Aug. 3, 1965 M. M. SMITH 3,198,562

INTERNALLY EXPANDING LOCKING DEVICE FOR TELESCOPED TUBES

Filed Feb. 20, 1963

FIG. 2.

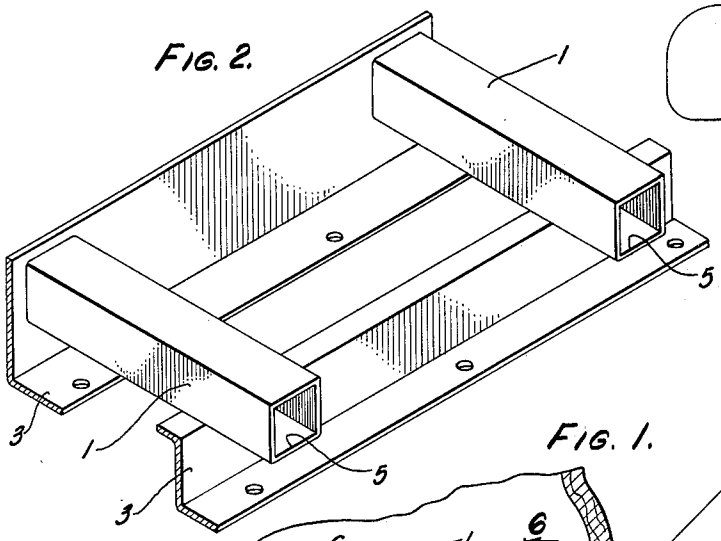
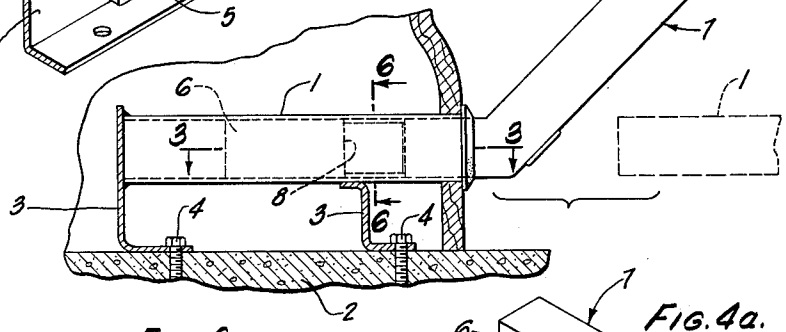


FIG. 1.



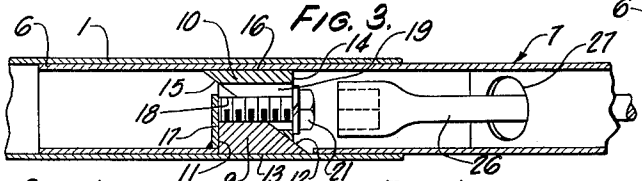


FIG. 3.

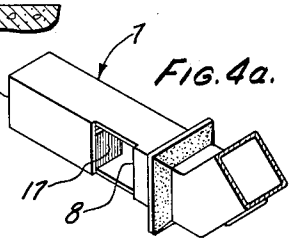


FIG. 4a.

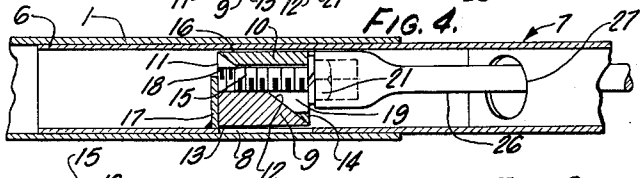


FIG. 4.

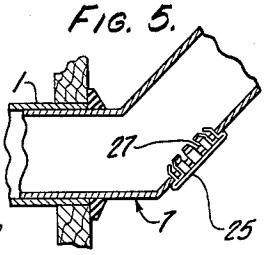


FIG. 5.

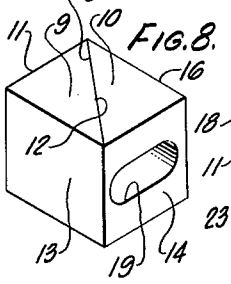


FIG. 8.

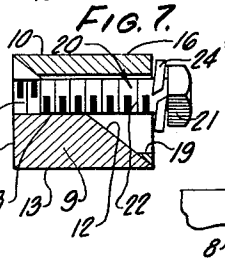


FIG. 7.

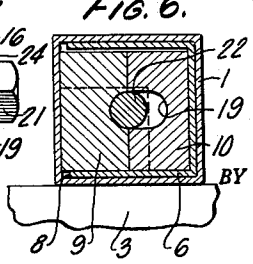


FIG. 6.

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INTERNALLY EXPANDING LOCKING DEVICE FOR TELESCOPED TUBES

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3 Claims. (Cl. 287—58)

The present invention relates primarily to a device for locking a seat support tube in a base tube.

An object of the invention is to provide a small, inexpensive, easily-adjusted locking device having few operable parts and insertable as a unit in a seat support tube.

A further object of the invention is to provide an easily adjustable locking device that rigidly locks a seat support tube in a base tube without deforming either of the tubes.

A still further object of the invention is to provide a locking device that will not work loose or require frequent adjustment with heavy use.

These and other objects and advantages will appear as the description progresses.

