The present invention relates to an anchoring means whereby a ladder may be anchored to a post or a tree at its upper end, so that it may not fall to either side nor backwards away from the post.

One of the objects of the invention is to provide such an anchoring means which may be readily and conveniently operated from the foot of the ladder, before ascending, and which will accommodate itself automatically to varying sizes of posts with which it may be engaged. An associated object is to permit adjustment to accommodate widely varying sizes of posts.

It is a further object to provide such an anchoring device which will not only prevent the ladder from falling directly in its own plane to one side or the other, or backwards away from the post, but which, by proper formation of the embracing jaws, will prevent the ladder from rotating around the post as an axis, and from rotating about the connection of the jaws to the ladder. An associated object is to form the anchoring jaws and to mount them in such a way that they are rigidly connected to the ladder, to resist such rotational tendencies.

It is a further object of the invention to provide such an anchoring device which shall be simple and inexpensive, yet rugged, and which may readily be applied to ladders already made, as well as built into new ladders.

In the accompanying drawing the invention is shown embodied in a convenient form, such as is typical of the principles of my invention, and well adapted to attain, the objects stated above, and others as will appear hereafter. In all views the parts are shown in jaw-open position.

Figure 1 is an elevation of the ladder, viewing it from the inner side—that is, the side adjacent a post.

Figure 2 is a section through the upper part of such a ladder, a gripping arm in elevation being shown applied to a tree, substantially along the line 2—2 of Figure 1.

Figure 3 is a section substantially along the line 3—3 of Figure 1, showing the lower end of the ladder.

In essence the invention comprises a pair of jaws, pivotally or otherwise mounted for relative movement between jaw-open and jaw-closed positions, these jaws being disposed in and movable in planes which are generally transverse to the plane of the ladder, and of course at the upper end of the ladder, which jaws are connected by simple means, including a yieldable device to accommodate the jaws to different sizes of trees or posts, to an actuating arm or the like at the lower end of the ladder, which is movable between two definite positions, one corresponding to jaws closed, and one corresponding to jaws opened. While heretofore there have been provided jaws which are swingable upon the upper end of a ladder into open and closed positions, and by mechanism at the lower end of the ladder, such arrangements have not heretofore incorporated the yieldable connections, whereby the device automatically accommodates itself to different sizes of post, while yet allowing the operating arm to move between the two definite positions in all instances, nor have such prior devices, to my knowledge, been so simply and effectively formed and arranged. Again, in no prior instance known to me has a stationary pivot for the jaws been disposed normal to the plane of the ladder.

The jaws are suitably shaped to embrace a tree or post P, and to lie in a plane which is or which approaches a horizontal plane; that is to say, the plane of the jaws is generally transverse to the plane of the ladder. However, these jaws are formed as parts of scissor-like levers, pivotally mounted at 10, upon an axis which is transverse to the normal plane of the ladder L, upon a cross bar 2 which is of a width to span the ladder and to be suitably secured, as by the bolts and nuts at 21, to the uprights at the upper end of the ladder. It may be noted here that the cross bar 2 may be of any suitable length to accommodate the width of ladder to which it is to be applied, or it may be so arranged that it may be fitted to varying widths of ladder, so that it is universally applicable.

While the jaws are thus actually swingable about an axis 10 which is normal to the plane of the ladder, because of their considerable extent, and because they are bent to lie in a generally horizontal plane, and because their lower ends 11 are relatively short, approach of the lower ends 11 causes approach in general of their upper ends 1. By thus causing approach of the lower ends 11 the jaws 1 are caused to close upon a post, and separation of the lower ends 11 causes the jaws 1 to open and to release a post which they have embraced. It may be pointed out here that the jaws 1 are provided with alternate pivot apertures 12 whereby their spread may be adjusted by engaging the pivot pin 16 in different pivot apertures 12.

