May 15, 1962 R. E. HELTZEL 3,034,613

SLIDE LOCK FOR CONCRETE ROAD FORMS

Filed Feb. 16, 1959 5 Sheets-Sheet 1

FIG.1.

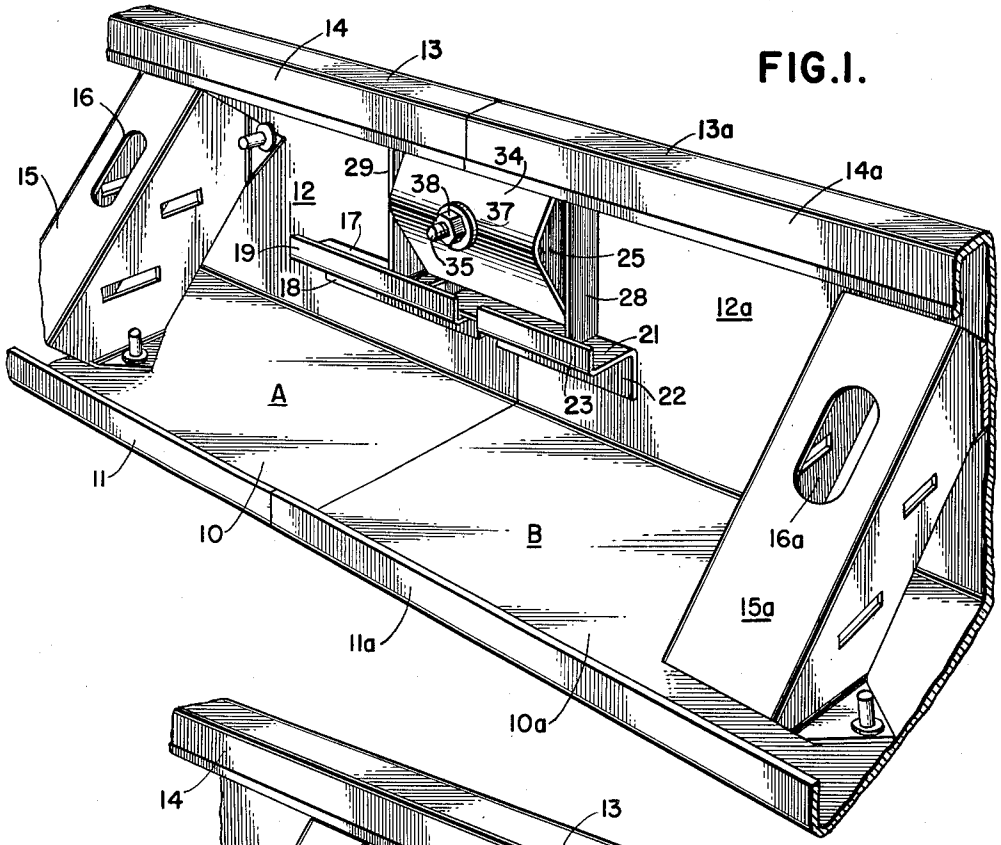
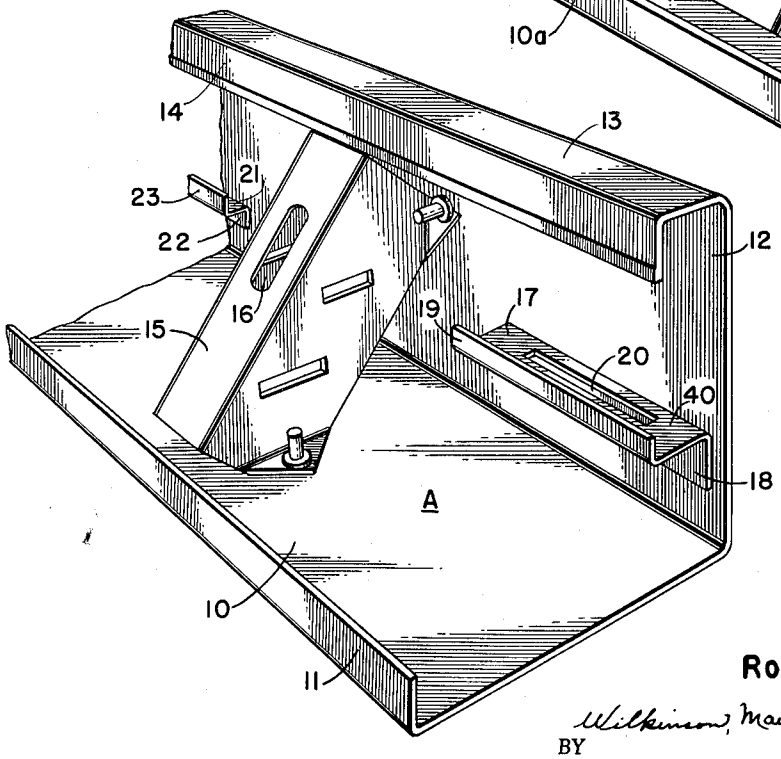



FIG.2.




