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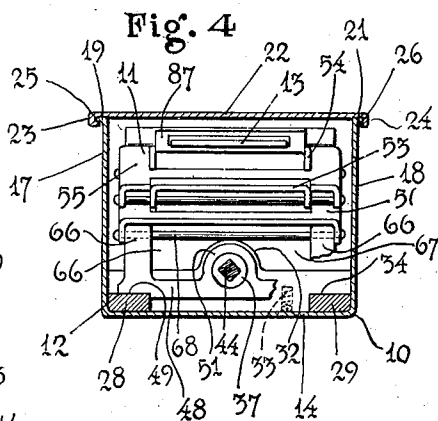
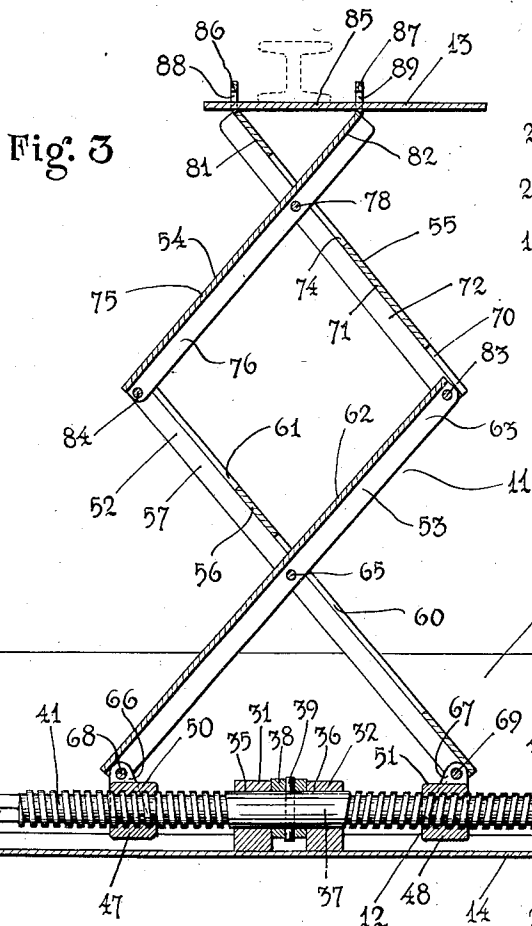
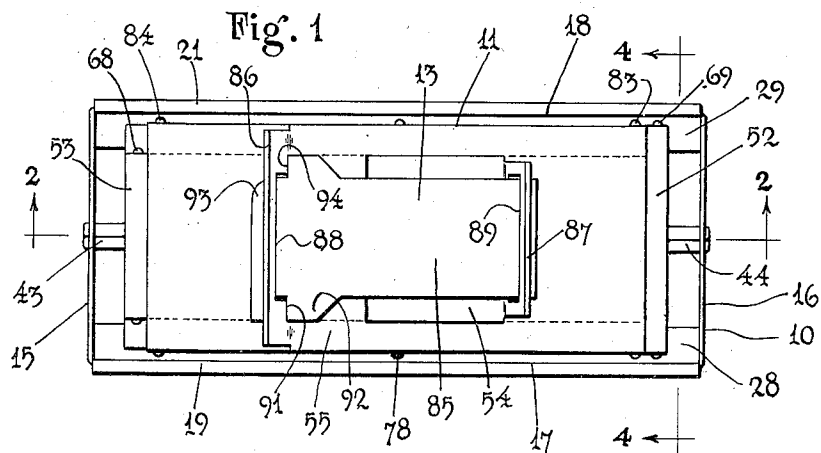
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