Movement of the jaws 1 is controlled by an operating arm 3 which is fulcrumed at 30 adjacent the lower end of the ladder, and which, intermediate its ends, is provided with an operative...
connection to the jaws 1. In many respects the connection between the arm 3 and the jaws 1 may be any that is found suitable, and as shown herein it consists of a clevis 31 that may be engaged with alternative holes 32 in the arm 3, which clevis is connected by a link 33 to a bridle 34, which in turn is connected to a slide 4. The slide 4 is guided by guides 40 extending lengthwise of the ladder, and one at each side of the ladder, suitably secured to the ladder uprights. The slide is connected to the jaws 1, or rather to their lower ends 11, by links 41, and a spring 44, interposed between the cross bar 2 and the slide 4, acts normally to hold the jaws open, or to move them to the open position when unfastened. However, it will be understood that by swinging the operating arm 3 downwardly from the position shown in Figures 1 and 3, until the clevis connection at 32 lies at the opposite side of the arm's fulcrum 30, the arm 3 will be self-locking, and will move the jaws 1 to closed position, and will hold them there, in opposition to the spring 14. The latter can only act when the operating arm 3 has again been swung sufficiently forward that its clevis connection at 32 crosses the line of pull through the fulcrum 30. Naturally all posts and all trees with which it will be desired to engage the jaws 1 will not be of one diameter. Their diameter will vary, and so it is desirable that the operating arm 3 be permitted always to move into the definite downward position corresponding to jaws closed, it is necessary to provide means to afford some yielding in the connection between the arm 3 and the jaws. This is accomplished in any suitable manner, but as shown herein, it may be very simply and easily accomplished by forming the fulcrum 30, not at some point which is fixed relative to the ladder, but rather upon a sliding collar 5, guided at 50 upon a tubular guide which is parallel to the guides 40, and which is itself carried upon the ladder, and further by providing with a compression spring 55 which is interposed between the sliding collar 5 and a fixed stop or abutment. This abutment may consist of the collar 61, against which one end of the spring bears, the collar embracing the guide 60. For adjustment, so that the jaws 1 may be permitted different spreads without undue compression of spring 55 or resistance by the spring 6, the abutment 61 may be backed by a lock pin 62 receivable in any one of several holes 69 provided in the guide 50, thereby to adjust the position of the abutment 61 lengthwise of the guide 50.

The inside of the jaws 1 are shown as serrated, so that they will bite into the post P, which they engage. When they thus embrace a post it is obvious that the ladder L may not fall to one side or the other in its own plane, nor fall backwards away from the post, and when the teeth of the jaws bite into the surface of the post, neither may the ladder rotate about the post as an axis, which would be equally dangerous to a person supported upon the ladder. However, it is not sufficient that the jaws be provided with teeth, but in addition the jaws must be rigidly connected to the ladder so that they may not themselves rotate about the axis 10 or about any axis parallel to the post, and it will be observed that this is not possible herein because the flat bars that form the jaws lie in the plane of and are held close against the cross bar 2, which is in the plane of the ladder, and the slide 4 is similarly held against any rotation, and is rigidly connected through the flat links 41 and the flat ends 11 of the jaws. There is no possibility of the jaws rotating with respect to the ladder or to the mounting means of the jaws upon the ladder.

With the jaws 1 securely clamped against a post, and with their teeth biting on arm 3 up to the point 55 should the ground slip away from the foot of the ladder, the action of the jaws will tend to cause them to bite even more deeply into the post, and to close them more tightly about the post, for the weight pulling downwardly at the pivot 10 tends to pull the jaws 1 inwardly. This results primarily because the pivot axis of the jaws does not extend lengthwise of the ladder, but rather normal to the ladder's plane, or generally so. It is believed that the operation of the device will be obvious from the above description. When it is desired to engage the device with post, the open jaws 1 are placed about the post; the lower end of the ladder rests upon the ground. The arm 3 is thrown downwardly, through such a position as is shown in dash lines in Figure 3, until it points downwardly, and in this position it is self-locking, and holds the jaws 1 closed. Any variation in the width of the post is accommodated by yielding upwardly of the collar 5 pressing against the spring 6, as has been indicated by the dash lines in Figure 3. To release the device it is only necessary to throw the arm 3 upwardly into its full line position, whereupon the jaws are positively moved open, assisted by the action of the spring 14.

