42, and is journalled in the bearing portion 37 of the collar. If desired, the tubular pole may be extended below the coupling, as at 44, to provide a convenient handle for the operator. By reason of the bevel gear arrangement described above, the operator can hold the device steady while manipulating the crank, and the laterally extending crank provides a convenient handle for obtaining additional leverage in turning the grapple to remove a reflector.

I have also provided a convenient form of gauge for determining the size of reflector which may be engaged by the clamping jaws in any particular position. The gauge may comprise a flat strip 50, secured at one end to the juncture of one of the links 20, with the end of one of the bell crank arms 33, as at 51. The opposite end of the strip may be provided with a slotted portion 52, which slidably engages the pivot at the juncture of an opposite bell crank and link. Suitable scales are provided along the slotted portion of the strip, in order to indicate the exact diameter of reflector which may be engaged by the arm in any particular position, the top scale indicating the distance between the upper set of notches and the lower scale indicating the distance between the lower set of notches. Thus, in the drawings, in Fig. 3 the clamp is shown in engagement with a reflector having a diameter of approximately 18 inches, while in Fig. 5 the diameter of the reflector is approximately 9½ or 10 inches. This feature is of great convenience when an operator desires to remove a series of reflectors of the same size, as he can set the clamps to approximately the desired diameter and each reflector will require only a few turns or perhaps only a fraction of a turn of the hand crank to move the clamping jaws the required distance to engage and disengage the reflector.

In Figs. 3 and 5, a modified form of operating mechanism is shown, which simply comprises a crank 47 secured to the end of the screw 26 in any convenient manner, as by a nut 29. The crank shaft is journalled in the end of the pole.

The device may be made of any suitable material. However, we have found that a very practical tool can be formed if all of the parts, except the screw and nut and the various pins, be made of aluminum. By constructing the device in this manner, we provide a strong and light device, which may be easily manipulated even though a long pole is employed.

From the foregoing description of a preferred form of our invention, it will be seen that I have provided an extremely simple and efficient device for removing reflectors, shades and globes from fixtures. By the use of our device the operator need not employ a step ladder and a great deal of time may be saved. The device is adapted to remove reflectors of any type, and furthermore, as a gauge is provided to indicate the distance between the clamping jaws, the operator can adjust the clamping jaws to approximately correct position, and when in use it will be necessary to only turn the operating crank handle a small amount, in order to effect clamping or releasing of a reflector. Also, by reason of the bevelled gear operating arrangement, shown in the preferred form of my device, it is possible for the operator to adjust the clamping jaws without wabbling the entire device.

I claim:

1. In a device of the character described, the combination of a pole, a plurality of bell cranks pivotally mounted adjacent the upper ends thereof, said bell cranks having upper and lower arms, the upper arms of said bell cranks comprising clamping jaws, and means for swinging the bell cranks about their respective pivots to actuate said clamping jaws comprising a collar slidably mounted on said pole, a plurality of links pivoted to said collar and to the lower arms of said bell cranks, and means for sliding said collar along said pole.

2. In a device of the character described, the combination of a tubular pole, a plurality of bell cranks pivotally mounted adjacent the upper ends thereof, the upper arm of each of said bell cranks comprising clamping jaws, and means for swinging said bell cranks about their respective pivots to actuate said clamping jaws comprising a collar slidably mounted on said tubular pole, a plurality of links pivoted to said collar and to the lower arms of said bell cranks, and means within said pole for sliding said collar along said pole.

3. In a grapple of the type described, the combination of a plurality of bell cranks having upper and lower arms, said upper

arms comprising clamping jaws, said bell cranks being pivotally mounted on a supporting pole, a link pivoted to the lower arms of each of said bell crank levers, a collar slidably mounted on the pole, each of said links being pivoted to said collar and means for moving said collar along said pole, comprising a screw within the pole and a nut adapted to be actuated by the screw and connected to the collar.