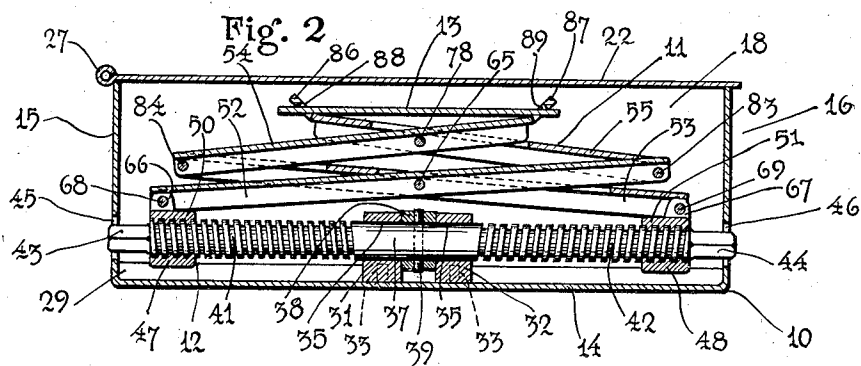
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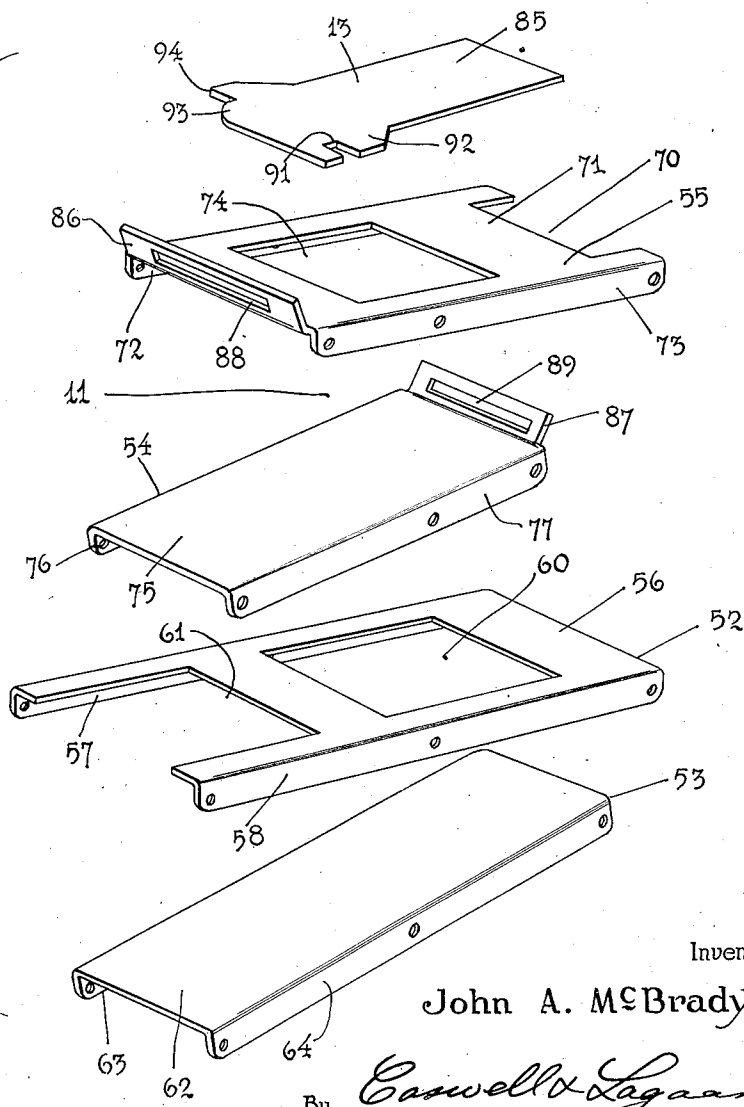
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**Fig. 5**