What I claim is:

1. In combination with a ladder, means to anchor its upper end to a post comprising a pair of jaws relatively movably mounted upon the upper end of the ladder, an arm pivotally mounted at the lower end of the ladder, a member pivoted upon said arm and operatively connected to the jaws, said arm being movable between two definite positions, one corresponding to jaw-open position in which the member pivot is between the arm pivot and the jaws, and the other corresponding to jaw-closed position, in which the member pivot is at the side of the arm pivot directly opposite the jaws to effect self-locking of said arm and yieldable means associated with said arm to compensate for variations in the size of the post, while yet allowing movement of the arm always into jaw-closed position wherein the member pivot is disposed to effect self-locking of the arm, regardless of the size of the post.

2. In combination with a ladder, means to anchor its upper end to a post comprising a pair of jaws relatively movably mounted upon the upper end of the ladder, to embrace the post, a member reciprocable to move said jaws, an arm fulcrumed at the lower end of the ladder, a link of fixed length pivotally connected by one end to the arm and unyieldingly connected by its other end to said member, said arm being swingable between two definite positions, one, wherein the link's pivot is at one side of the arm's fulcrum, corresponding to jaw-open position, and the other, wherein the link's pivot is at the opposite side of the arm's fulcrum, corresponding to jaw-closed position, and means yieldably positioning the arm's fulcrum, to permit shifting of the fulcrum to accommodate variations in the size of the post, while yet allowing the full range of movement of the arm, regardless of the size of the post.

3. Mechanism for anchoring the upper end of a ladder to a post, comprising a pair of jaws disposed generally transversely of the ladder, crossed arms disposed generally parallel to the ladder, one
end of each arm carrying one of said jaws, a stationary pivot interconnecting said crossed arms and fixed to the upper end of the ladder substantially perpendicular thereto, control means at the said slide of the ladder for moving the other ends of said arms toward and away from each other to close and open said jaws, respectively, and means operatively connecting said control means to said arms for effecting corresponding movement thereof.

4. In combination with a ladder, means to anchor its upper end to a post comprising a pair of jaws pivotally mounted at the upper end of the ladder upon an axis disposed generally normal to the plane of the ladder, the jaws extending generally transversely of the ladder's plane, jaw-operating means at the lower end of the ladder including a slider guided upon the ladder for movement in the latter's plane, and a connection between said member and the jaws, resisting rotation of the plane of the ladder relative to the jaws or the post embraced by the jaws.

5. Mechanism for anchoring the upper end of a ladder to a post, comprising a pair of jaws disposed generally transversely of the ladder, crossed arms disposed generally parallel to the ladder, one end of each arm carrying one of said jaws, a stationary pivot interconnecting said crossed arms and fixed to the upper end of the ladder substantially perpendicular thereto, a slide and means guiding the slide for movement in the plane of the ladder, an operative connection between the slide and the other ends of said arms, and means operable from the lower end of the ladder to reciprocate the sliding said arms, and consequently to move the jaws between jaw-open and jaw-closed positions.

6. In combination with a ladder, means to anchor its upper end to a post comprising a pair of jaws pivotally mounted at the upper end of the ladder, upon an axis disposed generally normal to the plane of the ladder, the jaws extending generally transversely of the ladder's plane, a slide and means guiding the slide for movement in the plane of the ladder, an operative connection between the slide and the respective jaws, and means operable from the lower end of the ladder to effect movement of said slide, and consequently of the jaws, between jaw-open and jaw-closed position, said latter means including an operating member movable between definite positions corresponding to jaws open and jaws closed, and a yieldable member operatively interposed between said operating member and the slide, to accommodate variations in the size of the post, while yet allowing the operating member to move always into jaw-closed position.

7. In combination with a ladder, means to anchor its upper end to a post comprising a pair of jaws pivotally mounted scissors-like at the upper end of the ladder, upon an axis disposed generally normal to the plane of the ladder, the jaws extending generally transversely of the ladder's plane, guides extending lengthwise of and at opposite sides of the ladder, a transverse slide guided thereon for movement lengthwise of and in the plane of the ladder, links extending from the scissored jaws to the slide and pivoted upon the slide, an operating arm fulcrumed at the lower end of the ladder, and an operative connection between the slide and said arm.

