

March 27, 1951

A. M. BOWZER

2,546,148

LAST

Filed Sept. 14, 1945

FIG. 1

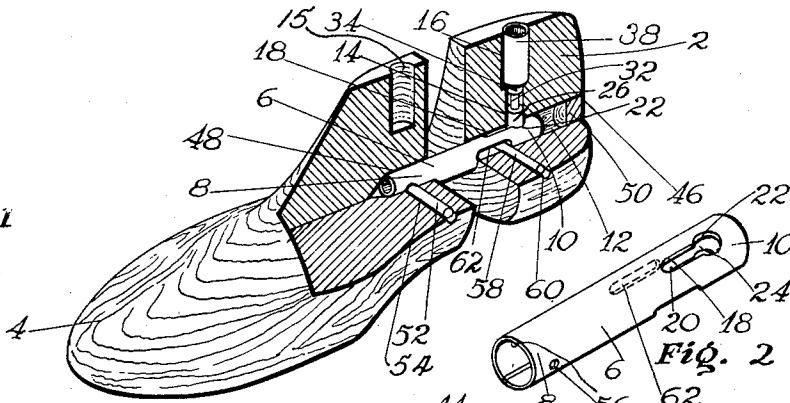


FIG. 2

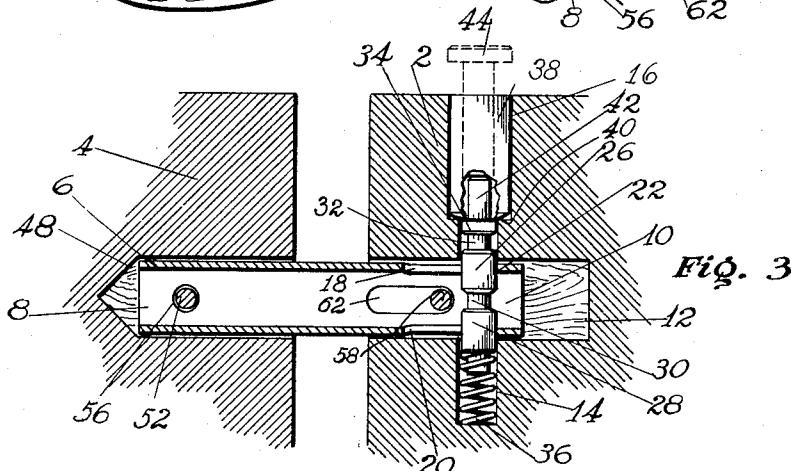


FIG. 3

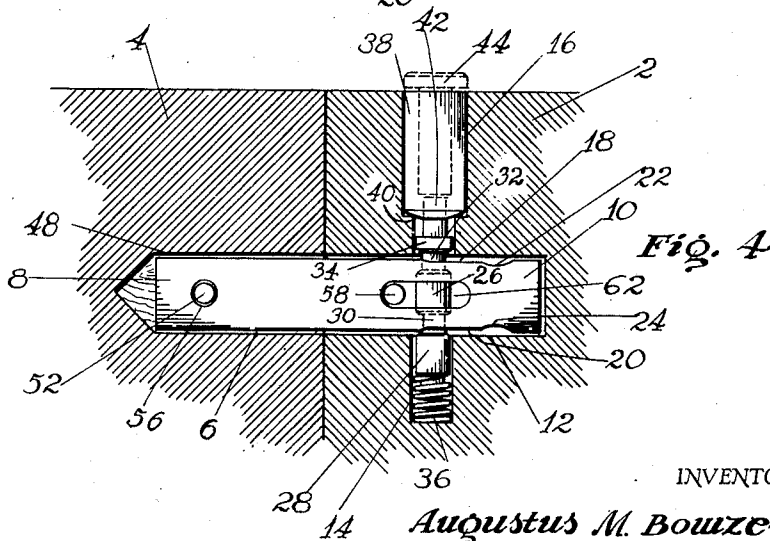


FIG. 4

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2,546,148

LAST

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Application September 14, 1945, Serial No. 616,171

24 Claims. (Cl. 12—135)

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The present invention relates to lasts and more particularly to divided lasts. From a more specific aspect, the invention relates to divided lasts the toe and heel members of which are relatively slidable back and forth along a straight line in the longitudinal or heel-toe direction to retracted and extended positions. The invention is not, however, in all its aspects, restricted to lasts alone.

