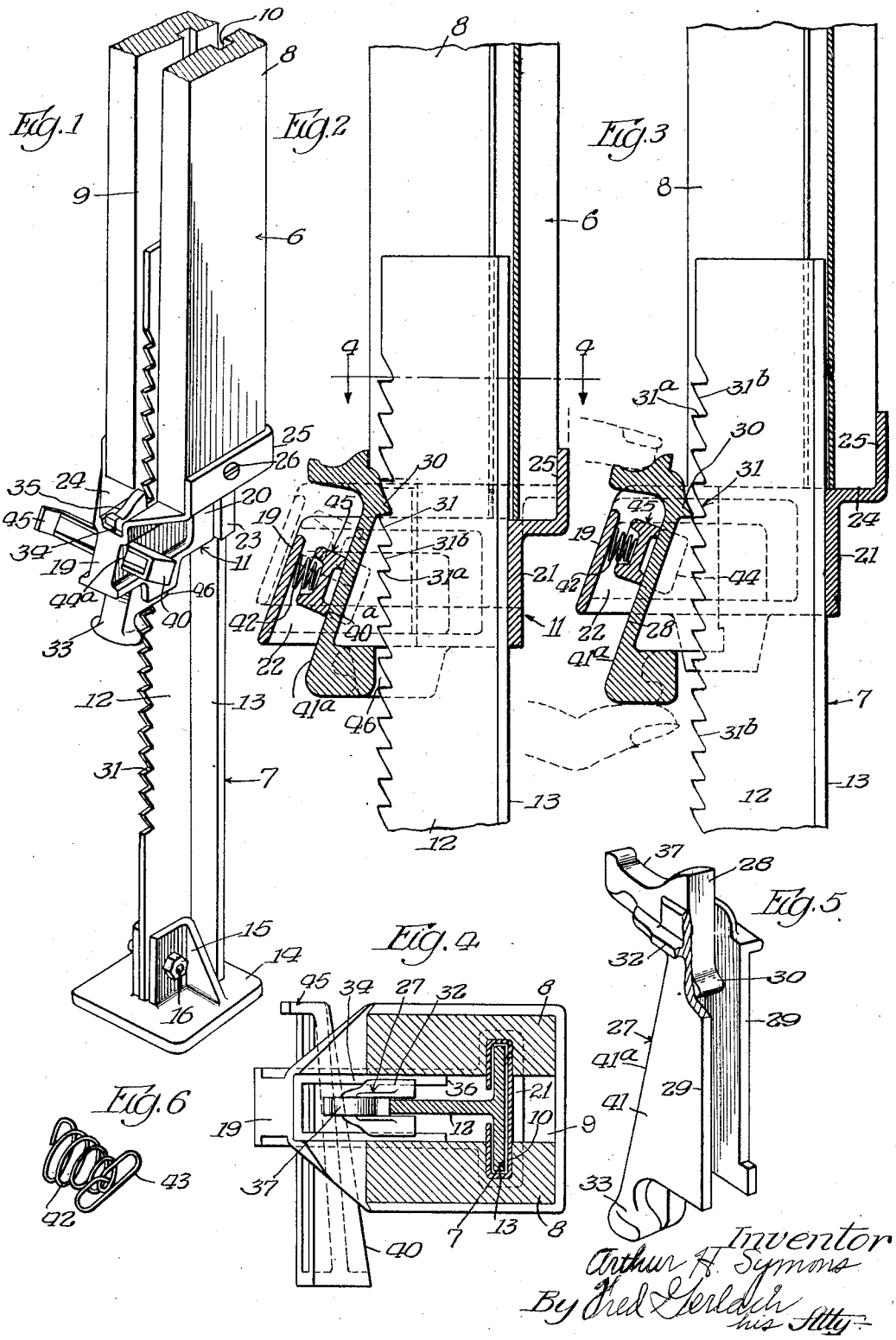
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SHORE

