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RETRACTABLE FOOTSTEP FOR UTILITY POLES AND THE LIKE

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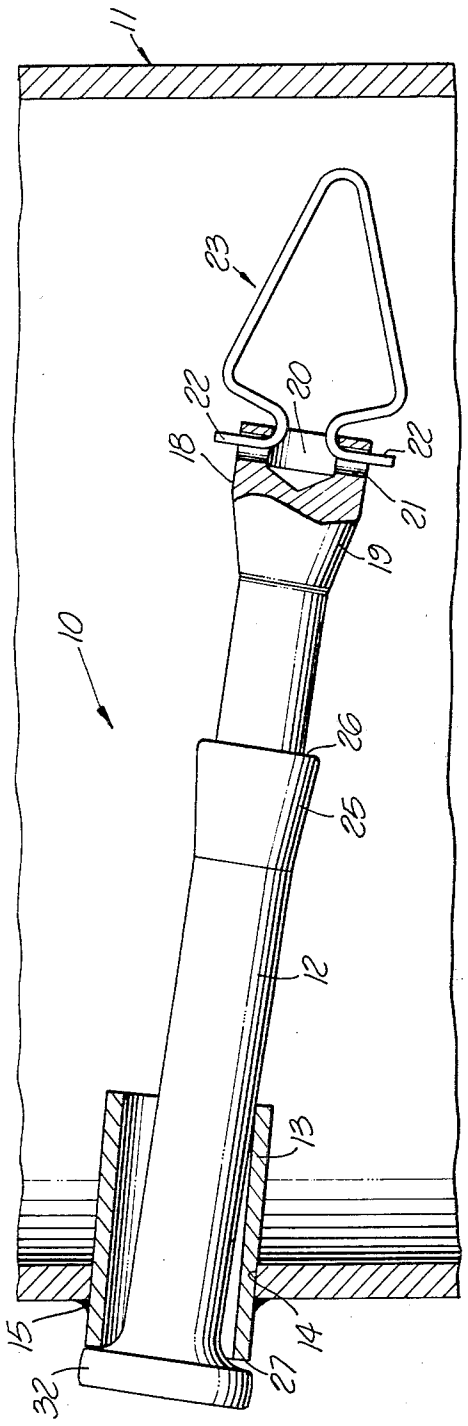

FIG. 1.

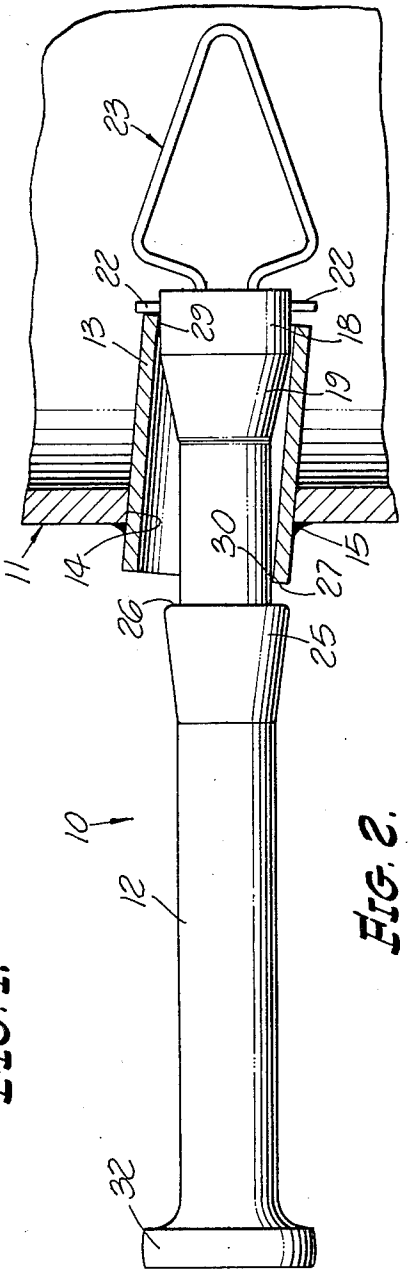

FIG. 2.