In the drawing:

FIGURE 1 is a side view of a seat support tube in a base tube.

FIGURE 2 is a perspective view of a pair of base tubes mounted on supporting brackets.

FIGURE 3 is a top sectional view along the line 3—3 in FIGURE 1 showing a seat support tube locked in a base tube with the device of my invention.

FIGURE 4 is a similar view showing the device in an unlocked position.

FIGURE 4*a* is a perspective view of the lower section of a seat support tube showing a side opening near one end thereof and a stop plate near said end contiguous with the opening and extending into said tube.

FIGURE 5 is a detailed side sectional view of a seat support tube and a base tube showing a removable covering on the wrench hole in the seat support tube.

FIGURE 6 is a cross-sectional view of the seat support tube and base tube taken along the line 6—6 in FIGURE 1.

FIGURE 7 is an enlarged top sectional view of the locking device.

FIGURE 8 is a perspective view of the device showing the opening in one of its members.

In the preferred embodiment of my invention, I attach a base tube **1** to the floor **2** by means of brackets **3** and screws **4**. Concrete may then be poured over both the brackets and tubes, provided the ends **5** are left open. I then insert the end **6** of a seat support tube **7** in the base tube until the base tube surroundns the end of the seat support tube and the side opening **8** near said end. While the drawing shows close-fitting square tubes, neither is essential to my invention. The base tube may be substantially larger than the end of the seat support tube and the tubes may have any desired cross-sectional configuration. It is therefore obvious that my invention will permit a mass produced seat support tube to be locked in a variety of different sized base tubes. In practice, I have found that close-fitting, non-circular tubes having the same cross-sectional configuration give the best results because such configuration prevents rotation of the seat support tube in the base tube.

In one form of my invention, the locking device comprises a first member **9** and a second member **10** positioned in the seat support tube. The first member has a base **11**, an inclined surface **12**, and a locking surface **13**. The second member has a base **14**, an inclined surface **15**, and a locking surface **16**. A stop plate **17** may be attached to the seat support tube near the end contiguous with the side opening therein and extending into said tube. While

the stop plate is not essential, it facilitates the locking operation, as will be seen later.

The inclined surface of the first member slidably engages the inclined surface of the second member and the base of the first member is remote from the base of the second member. The first member has an internally threaded bore **18** extending from its base to its inclined surface and the second member has an opening **19**, best shown in FIGURE 8, extending from its base to its inclined surface, the bore in the first member being in alignment with the opening in the second member. A bolt **20** has a head **21** abutting the base of the second member, a body **22** extending through the opening in the second member, and a threaded end **23** engaging the internally threaded bore of the first member. To prevent the bolt from turning, a lock washer **24** may be inserted between the head and the base of the second member. Thus, the word "abutting" as used herein means touching or located in close proximity to. The base of the first member is adapted to slidably engage the stop plate and the locking surface is adapted to pass through the side opening in the seat support tube. Also, the opening in the second base of the first member is remote from the base of the member, as best shown in FIGURE 8, is so constructed and arranged as to permit movement of the bolt away from the locking surface of the second member as the bolt is screwed into the first member.

I lock the tubes by removing the covering **25** and inserting a socket wrench **26** through a hole **27** in the seat support tube to engage the head of the bolt. I then force the base of the first member against the stop plate and turn the bolt, which forces the locking surface of the second member against the inside of the seat support tube and the locking surface of the first member against the inside of the base tube. For best results, the locking surface of each element should be 1½ sq. in. or larger.

One of the main advantages of the device described over the prior art is that it rigidly locks the seat support tube in the base tube without deforming either of the tubes. When the device is unlocked the tubes move freely, thereby facilitating adjustment from one locked position to another. In addition, the mechanical advantage of the device permits an unusually tight fit that will not work loose or require frequent adjustment with heavy use.

Having fully described my invention it is to be understood that I am not to be limited to the details herein set forth but that my invention is of the full scope of the appended claims.

I claim:

1. A seat assembly comprising a seat support tube having a side opening near one end, a stop plate near said end contiguous with said opening and extending into said tube, a base tube surrounding said end and said opening, a locking device comprising a first member extending through said opening and a second member positioned in the seat support tube, each of said members having a base, an inclined surface, and a locking surface, the base of the first member slidably engaging said stop plate, the base of the first member being remote from the base of the second member, the inclined surface of the first member slidably engaging the inclined surface of the second member, the locking surface of the first member engaging the base tube, the locking surface of the second member engaging the seat support tube opposite said opening, the first member having an internally threaded bore extending from its base to its inclined surface, the second member having an opening extending from its base to its inclined surface, the bore in the first member being in alignment with the opening in the second member, a bolt having a head, a body and a threaded end, the head abutting the base of the second member, the body extending through the opening in the second member, and the

threaded end engaging the internally thread bore of the first member, the opening in said second member being so constructed and arranged as to permit movement of the locking surface of the second member away from the bolt as the bolt is screwed into the first member.

2. A seat assembly as defined in claim 1 in which said first and second members are secured in assembled relationship by said bolt in such a manner that the distance between said locking surfaces may be adjusted to less than the distance between the adjacent surfaces of said base tube to permit said seat support tube to be moved relatively to said base tube.

3. A seat assembly as defined in claim 1 in which the height of said stop plate is no greater than the maximum height of each of said members.

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