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SHORE

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The present invention relates generally to shores which are designed primarily for use in building construction and are adjustable vertically so that the head or upper ends thereof may be positioned at the proper elevation to support the work or load. More particularly the invention relates to that type of shore which comprises a pair of longitudinally aligned and adjustable struts and locking mechanism for securing the struts in their various adjusted positions, and in which the locking mechanism is associated with a one-piece cast metal housing at the lower end of the upper strut and consists of (1) a lock-element which embodies a downwardly flared cam and is adapted to slide lengthwise of and cooperate with a longitudinal series of notches in the lower strut, and (2) a horizontally movable wedge which is shiftable to effect a secondary adjustment and coacts with the cam so that the weight of the upper strut or the combined weight of the latter and the work is applied positively to jam the lock-element into its locked position.

One object of the invention is to provide a shore of the aforementioned type which embodies in connection with the locking mechanism a spring that is applied in such a manner that it tends to prevent accidental displacement of the wedge-member and operates to force the lock-element into its locked position.

Another object of the invention is to provide a shore of the type under consideration in which the notches that are formed in the lower strut and cooperate with the lock-element of the locking mechanism are so formed that the element, regardless of its position relatively to the lower strut, is always adapted for cooperation with one of the notches and thus insures a positive action of the locking mechanism at all times.

A further object of the invention is to provide a shore which is an improvement upon that exhibited in an application for Letters Patent of the United States filed by me February 8, 1929, Serial No. 338,562.

Other objects of the invention and the various advantages and characteristics of the present shore construction will be apparent to those skilled in the art from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more fully defined by claims at the conclusion hereof.

In the drawings which accompany and form a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a perspective of a shore embodying the invention, the top part of the upper strut which is substantially the same as the part that is shown, being omitted;

Figure 2 is a vertical sectional view of the locking mechanism, showing in detail the construction and arrangement of the spring which operates to prevent accidental displacement of the wedge-member and to force the element into its locked position;

Figure 3 is a sectional view similar to Figure 2, illustrating the manner in which the lock element may be released from engagement with one of the notches in the lower strut in order to permit the upper strut to be raised or lowered to the desired position;

Figure 4 is a horizontal section taken on the line 4—4 of Figure 2 and exhibiting the cross sectional construction of the two struts;

Figure 5 is a perspective of the lock-element; and

Figure 6 is a perspective of the spring of the locking mechanism.

The shore which forms the subject matter of the invention is adapted primarily for use in building construction and comprises an upper strut 6 and a lower strut 7. The upper strut is adapted to be placed beneath the load or work, as well understood in the art, and consists of a pair of elongated timbers 8. These timbers are spaced apart laterally to form an intermediate space or compartment 9, and have formed in their inner faces a pair of oppositely facing open sided longitudinal grooves 10. A one-piece cast metal lock-housing 11 operates to hold the lower ends of the timbers in spaced relation. The lower strut 7 is preferably formed of struc-

tural steel and is T-shaped in cross section. It is elongated and consists of a web portion 12 and a flange 13. The latter is formed integrally with and projects outwardly from both sides of the web portion. The bottom end of the lower strut 7 is provided with a shoe 14 which embodies a pair of upstanding ears 15. These ears are rigidly connected to the web portion 12 of the strut 7 by a bolt 16. The top end of the lower strut is positioned so that the web portion is located in the compartment 9 and the side margins of the flange 13 are slidable in the grooves 10. By means of this arrangement the two struts are adjustable longitudinally relatively to one another and their combined length may be readily varied.

The mechanism for locking the struts together in any desired adjusted position is associated with the housing 11. The latter embodies a front wall 19, a pair of vertical and substantially parallel sides 20 and a back wall 21, which together form an open top and open bottom chamber 22 through which the lower strut 7 extends. The back wall 21 is joined to the rear marginal parts of the sides 20 by a pair of U-shaped wall-members 23 which project outwardly of said sides. These members 23 together with the back wall 21 form a slideway for the flange 13. A pair of coplanar walls 24 are formed integrally with and extend outwardly or laterally from the top marginal parts of the sides 20. These last mentioned walls form a support upon which rest the lower ends of the timbers 8. A three sided flange 25 projects upwardly from the side and rear edges of the walls 24 and forms a socket for the bottom end of the upper strut 6. The housing 11 is held in connected relation with said upper strut by screws 26 which extend through the flange 25 and into the bottom ends of the timbers. The walls 24 and the flange 25 are so arranged relatively to the lower parts of the housing that the chamber 22 is in alignment with the compartment 9.

