Sept. 23, 1930. C. A. KINNINGER 1,776,439

ADJUSTABLE SHORE

Filed March 29, 1923

Fig. 1

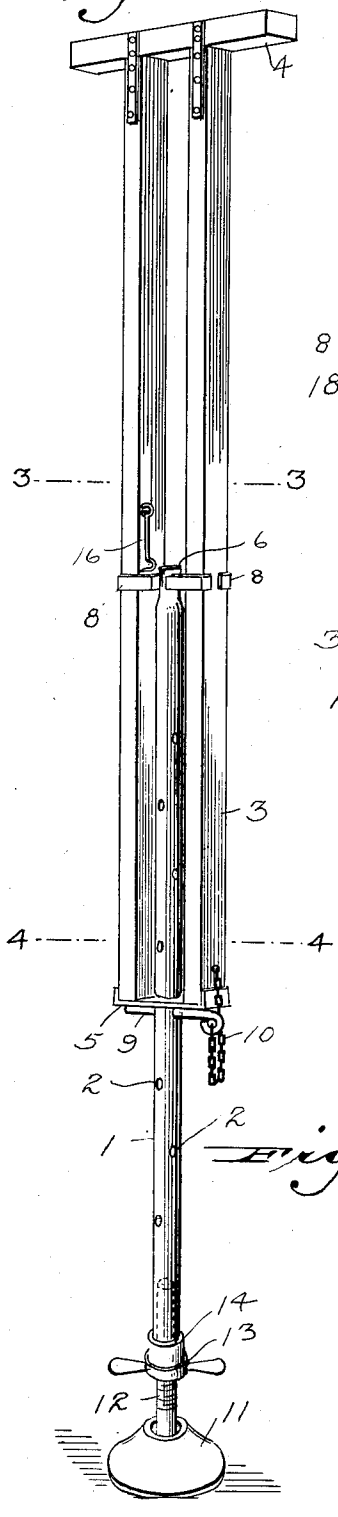



Fig. 2

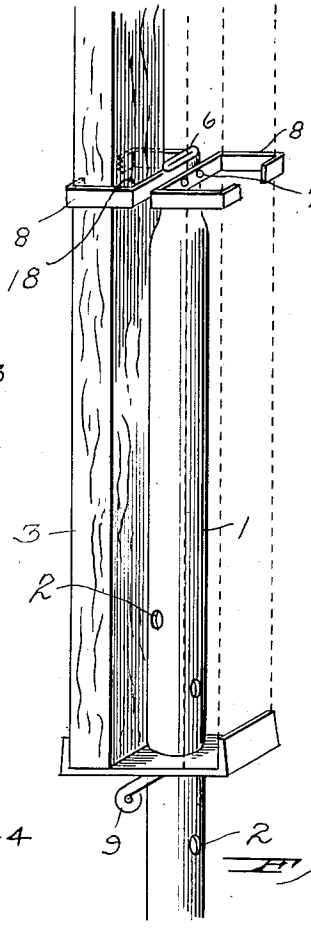



Fig. 3

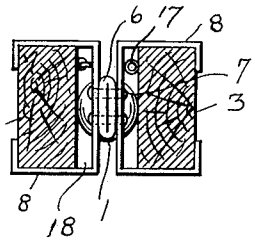



Fig. 4

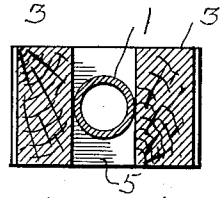



Fig. 5

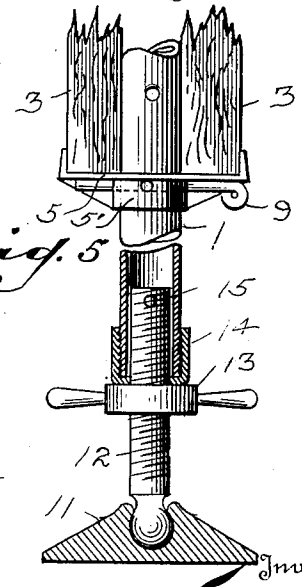
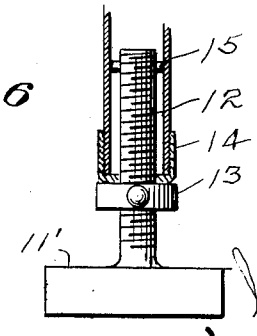



Fig. 6




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Patented Sept. 23, 1930 1,776,439

# UNITED STATES PATENT OFFICE

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## ADJUSTABLE SHORE

Application filed March 29, 1923. Serial No. 628,466.