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RETRACTABLE FOOTSTEP FOR UTILITY POLES AND THE LIKE

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ABSTRACT OF THE DISCLOSURE

A retractable footstep for use on utility poles and the like and normally stored in retracted position featuring self-locking means holding the footstep safely and positively in an extended operating position until intentionally released for return to stored position. The step is readily assembled into a mounting member whereupon keeper means automatically locks the parts assembled. A second lock serves to hold the step positively extended until intentionally released for return to stored position.

This invention relates to utility pole structures and the like, and more particularly to an improved retractable footstep assembly adapted to be mounted at spaced points along the side of such structures for use by workmen having need to climb the structure to perform service operations.

Retractable footsteps for utility poles are highly desirable for esthetic reasons as well as to avoid encouraging children and unauthorized persons from attempting to climb such poles. Prior constructions designed with these ends in view are subject to certain shortcomings and disadvantages sought to be obviated by the present invention.

Accordingly, there is provided by this invention an inexpensive, rugged, retractable footstep assembly which is foolproof in operation and includes provision for holding the same permanently assembled as well as a safety feature for retaining the footstep positively locked in operating position until intentionally released. To this end, the invention footstep includes a one-piece rod-like footstep slidably and loosely supported within a mounting member and held permanently assembled to the latter by a spring keeper. The keeper is designed to be readily insertable into the mounting member followed by automatic release to a permanent locking position as the keeper emerges from the inner end of the mounting member.

The means for locking the footstep in its operating position include cooperating first and second detent means respectively carried by the footstep and by the mounting member and utilizing the unbalanced weight of the footstep when in extended position to activate the cooperating detents. The detents are disengageable as the outer end of the step is lifted through a slight angle to a position wherein it is slidable to its retracted, stored position. The mounting member is weldable or otherwise securable to an opening in the side wall of a utility pole or other structure.

Accordingly, it is a primary object of the present invention to provide a novel, retractable footstep for assembly on utility poles and featuring novel means for holding the same permanently in assembled position and releasably locked in its extended operating position.

Another object of the invention is the provision of a simple, rugged retractable footstep assembly including a footstep slidably supported in a mounting member and including cooperative means on the mounting member and on the footstep proper for locking the latter in its fully extended operating position.

Another object of the invention is the provision of a retractable foolproof footstep assembly utilizing a minimum number of simple, inexpensive components and utilizing the weight of the footstep when in stored position to hold it retracted.

These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawing to which they relate.

Referring now to the drawing in which a preferred embodiment of the invention is illustrated.

FIGURE 1 is a vertical view partly in section showing one preferred embodiment of the present invention in stored position; and

FIGURE 2 is a view similar to FIGURE 1 but showing the invention footstep locked in its extended operating position.

Referring to FIGURES 1 and 2, there is shown an illustrative embodiment of the invention retractable footstep assembly, designated generally **10**, and there shown as permanently assembled to a typical tubular utility pole **11**. Assembly **10** comprises an elongated rod-like step member **12** loosely and slidably supported in a short mounting member or sleeve **13** extending through an opening **14** in the side wall of pole **11** and securely fixed thereto, as by welding **15**.

The inner end of footstep **12** is provided with an upset or enlarged portion **18** having a conical surface **19** merging smoothly with the main body of the footstep. Surface **19** provides a camming surface having a purpose which will become apparent presently. The cylindrical exterior of enlarged portion **18** has a diameter slightly smaller than the interior diameter of mounting member **13** but the smaller diameter end of conical surface **19** is substantially smaller in diameter as is made clear by FIGURE 2.

The inner end of step **12** is provided with an axial bore **20** pierced by a diametric passage **21**. Loosely supported in passage **21** are the out-turned ends **22** of a generally V-shaped spring keeper **23**. The out-turned ends **22** lie in general alignment with one another and are of such length that keeper **23** can be assembled to bore **21** by compressing spring **23** until the ends **22** overlap one another. In this position the collapsed spring can be inserted into bore **20** whereupon the release of the pressure applied to the spring allows ends **22** to expand into passage **21**. The keeper spring is very stiff and ends **22** project beyond the exterior of enlargement **18** and abut the inner end of mounting sleeve **13** thereby locking the footstep permanently assembled within sleeve **13**.