The locking mechanism comprises a one-piece metallic lock-element 27 which is disposed in and is somewhat longer than the chamber 22. Said element is preferably of U-shaped conformation and comprises a connecting web 28 and a pair of laterally spaced legs 29. The latter are adapted to fit against the side faces of the web portion 12 and together form a slideway which permits the lock-element to slide longitudinally relatively to the lower strut 7. The connecting web 28 is provided at the top part thereof with an integral inwardly extending protuberance or tooth 30. The latter is adapted to effect the desired locking of the struts in conjunction with a longitudinal series of notches 31 in the outer marginal part of the web portion 12. The notches 31 are cut or otherwise formed in the web portion 12 in such a manner as to form a series of flat horizontally extending abutments 31^a upon which the tooth 30 is adapted to rest. The under side of the tooth is flattened, as at 30^a, and extends horizontally so as to lap in an efficient manner the abutments and form an efficient interlock between the lock-element and the lower strut. In addition to the abutments 31^a, the notches 31 form upwardly inclined straight surfaces 31^b. These surfaces operate to direct the tooth 30 against the abutments and extend so that the outer ends of the abutments are sharp and there are no flat portions along the outer margin of the web portion 12 against which the tooth might be lodged without a locking action existing between the lock-element and the lower strut. By having the outer ends of the flat horizontally extending abutments 31^a sharp and formed in the manner set forth, the lock-element 27, regardless of its position relatively to the lower strut, is always adapted for cooperation with one of the notches and thus insures a positive locking action at all times. The lock element is confined to limited longitudinal movement relatively in the chamber 22 by a pair of upper shoulders 32 and a pair of lower shoulders 33. The latter are formed integrally with and extend outwardly from the bottom part of the connecting web 28 and are adapted to engage or contact with the bottom edges of the housing-sides 20 to limit upward movement of the lock-element. The shoulders 32, like the shoulders 33, are formed integrally with the web 28. They extend outwardly from the top part of the lock-element and fit against seats 34 to limit downward movement of said element. By means of the limited relative longitudinal movement which is permitted by the shoulders 32 and 33, and by reason of the fact that there is play towards and away from the strut 7, the lock-element may be readily shifted, as shown in Figure 3, to dislodge the tooth 30 with respect to the adjacent notch 31. In this position of the lock-element, the struts 6 and 7 are free so that they may be adjusted longitudinally relatively to one another. The aforesaid seats 34 are formed in the members 35 which connect the walls 24 to the top margins of the sides 20. To permit the lock-element 27 to be assembled in place, the rear margins of the sides 20 are provided with cutaway portions or recesses 36. The latter are of sufficient depth to accommodate the shoulders 32 and to permit the lock-element to be shifted bodily upwards through the chamber 22 when the lower strut 7 is disconnected with respect to the housing 11 and the upper strut 6. To complete the assembly operation the lock-element is shifted forwardly towards the front wall 19. In this position of said element the shoulders 32 and 33 are operative as stops and the lower strut is capable of

connection to the upper strut simply by inserting into place the upper parts of the web portion 12 and the flange 13. When the struts are in connected relation the web portion 12 prevents movement of the lock-element 27 towards the back wall 21 and the recesses 36. A finger grip 37 whereby the lock-element may be pulled or manipulated readily into its inoperative position is formed integrally with and extends forwardly from the upper part of the connecting web 28. This finger piece projects above the walls 24 so that it is readily accessible. The housing-sides 20 are arranged in close proximity to the legs 29 and operate through the instrumentality of the lock-element to prevent transverse movement of the housing 11 relatively to the lower strut 7.