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SLIDE LOCK FOR CONCRETE ROAD FORMS

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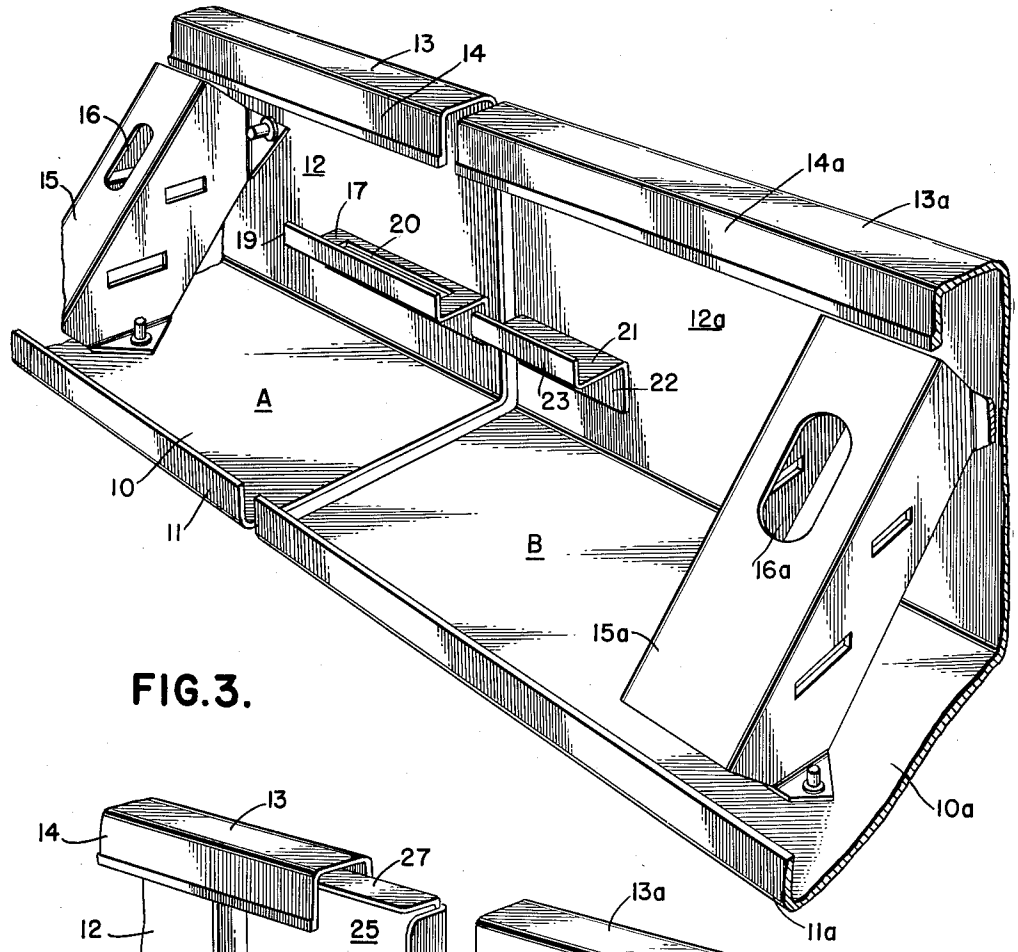



FIG.3.

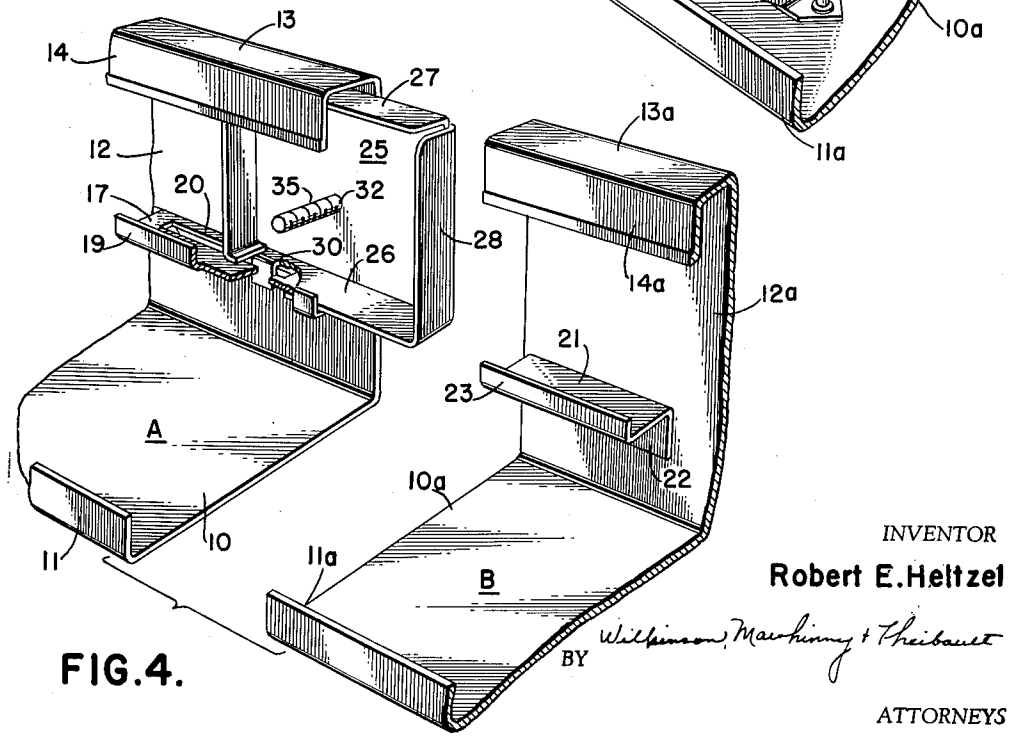



FIG.4.