To prevent relative wobbling of the heel and toe members of the divided last while occupying the extended position, lasts of the above-described character have heretofore been characterized by two chief types of construction: first, they have been provided with double guides; and secondly, they have been provided with still an additional member or members interposed between the heel and toe members.

Among the objects of the present invention are to improve upon the sturdiness, the ruggedness and the rigidity, as well as the durability, of lasts of the above-described character, though simplifying their construction and reducing their cost of manufacture.

Another object is to provide a last of the above-described character the slidable heel and toe members of which may be readily assembled, yet that shall not be separable, thus preventing loss.

Other and further objects will be explained hereinafter and will be particularly pointed out in the appended claims.

The invention will now be more fully explained in connection with the accompanying drawings, in which Fig. 1 is a perspective, partly in longitudinal and horizontal section, of a last embodying the present invention, the heel and toe members being shown locked against relative slidable movement in the extended position; Fig. 2 is a perspective of the preferred tubular shell shown in Fig. 1, but upon a larger scale; Fig. 3 is a fragmentary longitudinal section of the last, as shown in Fig. 1, but on still a larger scale; and Fig. 4 is a section similar to Fig. 3, but showing the heel and toe members in the retracted position.

The wooden last is shown divided into a heel-member part 2 and a toe-member part 4. These two parts are illustrated as connected together for relative slidable movement along a straight line in the longitudinal, or heel-toe direction, to a retracted position, illustrated in Fig. 4, and an extended position, illustrated in Figs. 1 and 3, by a single element, namely, a tubular metal shell 6. The shell 6 is shown cylindrical, with its forward end 8 rigidly fixed in the toe member 4, in order

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that the shell 6 may project longitudinally rearward from the toe-member 4 in the heel-toe direction. The rear end 10 of the shell 6 is freely slidable in a correspondingly cylindrical bore opening 12 extending in the heel member 2 longitudinally in the heel-toe direction. This arrangement, of course, may be reversed. The back-and-forth relative slidable movement of the heel and toe members 2 and 4 is effected by sliding the rear end 10 of the shell 6 in the bore 12 back and forth in the heel-toe direction, between the extended position shown in Figs. 1 and 3, and the retracted position shown in Fig. 4.

The heel member 2 is provided also with a transversely disposed opening, also shown as a cylindrical bore, communicating with the bore 12. The inner or lower portion of the transversely disposed opening, including the regions where it communicates with the bore 12, is of smaller diameter, as shown at 14, than the outer or upper portion 16. The inner end portion 14, moreover, is shown closed, and the outer or free end portion 16 open. If the shell 6 should be fixed in the member 2, of course, the opening 14, 16 would be in the member 4.

The portion 16 of the opening is shown as one of the bushings or thimble-receiving openings for mounting the last on a jack. The toe member 4 is shown provided with another such bushing or thimble-receiving opening 15.

A latch plunger is slidably mounted in the transversely disposed opening 14, 16. The plunger is provided with upper and lower circular latch portions 26 and 28, of the same diameter, integrally connected together by a guide portion 30 of smaller diameter. A further guide portion 32 of similarly smaller diameter integrally connects the latch portion 26 to a circular stop member 34. The plunger is always wholly disposed in the closed-end portion 14 of smaller diameter of the transversely disposed opening, except for an uppermost integrally provided pin 42.

A compression spring 36 in the closed end portion 14 of the transversely disposed opening yieldingly forces the plunger to its uppermost position, illustrated in Figs. 1 and 3. In this position, the stop member 34 engages against the lower closed end of a bushing or a thimble-shaped stop member 38, fixed in the open-end bushing or thimble-receiving portion 16 of the transversely disposed opening. The lower end of the thimble or bushing 38 is disposed adjacent to the junction of the portions 14 and 16 of the transversely disposed opening. It is not entirely closed, as it is perforated, so as to provide an opening 40 for

receiving the guide pin 42. The guide pin 42 just fits projectingly in the opening 40, but the diameter of the stop member 34 is considerably greater than that of the opening 40. The lower end of the bushing or thimble 38 thus constitutes a stop, cooperating with the stop member 34, to limit the upward movement of the plunger under the yieldingly upward forcing action of the spring 36. The plunger is thus confined to slide back and forth in the smaller-diameter portion 14 of the transversely disposed opening, between its closed end and the bushing or thimble stop member 38, though the guide pin 42 extends into the portion 16 of larger diameter of this transversely disposed opening.

