

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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 (72) Inventor AGE RINDAL



(54) TELESCOPING SUPPORT

(71) I, AGE RINDAL, a Norwegian subject of Bygdøy Allé 37, OSLO, 2, Norway, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a telescoping support comprising two telescopic tubes, which may be locked in any relative position by means of a locking slab having a bore through which the inner tube extends with a small clearance, one end of the slab being secured in the longitudinal direction of the tubes by engagement in a socket in a retainer member which is secured to the outer tube and extends beyond this tube in the longitudinal direction, said locking slab upon stressing of the support taking an inclined locking position in which it is jammed on the inner tube.

The object of the present invention is to provide a simple and sturdy support of this type, which support may withstand substantially higher loads than previously known supports.

The invention has emanated from continued experiments with various embodiments of a support of the kind referred to. In the telescoping support according to the invention the locking slab at said one end has a projecting shoulder having a surface facing the outer tube and in the locking position engaging a surface of said socket extending perpendicularly to the axis of the support, said surface of the shoulder further lying approximately on the same level as the diametrically opposed edge portion of the bore in the slab engaging the inner tube.

Whereas in a known support of the type referred to the locking slab in its inclined locking position would exert an obliquely directed force on the retainer member relatively to the longitudinal direction of the support and thus force the retainer member outwardly from the outer tube whether the socket in the retainer member were obliquely directed corresponding to the oblique position

of the locking slab, or the locking slab did only engage the outer edge of the socket, such forces will, as a result of the above cited features which are characteristic of the invention, not be created, and these features are therefore believed to be of essential importance to the obtaining of a support which may withstand heavy loads. Thus, experiments have shown that a telescoping support embodying the invention and having the dimensions which will be referred to when discussing the specific embodiment, may withstand an axial load of several tons, whereas supports of corresponding dimensions according to previously suggested designs fail at a load of about 300 kp (about 3000 N or 670 lb).

The two tubes should be carefully fitted within each other without clearance in the lateral direction, which fact, however, leads to an undesirably large friction and very large tolerance requirements if both tubes have a circular cross section. It is therefore preferred that the outer tube has an inner diameter sufficiently larger than the outer diameter of the inner tube to enable the outer tube to be provided with three or more longitudinal impressions from the exterior of the tube to provide internal ridges on which the inner tube slides with approximate line contact.

In order to obtain a sufficient strength the locking slab should have side flanges and be manufactured from spring steel. The side flanges must then be formed by hot pressing or other hot working. After being shaped the locking slab should be hardened. However, the inner tube on which the walls of the bore in the locking slab shall become jammed, should consist of relatively soft steel.

The free end of the locking slab is preferably guided on a bolt connected to the outer tube. The free end of the bolt may consist of a bolt head, and a helical spring surrounding the bolt may act between the head and the locking slab for urging the locking slab towards the locking position.

The invention will now be described in more detail, reference being had to the

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accompanying drawings, which illustrate by way of example a telescoping support, the length of which may be adjusted and which can withstand very high loads.

Fig. 1 is an elevational view of that portion of a telescoping support for shuttering at which the inner tube enters the outer tube, the figure illustrating partly in section the means locking the two tubes in a desired relative position.

Figs. 2, 3 and 4 are an end view, a plan view and a side view, respectively, of a locking slab for a shuttering support embodying the invention.

As illustrated in Fig. 1 the adjustable parts of the shuttering support consist of two tubes 1 and 2, which are made to telescope. At the ends the two tubes of the support may be provided respectively with a suitable portion for supporting and possibly locking a shuttering girder and with a suitable base. However, the ends of the shuttering support are not illustrated since they are not important to the present invention.

In the illustrated embodiment the outer tube 1 is a solid drawn steel tube having an outer diameter of 57 mm and a wall thickness of 2.65 mm. The inner tube is also a solid drawn steel tube having an outer diameter of 48.3 mm and a wall thickness of 3.25 mm. The inner tube 2 is manufactured from a relatively soft steel. The outer tube 1 is provided with four longitudinal impressions 3 to provide internal ridges (not shown) on which the inner tube is accurately guided with approximate line contact and without substantial clearance.