The foolproof means for locking the step in its extended operating position, as herein shown by way of example, comprises a conical enlargement **25** swaged, forged or cast on the main body of the footstep with its shouldered end **26** positioned closely adjacent the outer ends of sleeve **13** when the footstep is fully extended. It will therefore be readily apparent from FIGURE 2 that the weight of the outer end of the footstep is effective to bias the footstep to its normal operating position and supported generally horizontally along the outer side of pole **11**. When so positioned, enlargement **18** bears against the interior surface near the inner ends of sleeve **13** as indicated at **29**, whereas the main body of the footstep bears against the interior lower surface of sleeve **13** near its outer end, as indicated at **30**. From the foregoing, it will be evident that the footstep is positioned at an acute angle to the axis of sleeve **13** but is nevertheless rigidly supported in a generally horizontal plane because of the fact that sleeve **13** is inclined downwardly toward the interior of pole **11**.

The outer end of the footstep is upset to provide a guard flange **32** effective to prevent or minimize the risk

of the user's foot slipping off the end of the footstep. This enlargement also provides an abutment surface engageable with the outer end **27** of sleeve **13** thereby serving as a stop limiting the inward retraction movement of the footstep when not in use. Flange **32** also serves as a means of grasping the footstep when extending it to its operating position.

The installation of the described footstep assembly in a pole **11** is carried out by first welding mounting member **13** in opening **14** using a suitable jig or other means for supporting the sleeve with its axis inclined downwardly at an angle of five to ten degrees from a horizontal plane. The footstep is then telescoped into the outer end of the sleeve by inserting the pointed forward end of retainer spring **23** into the sleeve and applying sufficient force to compress the legs of spring **23** toward one another. As this spring clears the inner end of the mounting sleeve, legs **22** expand away from one another and thereafter serve to lock the step permanently installed within the sleeve.

If the sleeve is shifted inwardly to its fully retracted position the unsupported weight of the inner end of the step counterbalances it downwardly to the position shown in FIGURE 1 and is highly effective in holding the step fully retracted until pulled outwardly by grasping the outer flanged end **32**.

When the user has need for climbing the pole to perform a service operation, he simply grasps the outer end **32** and pulls the step outwardly. During this operation, conical surface **25** engages the interior inner end of the sleeve and guides this enlarged portion into the sleeve bore. A similar function is performed by conical surface **19** as this surface is drawn into the inner end of the sleeve. As the step reaches its fully extended position, shoulder **26** is positioned outside the outer end of the mounting sleeve and enlargement **18** is quite snugly seated within the inner end of the sleeve. Further outward movement is arrested by the abutment of legs **22** of the retainer spring with the sleeve end. Shoulder **26** of the step is then positioned to abut the outer end **27** of the sleeve and positively prevent accidental and unintended retraction of the step.

When the service operation has been completed, it is a simple matter to disengage the positive lock **26, 27** merely by lifting the outer end of the footstep upwardly into axial alignment with sleeves **13** and then sliding the step inwardly through the sleeve to the position shown in FIGURE 1.

While the particular retractable footstep for utility poles and the like herein shown and disclosed in detail is fully capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that it is merely illustrative of the presently preferred embodiments of the invention and that no limitations are intended to the details of construction or design herein shown other than as defined in the appended claims.

I claim:

1. In combination with a utility pole or the like, a retractable footstep normally stored in retracted position within the side wall of a pole or the like supporting structure, said footstep having means on the outer end thereof by which the step can be engaged and extended outwardly to a generally horizontal operating position effective to support the foot of a workman, means for limiting the movement of said footstep to its operating position, and mounting means loosely and slidably supporting said footstep in the side of a utility pole with the footstep inclined downwardly from a horizontal plane when the footstep is in its retracted stored position whereby the weight of the inner end thereof is effective to bias hold the footstep retracted until the footstep is pulled bodily outwardly from its stored position.