The rear end 10 of the shell 6 is shown provided with two openings at the diametrically opposed upper and lower sides of the shell. Each of these openings is provided with two communicating portions of different widths. The portions 18 and 20 of smaller width are elongated to constitute guide portions, slightly wider than the corresponding guide portions 30 and 32, respectively, of the plunger. The portions 22 and 24 of larger diameter constitute latch portions, of slightly larger diameter than the corresponding latch portions 26 and 28, respectively, of the plunger.

In the extended positions of the last, illustrated in Figs. 1 and 3, the larger-width latch portions 22 and 24 are alined with the transversely disposed bushing or thimble-receiving opening 16 and the opening 14. In the retracted position, illustrated in Fig. 4, the smaller-width guide portions 18 and 20 are so alined.

The plunger is mounted in the transversely disposed opening 14, 16 so as to extend through the openings 18, 22 and 20, 24 of the shell 6. The spring 36 normally forces the stop members 34 and 38 yieldingly into engagement when the members 2 and 4 occupy their extended position, illustrated in Figs. 1 and 3, thus to maintain the latch portions 26 and 28 of the plunger in their respective latch openings 22 and 24. Since the diameters of the latch portions 26 and 28 are just slightly less than the diameters of the corresponding latch openings 22 and 24, the heel and toe members 2 and 4 become thus locked against relative sliding movement in the extended position, illustrated in Figs. 1 and 3. Upon pressing down upon the pin portion 42 of the plunger, as with a tool 44, in opposition to the action of the spring 36, the guide portions 30 and 32 will be caused to become alined with the respective guide openings 18 and 20. Relative slidable movement of the members 2 and 4, without wobbling or relative rotative movement thereof, will then be permitted; all that is necessary is to force them slidably toward each other, the guide portions 30 and 32 of the plunger then readily entering the guide openings 18 and 20.

To prevent the plunger being forced by the tool 44 beyond the position in which the guide portions 26 and 28 become alined with the guide openings 18 and 20, the stop member 34 may be made of a little larger diameter than the diameter of the latch opening 22. In other respects, the diameters of the latch portions 26 and 28 and the stop member 34 of the plunger may be such as to fit snugly in the portion 14 of smaller diameter of the transversely disposed opening.

The divided last of the present invention may be manufactured in many ways. A preferred method is first to fashion a block of wood into a last in the customary manner, and then to drill the cylindrical bore 12 into the last longitudinally

from the rear of the heel portion 2 of the last, at 46, forward toward the portion 4 and beyond the ankle portion in between the toe and heel portions. This will result in producing not merely the cylindrical bore 12 in the heel portion 2, but also, continuous and alined therewith, a cylindrical bore 48 in the toe portion 4. The heel end of the bore 12, 48 may next be plugged, as shown at 50.

The next step of the method is preferably to saw the last transversely at the ankle portion, to divide it into the two separate heel and toe members 2 and 4. The transversely disposed hole 14, 16 may be drilled in the heel member 2, preferably in two drilling operations, either before or after the sawing operation.

The forward end 8 of the shell 6 may be fixed rigidly in the bore 48 by means of a metal pin 52 driven through previously provided diametrically opposed small holes 54 and 56 in the toe member 4 and the shell 6, respectively. The rear end 10 of the shell 6 is then slidably inserted into bore 12. The heel and toe members 2 and 4 may be held against disassembly by similarly driving a metal pin 58 through previously drilled oppositely disposed openings 60 in the heel member 2, and through diametrically opposed longitudinally disposed elongated openings or slots 62 in the shell 6. The openings 62 may be oriented ninety degrees with respect to the openings 18, 22 and 20, 24. Their width is such as to permit slidable movement therein of the pin 58, without too much play, but separation of the parts is prevented by the pin 58 engaging their end walls. This also prevents wobbling and relative rotative movement of the members 2 and 4 during their back-and-forth slidable movement. The pin 58 and the slot 62, indeed, cooperate to guide the slidable movement. When the heel and toe members 2 and 4 occupy the extended position, illustrated in Figs. 1 and 3, wobbling and rotation are further prevented by the latch portions 26 and 28 fitting snugly in the latch openings 22 and 24.