My invention relates to shores or supports, such as are usually employed for supporting forms for concrete structure, and more particularly to an adjustable shore or strut having a wide range of adaptability.

While the adjustable shore herein shown and described is especially designed for supporting overhead forms for concrete construction, it is to be understood that it is not limited to such purpose, but is also applicable to the construction of staging, scaffolding, as a lateral brace for a wall or abutment, and for other analogous purposes, wherein an adjustable brace or strut may be advantageous.

In the construction of staging and shoring for concrete forms and the like, it is the present practice to employ timbers, cut to the required length for one particular job. Such timbers may be reused a second or third time by recutting and splicing short lengths together. Under such method of cutting and splicing timbers to fit particular jobs, the period of usefulness of the material is quite short. Such methods are very wasteful and in view of the increasing scarcity of lumber, and the high prices of such material, these methods are quite uneconomical. To meet these conditions, various types of adjustable shores have heretofore been developed. Many of these embodied automatic clutch devices, which while sufficient to hold the adjustable members under reasonable strain are not sufficiently positive to withstand extreme loads, and moreover such devices as usually constructed have been too costly for general use and are too heavy to be economically handled and installed.

The present invention contemplates an extensible or adjustable shore, which will be comparatively light in weight to enable it to be carried and installed by a lone workman but which will be sufficiently staunch and rigid to enable it to sustain a high maximum load. The shore is further provided with two forms of adjustment of positive character, one of which affords predetermined degree of extension or adjustment while the other by its cooperation will afford intermediate variations of adjustment, between the points determined by the primary adjusting means. The present shore consists of two spaced struts, preferably, though not necessarily, of wood, interconnected at their opposite ends in spaced relation and having telescopic relation with a length of pipe slidingly mounted intermediate such spaced struts, the pipe having sliding bearing through the space plate at the lower end of the struts, while the upper end of such pipe is slidingly engaged with the struts by means of yokes secured to the pipe and embracing the struts. The pipe is provided with a series of spaced holes to receive the stop pin, by which the struts are positively supported upon the pipe in any one of several positions. To afford intermediate degrees of adjustment to fractional portions of the units represented by spaced holes in the pipe, there is provided at the lower end of the pipe or standard an adjustable foot, preferably of the screw jack type. This not only affords accurate fractional adjustment intermediate the points determined by the spaced holes in the pipe, but it also enables the shore to be firmly and tightly adjusted in position during installation, and enables the pressure to be easily and readily removed when dismantling the staging or forms.

The object of the invention is to simplify the structure as well as the means and mode of operation of adjustable shores or extensible struts, whereby they will not only be cheapened in construction, but will be more efficient in use, positive in their engagement in different positions of adjustment, capable of being readily and quickly adjusted to fractional degrees of extension, to facilitate installation and removal, of maximum strength and durability and unlikely to get out of repair.

A further object of the invention is to provide a duo-coacting adjusting means for such extensible strut or adjustable shores, by which the relatively adjustable portion will be positively locked in their relation one with the other.

A further object of the invention is to provide an adjustable shore which will be comparatively light in weight thereby enabling

it to be easily and readily transported and installed with minimum labor expense.

A further object of the invention is to provide such an adjustable strut having maximum strength and durability, and capacity for carrying heavy overload in its various positions of adjustments.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof, and the mode of operation or their equivalents as hereinafter described and set forth in the claims.

Referring to the drawings, Fig. 1 is a perspective view of the adjustable shore forming the subject matter hereof. Fig. 2 is a detail view of a portion of the shore with one of the side struts removed to illustrate the telescopic adjustability of the parts. Fig. 3 is a transverse sectional plan view on line 3—3 of Fig. 1. Fig. 4 is a transverse sectional plan view on line 4—4 of Fig. 1. Fig. 5 is a front elevation partly in section, having co-acting duo-adjusting means illustrating the foot of the shore as being universally adjustable. Fig. 6 illustrates a fixed adjustable foot or elevating jack for the shore, which is the preferred form for general staging and concrete form construction purposes.

Like parts are indicated by similar characters of reference throughout the several views.