2. The combination defined in claim **1** characterized in the provision of means for preventing accidental and unintended return movement of said footstep from its said operation position back toward the stored position thereof.

3. The combination defined in claim **2** characterized in that said means for preventing unintended return movement of said footstep includes gravity-actuated stop and detent means on said footstep and pole and mutually cooperating to prevent retraction movement of said footstep to the stored position thereof until and unless said movement limiting means has been released.

4. The combination defined in claim **2** characterized in that said means for preventing unintended return movement of said footstep includes cooperating first and second means with said first means being carried by said footstep and said second means being carried by said pole and positioned to abut one another when said footstep is extended to its operating position.

5. The combination defined in claim **1** characterized in that said footstep mounting means comprises a short tubular member having its axis inclined downwardly from a horizontal plane and toward the interior of the utility pole, the upper interior surface at the inner end of said tubular mounting member cooperating with the lower interior surface at the outer end of said tubular member to support said footstep generally horizontally when extended to its normal operating position.

6. The combination defined in claim **5** characterized in that said footstep is operable automatically as the footstep reaches the extended operating position thereof to engage stop means to prevent return movement of the footstep toward stored position, said stop means comprising first detent means carried by said footstep and second detent means carried by said pole and positioned to interengage and positively prevent return of said footstep toward stored position.

7. The combination defined in claim **6** characterized in that said footstep is constructed and arranged for rerlase and return to the stored position thereof by first elevating the outer end sufficiently to deactivate said first and second detent means and then sliding the footstep toward its storage position.

8. A retractable footstep for use on pole lines and the like comprising: a short mounting sleeve adapted to be rigidly secured in the side wall of an upright support, an elongated rigid footstep adapted for use to support the foot of a workman, said footstep being slidable lengthwise within said mounting sleeve between a retracted stored position and an extended operating position, said first footstep and sleeve including a pair of spaced-apart first and second stops cooperating to hold said footstep positively but releasably in the extended operating position thereof and against disassembly from said sleeve, and said footstep being returnable to the retracted stored position thereof only after manually disengaging said first stop from locking engagement with respect to said sleeve.

9. A retractable footstep as defined in claim **8** characterized in that said second step is carried by said footstep in a position to engage the outer end portion of said sleeve after said footstep has been moved outwardly to its extended operating position.

10. A retractable footstep assembly adapted to be rigidly secured to the side of a supporting structure, said assembly comprising an elongated rigid footstep adapted to accommodate the foot of a user when extended, a mounting member loosely encircling said footstep and having a length very substantially shorter than said footstep, said mounting member being rigidly securable to the side of a supporting structure so as to support said footstep selectively in a retracted stored position and in an extended operating position, and disengageable lock means carried by said assembly and effective to lock said footstep releasably in the extended operating position thereof automatically as an incident of moving said footstep to said operating position.

11. A footstep assembly as defined in claim **10** characterized in that said lock means comprises stop means

projecting outwardly from said footstep in position to abut the outer end of said mounting member as the footstep endeavors to move torward its stored position after being shifted outwardly to its operating position.

12. A footstep assembly as defined in claim 11 characterized in that said stop means comprises a ring encircling said footstep and having a conical peripheral surface converging toward the remote end of the footstep.

13. A footstep assembly as defined in claim 11 characterized in that the inner of said footstep is enlarged and includes a conical surface sloping toward the remote end of said footstep.

14. A footstep assembly as defined in claim 10 characterized in the provision of spring keeper means mounted on the inner end of said footstep, said spring keeper means including a converging leading end insertable into the outer end of said mounting member and adapted to cooperate with the interior side walls of said mounting member to contract the legs of said keeper toward one another while being assembled to said mounting member and including means expandable to lock said footstep to the mounting member as the keeper means emerges from the inner end of said mounting member.

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