Exteriorly of the outer tube 1 at the end thereof there is welded a retainer iron 4 which extends beyond the end of the tube 1. The retainer iron may for instance be manufactured from a steel plate of 8 mm thickness. At the edge of the retainer iron 4 facing the outer surface of the inner tube 2 there is provided a socket 5 having a lower side 6 extending perpendicularly to the common axis 7 of the tubes 1 and 2. A locking slab 8, which is illustrated in more detail in Figs. 2-4, is at one end seated in the socket 5. The locking slab 8 has an opening in the form of a bore 9 having rounded edges, the inner tube 2 extending through said bore. On the side of the locking slab 8 opposite the socket 5 the locking slab has a smaller bore 10. On the upper side of this bore there is fastened a washer 11 having a somewhat smaller inner diameter than the bore 10. A headed bolt 12 extends through the washer 11 and the bore 10 and further through a hole in a bracket 13 which is welded onto the outer tube 1 opposite the retainer iron 4. The bolt 12 is retained on the bracket 13 by means of a nut 14. As illustrated a helical spring 16 is provided between the head 15 of the bolt 12 and the washer 11, said

spring acting to press the locking slab 8 downwards, i.e. towards the locking position illustrated in Fig. 1.

The locking slab 8 is manufactured from spring steel of 8 mm thickness. The slab comprises a flat body portion in which the bores 9 and 10 are provided, and which is extended beyond the bore 10 to form a portion 17 which may be gripped for raising the locking slab 8 against the action of the spring 16. In addition to the flat body portion the locking slab 8 comprises two side flanges 18 for increasing the strength of the locking slab. The shape of the locking slab at the place in which it engages the socket 5 is of essential importance to the invention. At this place the locking slab has a downwardly projecting shoulder 19 formed by pressing down the edge 20 in the vicinity of the longitudinal axis 21 of the locking slab 8 through the axes of the bores 9 and 10. As best illustrated in Figs. 1 and 4, the surface or lower side 22 of the shoulder 19 facing the outer tube is not parallel to the plane body portion of the locking slab 8, said surface 22 on the contrary extending approximately perpendicularly to the axis 7 and engaging the lower side 6 of the socket 5 when the locking slab 8 is in its inclined locking position illustrated in Fig. 1. As shown in Fig. 1 the surface 22 of the shoulder 19 lies approximately on the same level as the diametrically opposed portion 23 of the bore in the slab engaging the inner tube 2 in the locking position of the locking slab.

The stamping of the shoulder 19 and the bending of the flanges 18 of the slab 8 must be done by hot pressing, since a cold working of the spring steel of which the slab 8 consists is impractical. When the locking slab 8 has obtained its final shape, it is hardened.

WHAT I CLAIM IS:—

1. Telescoping support comprising two telescopic tubes which may be locked in any relative position by means of a locking slab having a bore through which the inner tube extends with a small clearance, one end of the slab being secured in the longitudinal direction of the tubes by engagement in a socket in a retainer member which is secured to the outer tube and extends beyond this tube in the longitudinal direction, said locking slab upon stressing of the support taking an inclined locking position in which it is jammed on the inner tube, wherein the locking slab at said one end has a projecting shoulder having a surface facing the outer tube and in the locking position engaging a surface of said socket extending perpendicularly to the axis of the support, said surface of the shoulder further lying approximately on the same level as the diametrically opposed edge portion of the bore in the slab engaging the inner tube.



accompanying drawings, which illustrate by way of example a telescoping support, the length of which may be adjusted and which can withstand very high loads.

5 Fig. 1 is an elevational view of that portion of a telescoping support for shuttering at which the inner tube enters the outer tube, the figure illustrating partly in section the means locking the two tubes in a desired relative position.