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SLIDE LOCK FOR CONCRETE ROAD FORMS

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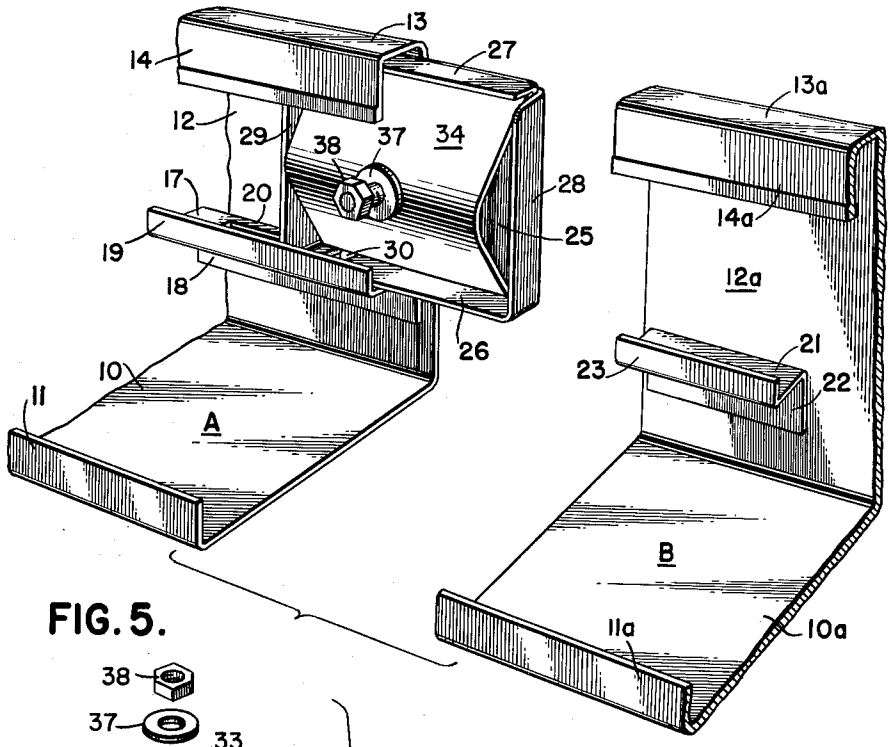



FIG. 5.

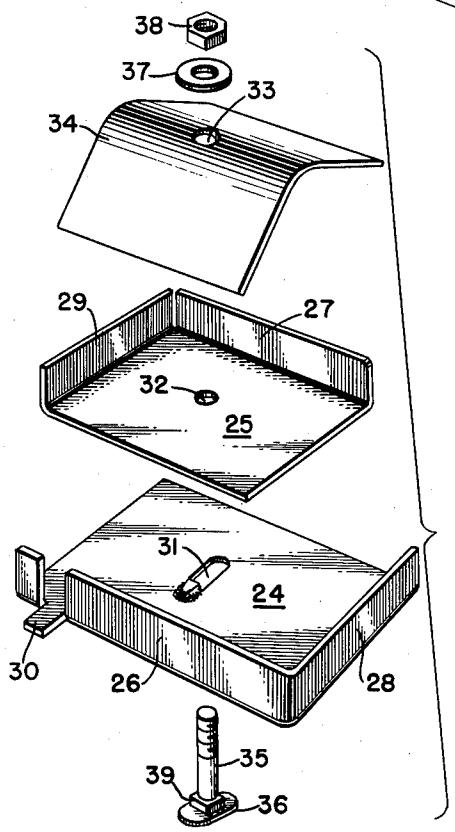



FIG. 6.

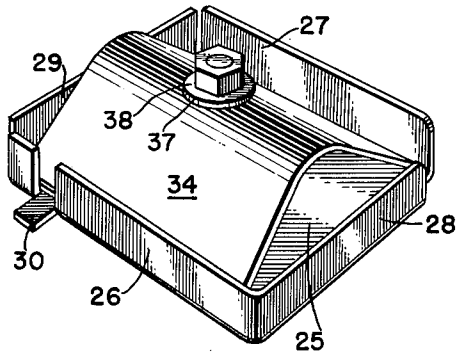



FIG. 7.

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May 15, 1962 R. E. HELTZEL 3,034,613

SLIDE LOCK FOR CONCRETE ROAD FORMS

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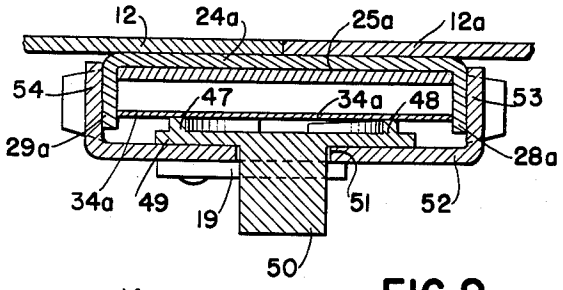



FIG.8.

FIG.9.

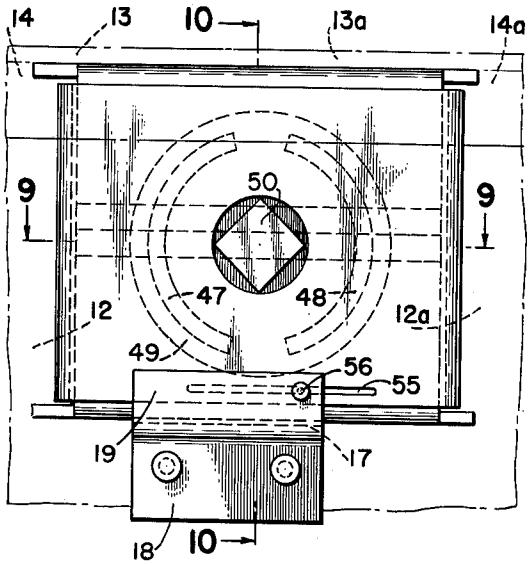



FIG.11.