In addition to the lock-element 27, the locking mechanism for the struts comprises a horizontally extending wedge-member 40 which is mounted in the front part of the housing 11 and is inclined upwardly toward the timbers 8. This member is provided with a flat inner face 40ª which is adapted to abut directly against a downwardly flared cam 41. The latter is formed as an integral part of the connecting web 28 of the lock-element and has an operating face 41ª which is inclined similarly to and at the same angle as the wedge-member 40. As a result of this arrangement of the wedge-member and cam, the weight of the upper strut 6 or, when the shore is in use, the combined weight of the upper strut and the work operates positively to jam the lock-element into its operative position, it being manifest that the downward thrust movement of the upper strut causes the wedge-member 40 to exert inward force upon the lock-element due to the inclination or angle of the cooperating faces 40ª and 41ª. As the weight of the load or work increases the inward force tending to maintain lodgement of the tooth 30 in the adjacent notch 31 also increases with the result that there is no danger whatsoever of slippage and the resultant dire consequences. The wedge-member 40 is mounted in the housing 11 so that it normally engages the cam operating face 41ª at or about the central part thereof. When it is desired to release the lock-element 27 so that relative adjustment of the struts may be effected, the upper strut 6 is raised or shifted a small distance with respect to the lower strut. This action operates to elevate the housing 11 and the member 40 relatively to the cam 41 and results in disengagement of the faces 40ª and 41ª, as shown in Figure 3. When the aforementioned faces are out of contact the element 27 is free so that it may be shifted away from the strut 7 by the finger-piece 37 to dislodge the tooth 30. The wedge-member permits of a secondary adjustment after the struts have been initially adjusted to approximately the desired height, and is mounted for transverse movement in a pair of oppositely facing slots or openings 44 in the front parts of the housing-sides 20. The outer face of the wedge-member is longitudinally inclined or angled relatively to the inner face 40ª and is adapted to coact with the frontmost side edges 44ª of the slots 44 to effect movement of said face 40ª to and from the cam face 41ª in response to transverse shift of the wedge-member. The aforesaid front side edges 44ª of the slots 44 are inclined upwardly at the same angle as the faces 40ª and 41ª and are staggered or offset with respect to each other in such a manner that the face 40ª is always parallel to the face 41ª during shift of the wedge-member 40. When it is desired to effect a slight increase in the elevation of the upper strut after the initial or primary adjustment, the said upper strut is raised by a jack or similar mechanism and the wedge-member 40 is shifted into rigid relation with respect to the lock-element and housing, or the wedge-member 40 is driven to force the large end thereof toward the lock-element and into engagement with the cam face 41ª. In this last mentioned type of secondary adjustment, the wedge-member 40 is shifted bodily inwardly due to its wedge formation and consequently is caused to ride upwards on the cam face and force upwardly the lock-housing and upper strut. To lower said upper strut, the wedge-member is driven or tapped in the reversed direction and so that the small end thereof is adjacent the lock-element. This causes outward movement of the member 40 and consequently the face 40ª is caused to ride downwardly with respect to the cam face 41ª. A foot 45 is formed integrally with the small end of the wedge-member 40. This foot is sufficiently large to prevent removal of the wedge-member from the lock-housing 11 while the latter and lock-element are in connected and operative relation with respect to the lower strut 7. When the foot 45 is shifted so that it is disposed adjacent to the lock-element 27, the operating face 40ª contacts with the extreme lower end of the cam face 41ª. To prevent the upper end of the lock-element from being pried or forced outwardly into its inoperative position when the wedge-member 40 is positioned so that the foot 45 is positioned adjacent to the lock-element and the operating face 40ª contacts with the cam face 41ª, a pair of ears 46 are provided. These ears are formed integrally with and depend from the bottom margins of the sides 20 and are adapted to be engaged by the shoulders 33 in such a manner that the lock-element is held against locking movement on the lower end of the connecting web 28 and consequently cannot be pried or forced away from the notches 31. When the upper strut and housing are raised so

that the small end of the wedge is disconnected with respect to the cam face, the ears 46 are elevated out of engagement with the shoulders 33 and thus permit the lock-element to be manipulated so as to dislodge the tooth 30 from the adjacent notch.