In the preferred but obviously not necessarily the only form of embodiment of the invention, as has been illustrated in the drawing, 1 is the main standard comprising a section of pipe having therein at spaced intervals transverse holes 2—2. To preserve the strength of the standard or pipe, these holes 2 are preferably staggered, that is successive holes extend transversely through the pipe at right angles to each other. This pipe or standard 1 is telescopically mounted in relation with two spaced struts 3—3, which are preferably though not necessarily of wood. The proportions of the pipe and struts may be varied according to conditions of use and the maximum weight or overload to be carried. However, for ordinary staging and concrete form construction, a two inch wrought iron pipe has been found sufficient for the standard 1, while the struts 3 are usually constructed from two by four studding. It will be understood that these dimensions are given merely for illustrative purposes and are not to be interpreted as limitations. The struts 3 are interconnected at their upper ends by a cross arm or head 4, which may be of any suitable shape or extent. In the present instance this cross arm or head has been shown extended laterally somewhat beyond the strut 3, but it may if desired terminate flush with such strut, or be of such extent as is necessitated by the purpose for which the shore is employed. At their lower ends the spaced struts 3 are interconnected by a flanged space plate 5. This space plate 5 in practice is a short section of channel iron or channel bar. However, any other suitable form of interconnection and guide for the standard 1 may be substituted. The space plate 5 is provided with a central opening intermediate the struts 3 through which the standard 1 extends. The upper edge of the standard 1 is flattened as at 6 and secured to such flattened portion by bolts or rivets 7 are two oppositely disposed bands or yokes which loosely and slidingly embrace the struts 3. The construction is such that the standard and strut are longitudinally slidingly adjustable in relation with each other, the standard sliding through the opening in the space plate 5, while the yokes 8 slide longitudinally upon the struts during such adjusting movement. A stop pin or key 9 is insertable thru any one of the holes 2 in the standard 1 to limit the descent of the strut 3 and afford a positive support for such strut in any selected position of adjustment. In order that the stop pin or key may be at hand when needed and avoid loss or misplacement, the key is preferably attached to the strut 3 by means of a flexible cable or chain 10.

At its lower end the standard 1 is provided with a screw jack or adjustable foot comprising a base 11, from which projects an upright screw shaft 12 projecting into the open lower end of the pipe standard 1 and provided with an adjustable collar or rest 13 threaded upon such shaft upon which the lower end of the standard 1 abuts. To increase the extent of the bearing surface of the standard on the rest 13 and to strengthen the lower end of the pipe 1 an ordinary pipe cap 14 is threaded upon the lower end of the standard and provided with an opening sufficiently large to admit the screw shaft 12. To maintain the parts in assembled relation during transportation, the screw shaft 12 is preferably provided with a transverse pin or cotter 15, within the pipe or standard 1, which by its engagement with the head of the pipe cap 14, which forms a flange about the screw shaft receiving opening, limits the withdrawal of the screw shaft from the standard. In Fig. 5 the screw shaft 12 has been shown connected with the foot or base 11, by a universal or ball and socket joint, by which a limited degree of flexibility is afforded. Such construction may be desirable in those instances in which the shore is to be positioned at an inclination with its support. The adjustability afforded by the ball and socket connection is of further material advantage in wrecking concrete forms which have been supported by such struts. It is quite dangerous to remove the shores singly. The usual practice is to loosen the struts slightly, leaving them standing up-

right and then by means of attached cables pull the shores sidewise allowing an entire section of forms to fall. If the shore was quite rigid, necessitating tilting of the base, this method of collapsing or wrecking forms could not be effectively accomplished. The provision of the flexible connection permitting wobble movement of the shore not only accommodates it to irregularities of attachment and support, but permits the shore to be pulled out of perpendicular relation with the plane of the base to facilitate the wrecking operations of forms and false work. The construction and relation of the parts shown in Fig. 6 is similar to that heretofore described, except that the screw shaft 12 is fixedly or rigidly secured to the base 11', preferably though not necessarily by being formed integral therewith.