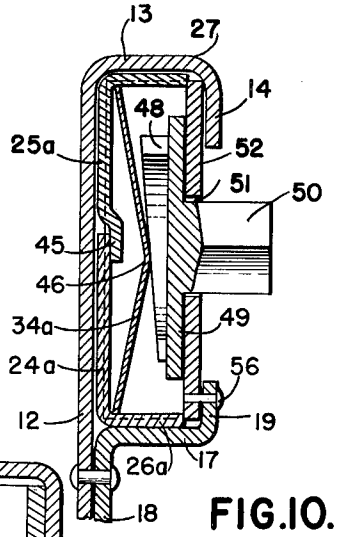



FIG.10.

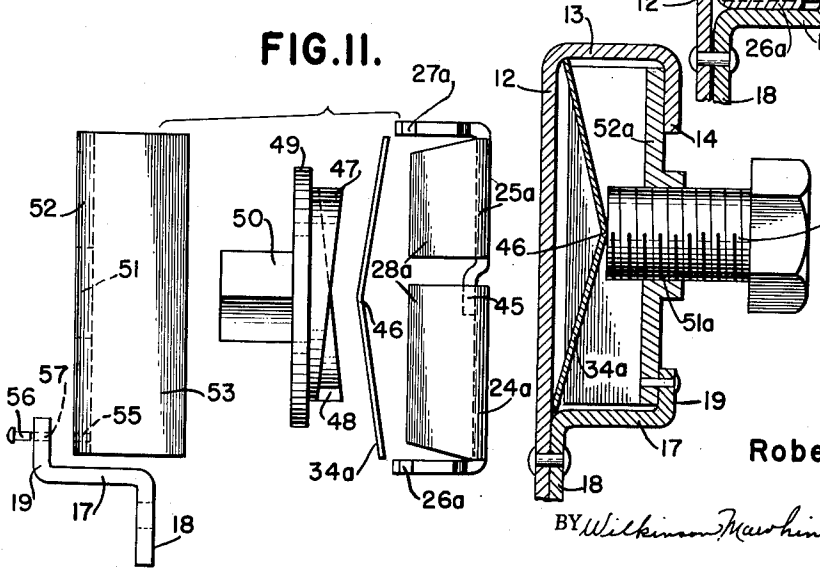



FIG.12.

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SLIDE LOCK FOR CONCRETE ROAD FORMS

Filed Feb. 16, 1959 5 Sheets-Sheet 5

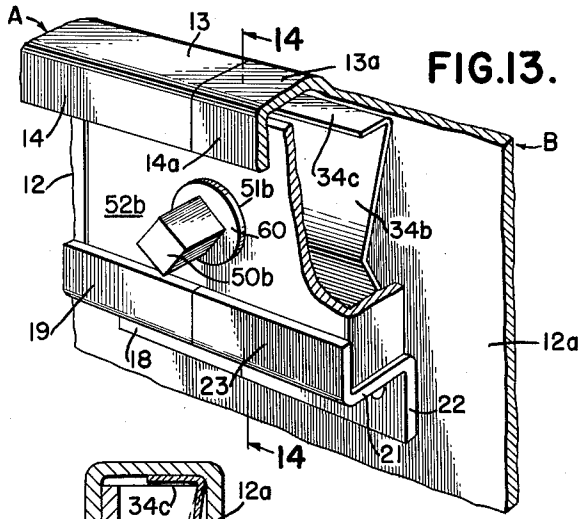



FIG.13.

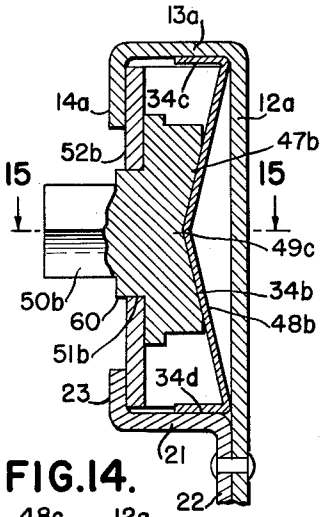



FIG.14.

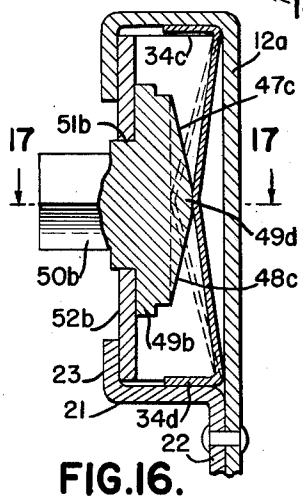



FIG.16.

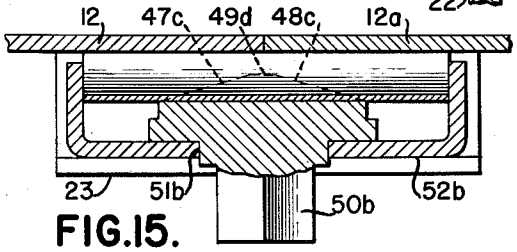



FIG.15.