It has already been explained that wobbling and relative rotative movement of the heel and toe members 2 and 4 is prevented by the cooperative engagement of the pin 58 and the latch plunger, both provided upon the heel member 2, with the walls of the openings 62 and the walls of the latch openings, respectively, all of which walls are provided upon the shell element 6. The wobbling and relative rotative movement that is thus prevented is about axes parallel to the axis of the cylindrical shell element 6. Wobbling and relative rotative movement of the heel and toe members 2 and 4 in a direction at right angles to the axis of the cylindrical shell element 6, moreover, is prevented by the fact that the shell element 6 is rigid with the toe member 4. All relative movement of the heel and toe members 2 and 4 is therefore prevented except the before-described relative slidable movement longitudinally in the heel-toe direction.

The shell 6 may be manufactured as described in a copending application, Serial No. 617,266, filed September 19, 1945.

Modifications will occur to persons skilled in the art, and all such are considered to fall within the spirit and scope of the invention, as defined in the appended claims.

What is claimed is:

1. A last comprising non-metal heel and toe members, means connecting the members for relative slidable movement in the heel-toe direction constituted of two alined cylindrical bores, one

in each of the members, extending in the heel-toe direction and a single tubular metal shell one end of which is mounted in the bore of one of the members and the other end of which is mounted to slide back and forth in the heel-toe direction in the bore of the other member, and means cooperating with the shell to prevent relative rotation of the shell in the said bore of the said other member about the axis of the shell, the shell being rigid with the said one member in order to prevent relative movement of the members in a direction at right angles to the said axis, thereby to prevent relative movement of the members except relative slidable movement in the heel-toe direction.

2. A last comprising heel and toe members, means connecting the members for relative slidable movement in the heel-toe direction constituted of two alined openings, one in each of the members, extending in the heel-toe direction and a single element one end of which is mounted in the opening of one of the members and the other end of which is mounted to slide back and forth in the heel-toe direction in the opening of the other member, and means cooperating with the element to prevent relative rotation of the members about an axis parallel to the element, the element being rigid with the said one member in order to prevent relative movement of the members in a direction at right angles to the said axis, thereby to prevent relative movement of the members except relative slidable movement in the heel-toe direction.

3. A last comprising heel and toe members, and means connecting the members for relative slidable movement in the heel-toe direction to either of two positions constituted of a single element fixed rigidly to one of the members having a tubular shell portion and a cylindrical bore in which the shell portion is mounted to slide back and forth in the heel-toe direction, the shell portion being provided with oppositely disposed latch openings, the said other member having also an opening, and a plunger mounted in the opening of the said other member having two latch portions for occupying the respective latch openings to lock the members against relative slidable movement in one of the said positions.

4. A last comprising non-metal heel and toe members, means connecting the members for relative slidable movement in the heel-toe direction to either of two positions constituted of two alined cylindrical bores, one in each of the members, extending in the heel-toe direction and a single tubular metal shell one end of which is fixed rigidly in the bore of one of the members and the other end of which is mounted to slide back and forth in the heel-toe direction in the bore of the other member, the said other end of the shell being provided with oppositely disposed latch openings, the said other member having an opening, and a plunger mounted in the opening of the said other member having two latch portions for occupying the respective latch openings to lock the members against relative movement in one of the said positions.

5. A last comprising non-metal heel and toe members, means connecting the members for relative slidable movement in the heel-toe direction to either of two positions constituted of two alined cylindrical bores, one in each of the members, extending in the heel-toe direction and a single tubular metal shell one end of which is fixed rigidly in the bore of one of the members and the other end of which is mounted to slide

back and forth in the heel-toe direction in the bore of the other member, the said other end of the shell being provided with oppositely disposed latch openings each with two portions of different width, the said other member having an opening, a plunger mounted in the opening of the said other member and the shell openings, the plunger being provided with two guide portions and two latch portions, the guide portions being adapted to occupy the respective smaller-width portions of the shell openings to permit relative slidable movement of the members, and the latch portions being adapted to occupy the respective larger-width portions of the shell openings to lock the members against relative slidable movement.