Within ordinary range of adjustment of the struts and standard the yokes 8 afford sufficient tie between the struts 3 to brace them against medial deflection. However, in an extreme position of adjustment, wherein the yoke 8 would be brought into proximity to the lower end of the strut and face plate 5, it may be found advantageous to tie the struts 3 medially one to the other by an intermediate connection. To this end a hook 16 may be secured to the inner face of one of the struts 3 at a medial point and a corresponding eye 17 may be positioned upon the inner face of the opposing strut, so that such hook may be engaged therewith to interconnect the struts and brace them one upon the other against bending or medial deflection. Ample clearance space 18 is afforded inside the yoke 8 as shown in Fig. 3 to enable the yokes to readily pass such hook and eye when the latter are disconnected. The necessity for such interconnection occurs only in the event of an extreme degree of adjustment at which time the hook and eyes 16 and 17 will be elevated a considerable distance from the end of the standard 1 and the yoke 8.

By inserting the stop pin or key in the hole 2 to afford the approximate adjustment of the shore and then adjusting the screw threaded collar or rest 13 the shore may be accurately adjusted to any intermediate fractional degree. Likewise by leaving the collar 13 in a slightly lowered position the strut is readily installed after which the tightening of the collar 13 will secure the strut in place with minimum effort and a great saving of time. Likewise when removing the shore a turn or two of the collar or rest 13 in reverse direction will relieve the pressure upon the shore and permit its ready disengagement.

In Fig. 5 the space plate 5 is shown provided with a hub or hollow boss 5' through which the stop pin 9 projects. The hub 5' not only increases the length of the standard bearing but also enables the pin to lock the parts against movement in both directions. This is a great convenience when the shore is being carried. The screw adjustment enables the shores to be adjusted after installation to aline the supported forms or other structure and to compensate for settling of the shores under load.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that it is not limited to the specific details shown, but that the means and construction herein disclosed comprises the preferred form of several modes of putting the invention into effect and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:

1. In an adjustable shore, a standard, an adjustable base for said standard by which the standard may be raised and lowered, a pair of struts extending on opposite sides of said standard and slidingly adjustable relative thereto, toward and from said adjustable base, a cross head connecting the struts at their upper end, a perforated head connecting the lower ends of said struts, through the perforation of which the standard extends, a transversely perforated hub on said head, a series of transverse spaced holes in the standard, and a removable pin insertable through the transverse perforations of the hub and standard to immovably lock the standard and struts in their adjusted relation against relative movement in either direction, the interlocked standard and struts being bodily adjustable in unison by the adjustment of the base.

2. In an adjustable shore, a pipe standard, a base for the standard, a screw stud carried by the base, extending loosely within the pipe standard, an adjustable collar on the screw stud, on which the pipe standard loosely rests, a pair of interconnected spaced struts extending on opposite sides of said standard and slidingly adjustable relative thereto, said struts being fixedly connected one with the other at both their upper and lower ends, a transverse pin transfixing the inner connected strut structure and the standard for immovably interlocking the standard and struts in adjusted relation against movement in either direction and means for bodily adjusting the interlocked standard and struts by

adjustment of the adjustable collar on said screw stud.

3. An adjustable shore, including a length of pipe comprising a standard, a pair of struts extending on opposite sides of the pipe standard, an apertured supporting plate connecting the extreme ends of the struts, through which the standard extends, the extremity of the pipe between said struts being flattened, oppositely disposed yokes attached to such flattened portion and embracing the struts, and means for interengaging the standard and struts in different positions of telescopic adjustment.

4. In an adjustable shore, two relatively adjustable sections one of the sections being a length of pipe provided with transverse perforations at spaced intervals, the other section comprising a pair of spaced struts extending on opposite sides of the length of pipe, a cross arm connecting the upper ends of the spaced struts, a plate carried by the other ends of the spaced struts, a sleeve formed integral with the plate, surrounding and slidingly adjustable upon the first mentioned section, said sleeve having therein a transverse perforation brought into registry with different perforations of the first section by their relative adjustment, and a pin insertable transversely through the registered perforations to lock the shore sections against relative adjustment in either direction.

5. As an article of manufacture, a coupling member for adjustable shore sections, comprising a plate, the opposite edges of which are upturned, and a centrally disposed hollow boss on said plate forming a sliding bearing and having a transverse perforation.

6. As an article of manufacture, a coupling member for adjustable shore sections, comprising a sleeve having laterally projecting wing portions for engagement with spaced struts, said sleeve affording a sliding bearing for an intermediate strut, the sleeve being transversely perforated for the reception of a transverse locking pin.

In testimony whereof, I have hereunto set my hand this 21 day of March, A. D. 1923.

CARL ANDREW KINNINGER.