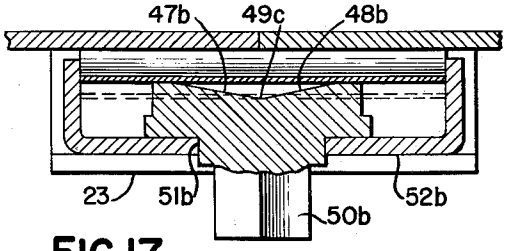



FIG.17.

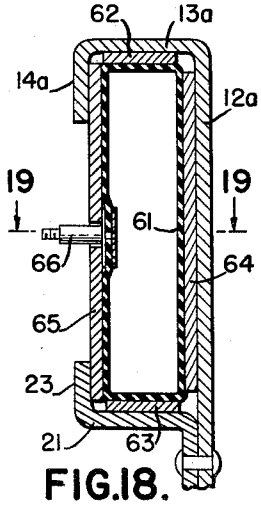



FIG.18.

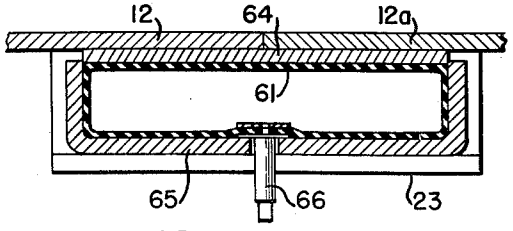



FIG.19.

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United States Patent Office 3,034,613
Patented May 15, 1962



# 3,034,613
# SLIDE LOCK FOR CONCRETE ROAD FORMS

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Filed Feb. 16, 1959, Ser. No. 793,550
3 Claims. (Cl. 189—36)

The present invention relates to slide lock for concrete road forms, and has for an object to provide an applicable device arranged between adjacent road forms for the purpose of aligning the same and maintaining the road forms in such aligned and coupled condition.

Another object of the invention is to provide a slide lock arranged to expand between opposed abutments on the adjoining end portions of two side forms for holding the side forms in aligned and abutted position.

It is a further object of the invention to provide the adjoining ends of side road forms with shelves which, in conjunction with the top rails and side walls of the forms, provide opposed abutments for receiving thereagainst the thrust forces of two relatively movable members interposed between the abutments and supported thereby and moved apart by a reactive resilient force of high value.

A still further object of the invention is to provide a simple form of mechanical device for expanding with high thrust pressure against opposed abutments on the adjoining ends of two forms wherein adjustable high degree of resilient pressure is imposed and constantly maintained while the forms are in service but which may be readily and speedily removed when the forms are to be disassembled.

It is also an object of the invention to provide an interlocking device between side forms or other associated members which acts to align the side walls or webs and also the top rails.

It is a still further object of the invention to provide a novel form of device which acts to align either the side walls or the top rails or both of adjoining forms or members and to do so by mechanical, pneumatic, hydraulic, or other means.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appanded hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views:

FIGURE 1 is a fragmentary isometric view showing two concrete road side forms joined together by a slide lock constructed in accordance with the present invention;

FIGURE 2 is a fragmentary isometric view of one end of a side form equipped with a slotted abutment shelf pursuant to the invention;

FIGURE 3 is a fragmentary isometric view of the two complementary ends of road forms showing two abutments affixed to the webs thereof;

FIGURE 4 is an exploded fragmentary isometric view of the two road forms showing the slide lock of the invention partially in place and in partially assembled condition;

FIGURE 5 is also a fragmentary exploded view of the ends of the two side forms showing a completely assembled condition of the slide lock, but before the pressure is applied thereto;

FIGURE 6 is an exploded isometric view of the various parts of the slide lock;

FIGURE 7 is an isometric view of the assembled slide lock;

FIGURE 8 is a front elevational view of a modified form of slide lock as applied to a side form indicated in broken lines;

FIGURE 9 is a horizontal sectional view taken on the line 9—9 of FIGURE 8 and showing a portion of the form side wall or web;

FIGURE 10 is a vertical sectional view taken on the line 10—10 of FIGURE 8 and showing a portion of the side form;

FIGURE 11 is an exploded side elevational view of the slide lock of FIGURES 8–10, inclusive;

FIGURE 12 is a vertical sectional view of a side form and shelf showing a further modified form of slide lock applied thereto;

FIGURE 13 is a fragmentary isometric view of two road form ends showing a still further modified form of the slide lock;

FIGURE 14 is a vertical sectional view taken on the line 14—14 of FIGURE 13.

FIGURE 15 is a horizontal sectional view taken on the line 15—15 of FIGURE 14;

FIGURE 16 is a view like FIGURE 14 with the cam member rotated to locking position and the spring plate tensioned;

FIGURE 17 is a horizontal sectional view taken on the line 17—17 of FIGURE 16;

FIGURE 18 is a vertical sectional view through a road form showing a pneumatic or hydraulic form of the slide lock, and

FIGURE 19 is a horizontal sectional view taken on the line 19—19 of FIGURE 18.



Referring more particularly to the drawings, A and B represent adjoining ends of two concrete road forms of conventional construction which include bases 10 and 10a, base flanges 11 and 11a, vertical side walls or webs 12 and 12a and top rails 13 and 13a. The usual rail flanges 14, 14a depend from the inner ends of the top rails 13, 13a, and the conventional diagonal braces 15 and 15a have the stake pockets 16 and 16a.