6. A last comprising heel and toe members, means connecting the members for relative slidable movement comprising an element fixed rigidly to one of the members and slidable with respect to the other member, the element having an opening with two portions of different width, and a latch provided with two portions of different width corresponding to the different widths of the element opening, the smaller-width portion of the latch being adapted to occupy the smaller-width portion of the element opening to permit relative slidable movement of the members, and the larger-width portion of the latch being adapted to occupy the larger-width portion of the element opening to lock the members against relative slidable movement.

7. A last comprising heel and toe members, means connecting the members for relative slidable movement in the heel-toe direction to retracted and extended positions comprising an element fixed rigidly to one of the members and an opening provided in the other member in which the element is mounted to slide back and forth in the heel-toe direction, the element having an opening with two portions of different width, and a latch provided with two portions of different width corresponding to the different widths of the element opening, the smaller-width portion of the latch being adapted to occupy the smaller-width portion of the element opening to permit relative slidable movement of the members, and the larger-width portion of the latch being adapted to occupy the larger-width portion of the element opening to lock the members against relative slidable movement in the extended position.

8. A last comprising heel and toe members, means connecting the members for relative slidable movement in the heel-toe direction to retracted and extended positions comprising an element having a cylindrical portion fixed rigidly to one of the members and a cylindrical bore provided in the other member in which the cylindrical portion is mounted to slide back and forth in the heel-toe direction, the cylindrical portion having a transversely disposed opening with two portions of different width, the said other member having a latch extending through the element opening and provided with two portions of different width corresponding to the different widths of the element opening, the smaller-width portion of the latch being adapted to occupy the smaller-width portion of the cylindrical-portion opening to permit relative slidable movement of the members, the larger-width portion of the latch being adapted to occupy the larger-width portion of the cylindrical-portion opening to lock the members against relative slidable movement in the extended position, and means yieldingly

maintaining the latch with its larger-width portion in the larger-width portion of the cylindrical opening when the members occupy the extended position.

9. A last comprising heel and toe members, means connecting the members for relative slidable movement comprising an element provided with a guide fixed rigidly to one of the members, the element having a latch opening and a guide opening communicating with the latch opening, means mounted upon the other member cooperating with the guide to guide the relative slidable movement of the members, a plunger mounted upon the said other member having a latch portion adapted to be moved into and out of the latch opening, and means carried by the said other member for yieldingly forcing the plunger in one direction to cause the latch portion to enter the latch opening in order to prevent relative slidable movement of the members, the plunger being movable in the opposite direction, in opposition to the yieldingly forcing means, to remove the latch portion out of the latch opening, and the plunger having a portion for sliding in the guide opening when the latch portion has been moved out of the latch opening to permit relative slidable movement of the members.

10. A last comprising heel and toe members, means connecting the members for relative slidable movement comprising a shell fixed rigidly to one of the members and a bore provided in the other member in which the shell is slidably mounted, the portion of the shell in the bore being provided with oppositely disposed latch openings and with oppositely disposed guide openings communicating with the latch openings, a plunger mounted upon the said other member having latch portions adapted to be moved into and out of the respective latch openings, and means carried by the said other member for yieldingly forcing the plunger in one direction to cause the latch portions to enter the respective latch openings in order to prevent relative slidable movement of the members, the plunger being movable in the opposite direction, in opposition to the yieldingly forcing means, to remove the latch portions out of the respective latch openings, and the plunger having portions for sliding in the respective guide openings when the latch portions have been moved out of the respective latch openings to permit relative slidable movement of the members.