The lock-element 27 is forced or urged into its locked position by means of a spiral spring 42. This spring is interposed between the front wall 19 of the housing 11 and the outer face of the wedge-member 40 and is under tension at all times so that it operates to force the wedge-member towards the lower strut 7. By means of this arrangement the lock-element is urged into its locked position and consequently when the upper strut and housing 11 are raised and then released there is no danger of the shore completely collapsing. The end of the spring that engages the front face of the wedge-member is shaped and extended laterally to form an elongated shoe 43. This shoe engages the wedge-member directly and tends to prevent accidental displacement of the wedge-member. By positioning and arranging the spring in the manner set forth, the spring has a two-fold purpose in that it operates to urge or force the lock-element into its locked position and to prevent displacement of the wedge-member. In effecting a complete collapse or telescoping of the struts 6 and 7, the element 27 is first released by raising the housing 11 and the upper strut as previously set forth and is then shifted away from the lower strut against the force of the spring in the manner indicated in Figure 3. While the lock-element is held in its unlocked position the upper strut 6 together with the housing may be lowered. When the upper strut is raised or elevated with respect to the lower strut the lock-element is automatically thrown into its inoperative position against the action of the spring 42 by action of the surfaces 31^b on the tooth 30. When the upper strut is brought to rest after being raised to the desired height and is then released, the spring forces the lock-element into its locked position where it is retained by the action of the wedge-member on the cam 41.

The operation of the shore is as follows:

When the shore is to be put in place, as for example, beneath a floor or a form in which concrete is to be poured, the struts 6 and 7 are relatively adjusted so that the upper strut is positioned at substantially the desired elevation. A secondary adjustment of the struts is then effected by operating the wedge-member 40 as previously described. After the pouring operation has been completed and the concrete has set, the shore is removed, first by tapping the foot 45. This forces the large end of the wedge-member out of engagement with the cam 41 of the lock-element and results in a small downward movement of the lock-housing 11 and the upper strut. The downward movement is sufficient to permit the upper end of the strut 6 to be shifted out of engagement with the superjacent form. Thereafter the upper strut may be totally collapsed by raising it a slight distance to disengage the wedge-member 40 with respect to the cam and then manipulating the lock-element so that the tooth is dislodged from the adjacent notch as previously described.

The shore which is disclosed herein is exceedingly efficient in operation in that it may be readily adjusted and is safe for the reason that the spring 42 and the specific tooth and notch arrangement herein disclosed cause a positive action at all times of the locking mechanism.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

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

1. An adjustable shore comprising an elongated strut adapted to be positioned vertically, a housing mounted on and movable longitudinally relatively to the strut and adapted to support thereabove a shore-member, and mechanism for locking the housing and strut together in adjusted relation, embodying an element confined loosely in the housing and slidable on the strut, a member arranged normally in direct engagement with the element and operable in response to downward movement of the housing and shore-member relatively to the strut to jam the element into a locked position against the strut and adapted, when the housing and shore-member are raised, to release the element, and a spring associated with the housing and separate from the member for pressing the element towards the strut and into its locked position.

2. An adjustable shore comprising an elongated strut adapted to be positioned vertically and having a longitudinal series of abutments, a housing mounted on and movable longitudinally relatively to the strut and adapted to support thereabove a shore-member, and mechanism for locking the housing and strut together in adjusted relation, embodying an element confined loosely in the housing and slidable on the strut, said element being provided with a tooth for cooperation with the abutments, a member arranged normally in direct engagement with the element and operable in response to downward movement of the housing and shore-member relatively to the strut to jam and hold the element in a position wherein the tooth is lodged against one of the abutments and adapted, when the housing and

shore-mmeber are raised to release the element, and a spring associated with the housing and applied to the member so as to press or urge said element towards the strut and into its locked position.