As best seen in FIGURE 2, an abutment shelf or chair 17 is affixed by an attaching flange 18 to the web 12 of one of the end sections A and includes an upstanding flange 19 along its inner edge which is spaced from and in substantial parallelism with the web 12 and in substantially the same plane as the rail flange 14. The shelf is provided with a slot 20.

In FIGURES 3 and 4, the companion side form B is provided with an abutment shelf or chair 21 having a downturned attaching flange 22 welded or otherwise secured to the web 12a and also having along its inner edge the upstanding flange 23 which is substantially parallel to the web 12a and in substantial alignment with the rail flange 14a. As indicated in FIGURE 1, when the two side forms A and B are abutted together or brought into close relationship it will be seen that the shelves 17 and 21 and their flanges 19 and 23 are in substantial alignment and registry.

Referring more particularly to FIGURES 6 and 7, the improved slide lock comprises generally a back plate 24, a front plate 25 and a bowed spring plate 34. The back plate 24 has a horizontal flange 26 and a vertical flange 28 adjoining one another at two edges only of the plate 24, leaving the other two edges free for the reception of the front plate 25 which also has a horizontal flange 27 and a vertical flange 29 which are respectively opposed to the horizontal and vertical flanges 26 and 28 of the plate 24, so that the four flanges 26, 27, 28 and 29 in the assembled condition of the two plates 24 and 25 form a substantially rectangular enclosure for receiving the spring plate 34, as shown in FIGURE 7, with the free edges of the spring plate being received against the flanges 26 and 27.

From the lower horizontal flange 26 of the back plate 24 may be struck out a tongue 30 which is bent downwardly for entering the slot 20 in the shelf 17 of the side form A.

It will also be clearly observed from FIGURE 6 that the back plate **24** is provided with a slot **31** with which register perforations **32** and **33** in the front plate **25** and in the spring plate **34**. Through these registering perforations in the slot **31** is received a bolt **35** having a head **36** which may be countersunk in the face of the back plate **24**, which engages against the web **12** and **12a** (FIGURE 5) in order that the bolt head not present any obstruction but will permit the outer surface of the back plate **24** to engage in its entirety and slide upon the inner surfaces of the webs **12** and **12a**. The bolt is also preferably provided with a square or straight lined section **39** adjacent its head to engage the walls of the slot **31** for the purpose of preventing rotation of the bolt **35** when the washer **37** and nut **38** are applied thereto outwardly of the bowed portion of the spring plate **34**.

In the use of the device, the side form adjoining ends A and B are brought into juxtaposition but before they are brought too close to cause any interference the assembled slide lock, as shown in FIGURE 7, is introduced into the slideway which is provided by the rail **13**, its flange **14** and the shelf **17** and its flange **19**. The distance between the shelf **17** and the rail head **13** will be preferably somewhat in excess of the height of the slide lock between the flanges **26** and **27**, it being understood that the flange **26** will rest upon the shelf **17** while the upper flange **27** will eventually be wedged up against the inner surface of the rail **13**. The flanges **26**, **27**, **28** and **29** are also of a depth just slightly less than the distance across between the flange **14** and the web **12** and between the flange **19** and the web **12** so that the slide lock may be rocked into position with its tongue **30** sliding over the short blank portion **40** of the shelf **17** until such tongue **30** arrives at the slot **20** into which it will drop, allowing the bottom flange **27** then to contact and slide upon the shelf **17**. FIGURE 5 shows the position of the slide lock on entry of the tongue **30** into the slot **20**. In this position a portion of the slide lock is entered between the rail head **13** and the shelf **17**. The slide lock then may be adjusted back and forth in the slideway with a portion thereof projecting out from the side form A and thereupon the adjoining end of the side form B is advanced toward the side form A in the position so that the slideway thereof may fit over the slide lock in the manner shown in FIGURES 1 and 4. FIGURE 1 shows the final position of the slide lock. After the section B is assembled to the section A and interengaged with the slide lock, the nut **38** is rotated against the washer **37** in order to spread the edges of the spring plate **34** which are in engagement with the flanges **26** and **27**. This expansive action will tend to move the back plate **24** downwardly and the front plate **25** upwardly. Thus the flange **26** will be urged strongly down against the shelves **17** and **21** while the upper flange **27** will be urged firmly up against the inner surfaces of the rail heads **13**, **13a**. As a result the two forms will be strongly bound together against any accidental separation and the rail heads will also be held to a very close alignment which is desirable for the smooth passage from one rail to the other of the wheels of road-making machines.

The parts are, or may be, all of metal. The tongue **30** will anchor the slide lock to the road form A and will hold the slide lock in place on the side form A when the side form B is being pulled away from the companion side form A when disassembling the side forms. After assembly the slide lock may be rocked out of the slideway of the side form A by pushing downwardly upon the upper flange **27** when the tongue **30** has reached the end of the slot **20**.

The parts **13**, **13a** and **17**, **21** constitute opposed abutments for receiving the thrust of the flanges **26**, **27** when the spring plate **34** is put under elastic tension by the pressure of the nut **38** and washer **37** on its intermediate offset or displaced portion and in so doing the plate **34** will be put under strong elastic stress which will cause it to react by spreading outwardly in the direction of the flanges **26** and **27**. By loosening the nut **38**, this elastic distortion will be relieved and the plate **34** will follow the washer **37**, pushing the same against the loosened nut **38** until the spring plate **34** returns to its normal unsprung condition.