8. In combination with a ladder, means to anchor its upper end to a post comprising a pair of jaws relatively movably mounted upon the upper end of the ladder, to embrace the post, a guide at the lower end of the ladder, a slide guided thereon, an operating arm fulcrumed upon said slide to swing between two definite positions, corresponding to jaws open and jaws closed, an operative connection between said arm and the jaws, and spring means reacting between said slide and a fixed abutment, to accommodate varying sizes of posts, while yet allowing movement of the arm always into jaw-closed position, regardless of the size of a given post.

9. In combination with a ladder, means to anchor its upper end to a post comprising a pair of jaws relatively movably mounted upon the upper end of the ladder, to embrace the post, a guide at the lower end of the ladder, a slide guided thereon, an operating arm fulcrumed upon said slide to swing between two definite positions, corresponding to jaws open and to jaws closed, an operative connection between said arm and the jaws, spring means reacting between said slide and a fixed abutment, to accommodate varying sizes of posts, while yet allowing movement of the arm always into jaw-closed position, regardless of the size of a given post, and means for adjustment of the fixed abutment, to compensate for posts of different sizes.

10. In combination with a ladder, means to anchor its upper end to a post comprising a pair of jaws pivotally mounted scissors-like at the upper end of the ladder, upon an axis disposed generally normal to the plane of the ladder, the jaws extending generally transversely of the ladder's plane, guides extending lengthwise of and at opposite sides of the ladder, a transverse slide guided thereon for movement lengthwise of and in the plane of the ladder, links extending from the scissored jaws to the slide, a guide at the lower end of the ladder, parallel to the slide's guide, a collar guided upon said lower guide, an operating arm fulcrumed upon said collar, a link connecting said arm with said slide, for movement of the latter in correspondence with swinging of the arm, and a spring on the lower guide, reacting between the collar and a fixed stop, to accommodate variations in the size of the post.

11. Mechanism for anchoring a ladder to a post, comprising a pair of jaws disposed generally transversely of the ladder, crossed arms disposed generally parallel to the ladder, one end of each arm carrying one of said jaws, a stationary pivot interconnecting said crossed arms and fixed to the ladder substantially perpendicular thereto, and means for moving the other ends of said arms toward and away from each other to close and open said jaws, respectively.

12. Mechanism for anchoring the upper end of a ladder to a post, comprising crossed flat bars disposed generally parallel to the ladder and having their upper ends bent considerably backward from parallelism with the ladder, the facing edges of said bent ends constituting post engaging jaws extending generally transversely of the ladder, a stationary pivot interconnecting said crossed bars and fixed to the upper end of the ladder substantially perpendicular thereto, and means for swinging said bars about their pivot for opening and closing said jaws.

13. The mechanism of claim 12, wherein the facing edges of the bent bar ends are serrated to afford secure gripping engagement with a post.

14. Mechanism for anchoring the upper end of a ladder to a post, comprising a pair of jaws disposed generally transversely of the ladder, crossed arms disposed generally parallel to the ladder, one end of each arm carrying one of said
jaws, a stationary pivot interconnecting said crossed arms and fixed to the upper end of the ladder substantially perpendicular thereto, two links pivoted one to the other end of each of said arms, a reciprocable pivot interconnecting said links, and means extending to the lower end of the ladder, connected to said link pivot, and reciprocable with respect to the ladder to move the link pivot in a direction to close said jaws.

15. Mechanism for anchoring the upper end of a ladder to a post, comprising a pair of jaws disposed generally transversely of the ladder, crossed arms disposed generally parallel to the ladder, one end of each arm carrying one of said jaws, a stationary pivot interconnecting said crossed arms and fixed to the upper end of the ladder substantially perpendicular thereto, two links pivoted one to the other end of each of said arms, a reciprocable pivot interconnecting said links, tension means extending to the lower end of the ladder, connected to said link pivot, and reciprocable with respect to the ladder to move the link pivot in a direction to close said jaws, and a spring interconnected between said link pivot and said stationary arm pivot urging the jaws toward open position.

RAY C. SWANN.