10 Figs. 2, 3 and 4 are an end view, a plan view and a side view, respectively, of a locking slab for a shuttering support embodying the invention.

15 As illustrated in Fig. 1 the adjustable parts of the shuttering support consist of two tubes 1 and 2, which are made to telescope. At the ends the two tubes of the support may be provided respectively with a suitable portion for supporting and possibly locking a shuttering girder and with a suitable base. However, the ends of the shuttering support are not illustrated since they are not important to the present invention.

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30 Exteriorly of the outer tube 1 at the end thereof there is welded a retainer iron 4 which extends beyond the end of the tube 1. The retainer iron may for instance be manufactured from a steel plate of 8 mm thickness. At the edge of the retainer iron 4 facing the outer surface of the inner tube 2 there is provided a socket 5 having a lower side 6 extending perpendicularly to the common axis 7 of the tubes 1 and 2. A locking slab 8, which is illustrated in more detail in Figs. 2—4, is at one end seated in the socket 5. The locking slab 8 has an opening in the form of a bore 9 having rounded edges, the inner tube 2 extending through said bore. On the side of the locking slab 8 opposite the socket 5 the locking slab has a smaller bore 10. On the upper side of this bore there is fastened a washer 11 having a somewhat smaller inner diameter than the bore 10. A headed bolt 12 extends through the washer 11 and the bore 10 and further through a hole in a bracket 13 which is welded onto the outer tube 1 opposite the retainer iron 4. The bolt 12 is retained on the bracket 13 by means of a nut 14. As illustrated a helical spring 16 is provided between the head 15 of the bolt 12 and the washer 11, said

spring acting to press the locking slab 8 downwards, i.e. towards the locking position illustrated in Fig. 1.

70 The locking slab 8 is manufactured from spring steel of 8 mm thickness. The slab comprises a flat body portion in which the bores 9 and 10 are provided, and which is extended beyond the bore 10 to form a portion 17 which may be gripped for raising the locking slab 8 against the action of the spring 16. In addition to the flat body portion the locking slab 8 comprises two side flanges 18 for increasing the strength of the locking slab. The shape of the locking slab at the place in which it engages the socket 5 is of essential importance to the invention. At this place the locking slab has a downwardly projecting shoulder 19 formed by pressing down the edge 20 in the vicinity of the longitudinal axis 21 of the locking slab 8 through the axes of the bores 9 and 10. As best illustrated in Figs. 1 and 4, the surface or lower side 22 of the shoulder 19 facing the outer tube is not parallel to the plane body portion of the locking slab 8, said surface 22 on the contrary extending approximately perpendicularly to the axis 7 and engaging the lower side 6 of the socket 5 when the locking slab 8 is in its inclined locking position illustrated in Fig. 1. As shown in Fig. 1 the surface 22 of the shoulder 19 lies approximately on the same level as the diametrically opposed portion 23 of the bore in the slab engaging the inner tube 2 in the locking position of the locking slab.

90 The stamping of the shoulder 19 and the bending of the flanges 18 of the slab 8 must be done by hot pressing, since a cold working of the spring steel of which the slab 8 consists is impractical. When the locking slab 8 has obtained its final shape, it is hardened.

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2. A support as claimed in claim 1, wherein the outer tube, in order to provide an accurate fitting of the two tubes within each other without excessive friction, is provided with
5 three or more longitudinal impressions from the exterior of the tube to provide internal ridges on which the inner tube slides with approximate line contact.

3. A support as claimed in claim 1 or 2,
10 wherein the locking slab has side flanges increasing its strength and is manufactured from spring steel by hot working and subsequent hardening.

4. A support as claimed in any of the pre-

ceding claims, wherein the free end of the slab is guided on a bolt connected to the outer tube, said end being spring biased towards the locking position by a helical spring on the bolt. 15

5. A telescoping support constructed and arranged substantially as herein described with reference to, and as shown in, the accompanying drawings. 20

REDDIE & GROSE,
Agents for the Applicant,
6, Bream's Buildings,
London, EC4A 1HN.

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