Referring more particularly to FIGURES 8 to 11, inclusive, **24a** and **25a** designate slide plates or expansion members disposed one above another. The lower plate **24a** has a bottom flange **26a** adapted to rest on the abutment shelves **17**, **21** of the adjacent ends of adjoining road forms A and B. The upper slide plate **25a** is provided with a top flange **27a** positioned to engage beneath the rail heads **13**, **13a**.

In FIGURES 10 and 11, the numeral **45** designates a lapped relationship between the slide plates **24a** and **25a** to permit relative sliding movement.

As best seen in FIGURES 9 and 11, the slide plates **24a** and **25a** are also provided with side or vertical flanges **28a** and **29a**.

The expanding spring plate or member **34a** is engaged at its ridge **46** by arcuate cams **47** and **48** on a rotary cam disc **49** having a square stud **50** projecting outwardly therefrom through an opening **51** in a cover plate **52** provided with side or vertical flanges **53**, **54** fitted outwardly of the side flanges **28a**, **29a** of the slide plates **24a**, **25a**, as best seen in FIGURE 9.

A limit slot is made in the cover plate **52** (FIGURE 8) in which is slidably received a rivet or other stop member **56**, the same being fixedly mounted through a hole **57** in the upstanding flange **19** of the shelf **17**.

In operation, application of a wrench or other device to the external stud **50** to give added mechanical advantage will enable the operator to readily rotate the cam disc **49** about the bearing **51** in the cover plate **52**, causing the inclined edges of the arcuate cams **47** and **48** to ride upon the ridge **46** of the expanding spring plate **34a**, causing the same to flatten out or tend to flatten out to place the plate under elastic stress. The initial movement of the cams will cause the rotary cam disc **49** to push the cover plate **52** up against the flanges **14**, **19**, and the spring plate **34a** out against the slide plates **24a** and **25a**, which will develop thrust upon the two side forms in a substantially horizontal direction tending to align the vertical walls or webs **12**, **12a**. As the cams continue in rotation, the spring plate **34a** will be expanded diametrically and as the lower edge of this spring plate engages the bottom flange **26a**, and this latter flange, as shown in FIGURE 10, rests upon the shelf or abutment **17**, the effective work performed by the expanding spring plate **34a** will be to lift the top flange **27a** and with it the upper slide plate **25a**. As this movement is communicated to the adjoining ends of both side forms A and B, the result will be a horizontal alignment of the rail heads **13**, **13a**.

Consequently, with this form of the invention two resultants are secured, the one, a registration of the vertical edges of the webs **12** and **12a**, and secondly, the arcuate registration of the rail head **13**, **13a**. These actions are secured by a movement of one member, namely, the cover **52** against the flanges or vertical abutments **14**, **19**, and by the movement angular thereto of the top flange **27a** beneath the rail heads **13**, **13a**.

The cover plate **52** in addition to its thrust function acts to enclose the device preventing the entrance of concrete thereto.

Referring more particularly to FIGURE 12, a form of the invention is illustrated eliminating the side plates **24a** and **25a** with the upper and lower edges of the spring plate **34a** engaging directly the abutments **13**, **17**. In this instance the cover plate **52a** is provided with a threaded opening **51a** to receive a screw **58** positioned to engage the ridge **46** of the spring expansion plate.

In operation of this form of the invention, assuming

the initial position of the spring plate 34a to be that shown in FIGURE 12 with its lower edge engaging both form walls or webs 12, 12a and also both bottom abutments 17, 21, rotation of the screw 58 in a direction toward the ridge 46 will first cause the cover plate 52a to back up against the horizontal abutments 14, 19 and 14a, 23 to cause aligning of the vertical joint between the walls or webs 12 and 12a. The abutments 14, 19 and 14a, 23 thereupon arrest any further outward movement of the cover plate 52a so that the further rotation of the screw 58 will cause the upper edge of the spring expanding plate 34a to rise beneath the rail heads 13, 13a and thus bring the same into accurate horizontal alignment. In this way the cover plate 52a, moving in a horizontal direction away from the spring plate 34a performs one aligning function and the lifting of the upper edge of the spring plate 34a in a direction angularly to the direction of movement of the plate 52a performs a second aligning function. Otherwise stated, the screw 58 when turned in one direction moves or tends to move the plates 34a and 52a apart horizontally and then goes on to spread or tend to spread the upper and lower edges of the spring plate 34a.

Referring more particularly to FIGURES 13 to 17, inclusive, the spring expansion plate 34b is provided with a top flange 34c and a bottom flange 34d in order to give additional areas of purchase against the undersurfaces of the rail heads 13, 13a and against the shelves 17, 21.

In this form of the invention the flanged cover plate 52b has a circular hole 51b into which is fitted the circular bearing hub 60 of the rotary cam disc 49b, the same giving continuous bearing support for the cam disc and the cams throughout the entire 360 degrees of the circle. The square stud 50b projects outwardly from the hub 60.

Additionally, this form of the invention shows arcuate outwardly inclined cam walls 47b and 48b leading in opposite circular directions to the low points 49c of the cams while oppositely sloping walls 47c and 48c are shown sloping to the high points 49d of the cams. With this arrangement the cam disc 49b may be rotated indiscriminately in right or left-hand direction without causing any injury to the spring plate 34b which would otherwise occur by reason of the sharp edges of the high points of the cams dropping off abruptly to the low points and, therefore, leaving the spring plate unprotected from scarring and grooving by such sharp edges in the event the cam disc was inadvertently rotated in a direction in which such sharp edges would lead.