3. An adjustable shore comprising an elongated strut adapted to be positioned vertically, a housing mounted on and movable longitudinally relatively to the strut and adapted to support thereabove a shore-member, and mechanism for locking the housing and strut together in adjusted relation, embodying an element confined loosely in the housing and slidable on the strut, said element being provided with an upwardly tapered cam, a member operable in response to downward movement of the housing and shore-member to engage the cam and cooperate therewith to shift and hold the element into locked position against the strut, and a spring associated with the housing and arranged to force the element into locked relation with the strut so that at all times it is in a position to be engaged by the member.

4. An adjustable shore comprising an elongated strut adapted to be positioned vertically and having a longitudinal series of abutments, a housing mounted on and movable longitudinally relatively to the strut and adapted to support thereabove a shore-member, and mechanism for locking the housing and strut together in adjusted relation, embodying an element confined loosely in the housing and slidable on the strut, said element having a tooth for cooperation with the abutments and being provided with an upwardly tapered cam, and a member operable in response to the downward movement of the housing and shore-member to engage the cam and cooperate therewith to shift and hold the element in a position wherein the tooth is lodged against one of the abutments, said member being adapted to release the element when the housing and shore-member are raised, and a spiral spring associated with the housing and arranged to force the element into locked relation with the contiguous abutment so that it is held in place for engagement by the member.

5. An adjustable shore comprising a pair of struts movable longitudinally relatively to each other, a housing secured to one of the struts and through which the other strut is movable, and mechanism for locking the housing and the other strut together in adjusted relation, embodying an element slidable on said other strut, a wedge-member movable lengthwise in the housing and adapted to jam and hold the element in locked position against the strut, and a spring associated with the housing and applied to the wedge-member so as to retard lengthwise displacement thereof.

6. An adjustable shore comprising an elongated strut adapted to be positioned vertically, a housing mounted on and movable longitudinally relatively to the strut and adapted to support thereabove a shore-member, and mechanism for locking the housing and strut together in adjusted relation, embodying an element slidable on the strut, a wedge-member movable lengthwise in the housing and adapted to jam and hold the element in locked position against the strut, and a spring associated with the housing and applied to the wedge-member so as to retard lengthwise displacement thereof.

7. An adjustable shore comprising an elongated strut adapted to be positioned vertically, a housing mounted on and movable longitudinally relatively to the strut and adapted to support thereabove a shore-member, and mechanism for locking the housing and strut together in adjusted relation, embodying an element slidable on the strut, a transversely extending wedge-member movable horizontally in the housing and operative to jam and hold the element in locked position against the strut, and a spiral spring extending between the wedge-member and the wall of the housing and adapted to form a drag to prevent accidental displacement of said wedge-member.

8. An adjustable shore comprising an elongated strut adapted to be positioned vertically, a housing mounted on and movable longitudinally relatively to the strut and adapted to support thereabove a shore-member, and mechanism for locking the housing and strut together in adjusted relation, embodying an element confined loosely in the housing and slidable on the strut, a horizontally extending wedge-member movable lengthwise and laterally in the housing and arranged so that one side thereof engages the element and serves to jam and hold said element in locked position against the strut, and a spring extending between the wedge-member and one wall of the housing and adapted to retard lengthwise displacement of the wedge-member and force the element against the strut.

9. An adjustable shore comprising an elongated strut adapted to be positioned vertically and having a longitudinal series of flat horizontally extending abutments at one side thereof and flat inclined surfaces between the abutments, a housing mounted on and movable longitudinally relatively to the strut and adapted to support thereabove a shore-member, and mechanism for locking the housing and strut together in adjusted relation, embodying an element slidable on the strut and provided with a tooth adapted to rest upon the abutments and to be guided by the inclined flat surfaces from one abutment directly to the other when the housing is raised,

and a member associated with the housing and operable in response to the weight of the housing and shore-member to jam and hold the element in a position wherein the tooth is lodged against one of the abutments.

Signed at Chicago, Illinois, this 28th day of May, 1930.

ARTHUR H. SYMONS.