11. A last comprising heel and toe members, means connecting the members for relative slidable movement comprising an element fixed rigidly to one of the members and a longitudinally disposed opening provided in the other member in which the element is slidably mounted, the element having an opening with two portions of different width, the said other member having a transversely disposed opening, a plunger mounted in the transversely disposed opening and in the element opening, the plunger being provided with a guide portion and a latch portion, the guide portion being adapted to occupy the smaller-width portion of the element opening to permit relative slidable movement of the members, the latch portion being adapted to occupy the larger-width portion of the element opening to lock the members against relative slidable movement, and a spring in the transversely disposed opening for yieldingly maintaining the plunger with its latch portion in the larger-width portion of the element opening.

12. A last comprising heel and toe members, 75

means connecting the members for relative slidable movement comprising a tubular shell fixed rigidly to one of the members and a longitudinally disposed bore provided in the other member in which the shell is slidably mounted, the said other member having also a transversely disposed opening, the portion of the shell in the bore being provided with oppositely disposed latch openings each with two portions of different width, a plunger mounted in the transversely disposed opening and in the shell openings, the plunger being provided with two guide portions and two latch portions, the guide portions being adapted to occupy the respective smaller-width portions of the shell openings to permit relative slidable movement of the members, the latch portions being adapted to occupy the respective larger-width portions of the shell openings to lock the members against relative slidable movement, and a spring in the transversely disposed opening for yieldingly maintaining the plunger with the latch portions in the respective larger-width portions of the shell openings.

13. A last comprising heel and toe members, means connecting the members for relative slidable movement in the heel-toe direction comprising aligned openings in the members extending in the heel-toe direction and a tubular shell one end of which is fixed in the opening of one of the members and the other end of which is slidably mounted in the opening of the other member, the shell being provided with diametrically opposed latch openings, the said other member being provided with a transversely disposed opening, and a latch plunger mounted in the transversely disposed opening and having latch portions for cooperating with the respective latch openings to hold the members against relative slidable movement.

14. A last comprising wood heel and toe members, means connecting the members for relative slidable movement in the heel-toe direction to retracted and extended positions comprising aligned openings in the members extending in the heel-toe direction and a single metal element one end of which is fixed rigidly in the opening of one of the members, the other opening being cylindrical, the other end of the element being cylindrical and being mounted to slide back and forth in the heel-toe direction in the cylindrical opening, and means mounted upon the said other member for preventing rotatable movement of the cylindrical end of the element in the cylindrical opening during the relative slidable movement of the members and for locking the members against relative slidable movement in the extended position.

15. A last comprising wood heel and toe members, means connecting the members for relative slidable movement in the heel-toe direction to either of two positions comprising aligned openings in the members extending in the heel-toe direction and a metal shell one end of which is fixed rigidly in the opening of one of the members and the other end of which is mounted to slide back and forth in the heel-toe direction in the opening of the other member, the shell being provided with opposed longitudinal openings, means extending through the opposed openings and fixed to the said other member for guiding the members during their relative slidable movement and preventing wobbling of the members during such movement, and means upon the said other member cooperating with the shell for

locking the members against relative slidable movement in one of the said positions.

16. A last comprising wood heel and toe members, means connecting the members for relative slidable movement comprising aligned openings in the members and a metal shell one end of which is fixed rigidly in the opening of one of the members and the other end of which is slidably mounted in the opening of the other member, the shell being provided with oppositely disposed guide openings, and means provided upon the said other member extending into the guide openings for guiding the members during their relative slidable movement and preventing wobbling of the members during such movement.

17. A last comprising heel and toe members, means connecting the members for relative slidable movement in the heel-toe direction comprising aligned openings in the members extending in the heel-toe direction and a tubular shell one end of which is fixed in the opening of one of the members and the other end of which is slidably mounted in the opening of the other member, the shell being provided with a longitudinally disposed opening, the said other member having means extending into the longitudinally disposed opening to guide the members during their relative slidable movement, and means for locking the members against relative slidable movement.

18. A last comprising non-metal heel and toe members, means connecting the members for relative slidable movement in the heel-toe direction to either of two positions constituted of two aligned openings, one in each of the members, extending in the heel-toe direction and a single metal element one end of which is fixed rigidly in the opening of one of the members and the other end of which is mounted to slide back and forth longitudinally in the heel-toe direction in the opening of the other member, and common means for preventing wobbling of the members and for locking the members against relative slidable movement in one of the said positions.