Referring more particularly to FIGURES 18 and 19, 61 represents a bladder or resilient container for air or hydraulic fluid which may be inserted in the slideways bridging the two forms or other members and having an inflatable air hose connection 66 or connection for hydraulic fluid by which the resilient container 61 may be expanded in two directions against the vertically opposed abutments and also against the horizontally opposed abutments. It is proposed in this connection to provide wear plates upon the bladder, preferably metal plates which may be affixed with suitable adhesive to the outer walls of such bladder and be of sizes to fit against the various abutments as this will give form to the bladder or air container and also will confine its expansive movements directionally to the opposed abutments in the slideways. These plates may comprise a rail plate 62, a shelf plate 63, a web plate 64 and a flange plate 65.

It will be appreciated that the back plate 24 of the form of invention shown in FIGURES 1 to 7 inclusive constitutes in effect a thrust member inasmuch as it absorbs the thrust of the bolt 35 when the nut 38 is tightened against the ridge of the spring plate 34. Similarly in the form of invention shown in FIGURE 12 where a screw 58 is employed instead of the nut and bolt, the thrust member is the plate 52a while in FIGURES 8, 9, 10 and 11 the plate 52 is the thrust member. In FIGURES 13 to 17 inclusive the front plate 52b constitutes the thrust member.



The spring plate 34 (FIGURES 1 to 7), 34a (FIGURES 8 to 12) and 34b (FIGURES 13 to 17) constitutes a resilient expansible member.

In FIGURES 1 to 7 inclusive the nut 38 and bolt 35 constitute an expander member, which function is performed by the screw 58 in FIGURE 12 and by the cams 47, 48 in FIGURES 8 to 11 inclusive, and by the cams 47c, 48c in FIGURES 13 to 17.

The abutments 17, 21 constitute with the top rails 13 and 13a slideways for receiving the slide lock of the invention, which slide lock is adapted to be expanded vertically incident to the stressing of the resilient expansible member.

Although I have disclosed herein the best forms of the invention known to me at this time, I reserve the right to all such modifications and changes as may come within the scope of the following claims.

What is claimed is:

1. For use with adjacent ends of road forms or the like including vertical webs, top rails, and slideways with abutments spaced below and in substantial alignment with the top rails, a slide lock slidable freely in the slideway in contracted condition comprising a thrust member, a resilient expansible member, and an expander member carried by the thrust member and exposed beyond the slide lock on the outside of the forms between the slideway and top rails for accessibility in operation, said resilient expansible member having an intermediate offset portion with upper and lower ends binding in the expanded condition the slide lock against the top rails and the slideway abutments, said expander member having a part engaged with the offset portion of the expansible member and movable relatively to the expansible and thrust members for stressing the resilient expansible member into expanded condition rigidly maintaining the abutting ends of the top rails in alignment, the said expander member part having a rotary movement against the resilient expansible member and being positioned outwardly of both the expansible and thrust members, the expander member being a nut and bolt with the bolt non-rotatably held in the thrust member and passing through the resilient expansible member, the nut being rotatably mounted upon the outer projecting end of the bolt beyond the resilient expansible member.

2. For use with adjacent ends of road forms or the like including vertical webs, top rails, and slideways with abutments spaced below and in substantial alignment with the top rails, a slide lock slidable freely in the slideway in contracted condition comprising a thrust member, a resilient expansible member, and an expander member carried by the thrust member and exposed beyond the slide lock on the outside of the forms between the slideway and top rails for accessibility in operation, said resilient expansible member having an intermediate offset portion with upper and lower ends binding in the expanded condition the slide lock against the top rails and the slideway abutments, said expander member having a part engaged with the offset portion of the expansible member and movable relatively to the expansible and thrust members for stressing the resilient expansible member into expanded condition rigidly maintaining the abutting ends of the top rails in alignment, said slide lock further comprising a front plate positioned outwardly of the thrust member and shiftable up and down relatively to the thrust member, said thrust member and front plate having parts engaging the top rails and the abutments of the slideway and receiving internally thereagainst the upper and lower ends of the resilient expansible member.

3. For use with adjacent ends of road forms or the like including vertical webs, top rails, and slideways with abutments spaced below and in substantial alignment with the top rails, a slide lock slidable freely in the slideway in contracted condition comprising a thrust member, a resilient expansible member, and an expander member

carried by the thrust member and exposed beyond the slide lock on the outside of the forms between the slideway and top rails for accessibility in operation, said resilient expansible member having an intermediate offset portion with upper and lower ends binding in the expanded condition the slide lock against the top rails and the slideway abutments, said expander member having a part engaged with the offset portion of the expansible member and movable relatively to the expansible and thrust members for stressing the resilient expansible member into expanded condition rigidly maintaining the abutting ends of the top rails in alignment, said slide lock further comprising stop members carried between an abutment and the slide lock for limiting the sliding movement



of the lock, in which said stop members comprise a slot in the slideway and an outstanding tongue on the lock extending into the slot, the over-all height of the slide lock in contracted condition being sufficiently less than the distance between the slideway abutments and the top rails to permit the lock to be rocked onto the slideway until the tongue arrives at the slot.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 1,690,295 | Heltzel | Nov. 6, 1928 |
| 2,750,014 | Gordon | June 12, 1956 |
| 2,844,234 | Brandes | July 22, 1958 |
| 2,888,112 | Keller | May 26, 1959 |