4. In a reflector engaging grapple, the combination of a plurality of bell cranks pivoted to a supporting pole, each of said cranks having upper and lower arms, said upper arms comprising clamping jaws adapted to engage a reflector and each of said upper arms having a plurality of reflector engaging notches, whereby said arms are adapted to engage reflectors of a wide range of sizes, and means connected to said lower arms for swinging said bell cranks about their respective pivots and thereby moving said upper clamping arms toward and away from each other.

5. In a grapple for removing reflectors, the combination of a supporting pole, a plurality of bell cranks pivotally mounted at one end of the pole, the upper arms of said bell cranks comprising reflector clamping jaws, mechanism for actuating said bell cranks carried by said pole and operable from a point adjacent the other end thereof, and a gauge for indicating the distance between the clamping arms, said gauge being positioned at a point intermediate the ends of the pole, whereby the distance between the ends of the clamping arms may be easily determined when the device is used.

6. In a device for removing reflectors, the combination of a supporting pole, a plurality of clamping arms mounted at one end of the pole and extending beyond the end thereof, mechanism for actuating said clamping arms carried by said pole and operable from a point adjacent the other end thereof, and a gauge for indicting the distance between the clamping arms, said gauge being positioned at a point intermediate the ends of the pole, whereby the distance between the ends of the clamping arms may be easily determined when the device is in use.

7. In a device of the character described, a supporting pole, a plurality of bell cranks pivoted for radial movement at one end of said pole, said bell cranks having arms projecting beyond the end of the pole, constituting clamping jaws, and arms projecting in a direction away from said clamping jaws, means connected to said last named arms for actuating said clamping jaws and a gauge positioned adjacent said last named arms for measuring the distance between said clamping jaws.

8. In a device of the character described, a supporting pole, a plurality of bell cranks pivoted adjacent one end thereof, said bell cranks having upper and lower arms, said upper arms constituting clamping jaws, means for actuating said bell cranks comprising a collar slidably mounted on said supporting pole, links connecting the lower arms of each of said bell cranks with said collar and means for actuating said collar, comprising a screw, a nut engaged by said screw and connected to said collar, a bevelled gear in driving connection with said screw, and a crank operated bevelled gear in mesh with said first-named bevelled gear.

9. In a device of the character described, the combination of a tubular supporting pole, a plurality of bell cranks having upper and lower arms pivoted for radial movement adjacent one end of said pole, the upper arms of said bell cranks having a plurality of sets of reflector engaging notches, means for swinging said bell cranks about their respective pivots comprising a collar slidably mounted on said supporting pole, and links connecting said collar with the lower arms of each of said bell cranks, said upper arms having reflector engaging notches, and a gauge for indicating the distance between each of said sets of reflector engaged notches.

10. In a device of the character described, the combination of a plurality of bell cranks, a supporting pole, said bell cranks being pivoted adjacent one end thereof, and means for actuating said bell crank comprising a collar slidably mounted on said pole, a plurality of links connecting said collar with each of said bell cranks, means for actuating said collar comprising a screw supported within said tubular pole, a nut engaged by the screw and connected to said collar, and bevelled gear means for rotating said screw.

11. In a device of the character described, a tubular supporting pole, a plurality of bell cranks having upper and lower arms, said bell cranks being pivoted adjacent one end of said supporting pole, means for actuating said bell cranks, including a screw mounted within said tubular pole and a nut in engagement therewith, and means operatively connecting said nut with the lower arms of said bell cranks, bevelled gear means for rotating said screw disposed at the end of the tubular supporting member remote from the bell cranks, and a handle projecting beyond said bevelled gear means.

12. In a grapple of the character described, the combination of a tubular supporting pole, a plurality of reflector clamping arms pivoted adjacent one end of said pole, and means for actuating said arms, including a screw within said pole, a nut on the screw operatively connected to said arms, and a crank projecting transversely from said pole and geared to said screw.

In testimony whereof, I hereunto affix my signature.

JOHN A. McKAY.