19. A last comprising heel and toe members, one of which is provided with an opening having an outer portion for mounting the last on a jack and an inner portion, means connecting the members for relative slidable movement in the heel-toe direction to either of two positions comprising an element carried rigidly by the other member and an opening provided in the said one member in which the element is mounted to slide back and forth in the heel-toe direction, and means positioned in the inner portion of the first-named opening for locking the members against relative slidable movement in one of the said positions.

20. A last comprising heel and toe members one of which is provided with an opening having an outer portion for mounting the last on a jack and an inner portion, means connecting the members for relative slidable movement in the heel-toe direction comprising an element carried by the other member and an opening provided in the said one member in which the element is mounted to slide back and forth in the heel-toe direction, and a latch positioned in the inner portion of the first-named opening for engaging the element to prevent relative slidable movement of the members.

21. A last comprising non-metal heel and toe members, means connecting the members for relative slidable movement in the heel-toe direction to retracted and extended positions constituted

of two aligned openings, one in each of the members, extending in the heel-toe direction and a single metal element one end of which is mounted in the opening of one of the members and the other end of which is mounted to slide back and forth in the heel-toe direction in the opening of the other member, means cooperating with the element to prevent relative rotation of the members about an axis parallel to the element, the element being rigid with the said one member in order to prevent relative movement of the members in a direction at right angles to the said axis, thereby to prevent relative movement of the members except relative slidable movement in the heel-toe direction, and means cooperating with the element for locking the members against relative slidable movement in the extended position.

22. A last comprising non-metal heel and toe members, means connecting the members for relative slidable movement in the heel-toe direction to either of two positions constituted of two aligned cylindrical bores, one in each of the members, extending in the heel-toe direction and a single tubular metal shell one end of which is mounted in the bore of one of the members and the other of which is mounted to slide back and forth in the heel-toe direction in the bore of the other member, means mounted upon the said other member cooperating with the shell to prevent relative rotation of the shell in the bore of the said other member about the axis of the shell, the shell being rigid with the said one member in order to prevent relative movement of the members in a direction at right angles to the said axis, thereby to prevent relative movement of the members except relative slidable movement in the heel-toe direction, and means carried by the said other member cooperating with the element to lock the members against relative slidable movement in one of the said positions.

23. A device for latching two relatively slidable members comprising an element carried by one of the members and a longitudinally disposed opening provided in the other member in which the element is slidably mounted, the element having a transversely disposed opening with two portions of different width, the said other member having also a transversely disposed hole with a portion having a closed end and a portion having an open end of larger width than the width of the closed end, a thimble fitted in the portion with the open end and having a perforated end disposed adjacent to the junction of the hole portions to provide a stop disposed in the hole between the closed and open ends, a latch plunger slidably mounted in the hole between the closed end and the stop, the plunger being provided with a guide portion and a latch portion, the guide portion being adapted to occupy the smaller-width portion of the element opening to permit relative slidable movement of the members, the latch portion being adapted to occupy the larger-width portion of the element opening to lock the members against relative slidable movement, the plunger being provided also with a cooperating stop and with a portion projecting into the perforation of the thimble, and a spring at the closed end of the hole for yieldingly maintaining the plunger with its cooperating stop in engagement with the first-named stop, the latch portion occupying the larger-width portion of the element opening when the stops are in engagement.

24. A device for latching two relatively slidable members comprising a tubular shell carried

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by one of the members and a longitudinally disposed bore in the other member in which the shell is slidably mounted, the said other member having also a transversely disposed hole with a closed end and an open end, a stop being disposed in the hole between the closed and open ends, the portion of the shell in the bore being provided with oppositely disposed openings each with two portions of different width, a latch plunger slidably mounted in the hole between the closed end and the stop, the plunger being provided with two guide portions and two latch portions, the guide portions being adapted to occupy the respective smaller-width portions of the shell openings to permit relative slidable movement of the members, the latch portions being adapted to occupy the respective larger-width openings to lock the members against relative slidable movement, the plunger being provided also with a cooperating stop, and a spring at the closed end of the hole for yieldingly maintaining the plunger with its cooperating stop in engagement with the first-named stop, the latch portions occupying the respective larger-width portions of the element openings when the stops are in engagement.

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