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## UNITED STATES PATENT OFFICE

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8 Claims. (Cl. 254—126)

My invention relates to jacks and has for an object to provide a jack which may be arranged in compact form when not required for use.

An object of the invention resides in providing a jack of the toggle linkage type and in utilizing therefor a rectangular case having a bottom serving as a base for the jack, said linkage being adapted to be projected outwardly beyond the case when in use and to be contained entirely within the case when in disuse.

Another object of the invention resides in using crossed levers in the toggle linkage and in constructing said levers as channels.

A still further object of the invention resides in constructing one of said levers with an opening extending through the web thereof and in disposing the complementary lever within said opening.

A feature of the invention resides in pivoting the levers together through the flanges thereof.

A still further object of the invention resides in utilizing upper and lower crossed levers and in constructing alternate levers with intermediate openings and in disposing the other levers within the openings of the first named levers.

Another object of the invention resides in utilizing a lifting head constructed as a plate and slidable relative to the upper ends of the upper levers of the jack.

A still further object of the invention resides in turning up the webs of the upper portions of said levers and in forming slots therein through which the lifting head slides.

A feature of the invention resides in providing a notch in the lifting head engaging web of one of said levers at the end of the slot therein for holding said lifting head in position within said slots.

An object of the invention resides in providing ways within the case resting upon the bottom thereof and disposed in proximity to the side walls of the case.

Another object of the invention resides in employing runners slidable along said ways and to which the lower levers are pivoted.

A still further object of the invention resides in providing spaced bearing blocks within said case attached to the bottom thereof, said bearing blocks holding the ways in position.

Another object of the invention resides in providing a spindle journaled in said bearing blocks and threaded at its ends with right and left hand threads to screw into said runners for moving said runners toward and from each other along said ways.

A feature of the invention resides in providing a collar on said spindle disposed between said bearing blocks and restraining axial movement of said spindle.

An object of the invention resides in constructing the end walls of the case with openings concentric with the axis of the spindle and in forming the ends of the spindle with wrench heads accessible through said openings.

Other objects of the invention reside in the novel combination and arrangement of parts and in the details of construction hereinafter illustrated and/or described.

In the drawings:

Fig. 1 is a plan view of a jack illustrating an embodiment of my invention and showing the cover of the case removed and the parts in retracted position.

Fig. 2 is an elevational sectional view taken on line 2—2 of Fig. 1 showing the cover applied to the case.

Fig. 3 is a view similar to Fig. 2 with the cover of the case removed and showing the parts in extended position.

Fig. 4 is a cross sectional view similar to Fig. 2 taken on line 4—4 of Fig. 1.

Fig. 5 is a perspective view of the toggle linkage of the invention with the parts thereof separated from one another.

Nearly all automobile jacks which are carried about in the vehicle are constructed as small and compact as possible. In such jacks movement of the elevating head is usually slow and considerable time is involved in bringing the head from its fully retracted position up to a position where the same commences to engage the axle or other portion of the vehicle to be raised. Where this difficulty has been attempted to be overcome, the procedure has been to raise the minimum elevation of the lifting head. This results in a jack of considerable dimensions. Due to the limited space available for the storage of jacks and other equipment in automobiles, such types of jacks are not particularly desirable. The present invention provides a jack which may be collapsed into an extremely compact form and contained within the case forming the base for the jack after the same has been collapsed and which may be quickly brought up to operating position and thereafter manipulated to raise the vehicle without the requirement of undue force.

My invention comprises a case in which the operating mechanism of the jack is contained. The jack proper includes toggle linkage which is operated through a slide mechanism and

which when operated raises and lowers a lifting head 13. When the parts are in fully retracted position, the same are contained within the case 10 as shown in Fig. 2 and when elevated, occupy positions similar to that shown in Fig. 3. The various parts of the jack will now be described in detail.

The case 10 is constructed of sheet metal and comprises a bottom 14. This bottom serves as a base for the jack as will presently become apparent and has issuing upwardly from it end walls 15 and 16, and side walls 17 and 18. The upper edges of the side walls 17 and 18 are turned outwardly to form flanges 19 and 21. The various walls and the bottom of the case 10 may be constructed from a single sheet of metal notched at the corners and the said walls bent upwardly therefrom. The end of the walls may be welded together or the same may be joined in any suitable manner such as is now common practice. The case 10 is open at the top as will become apparent from Fig. 3 and may be closed by means of a cover 22. Cover 22 is constructed in the form of a plate. This plate is provided with turned over lips 23 and 24 at the longitudinal edges thereof which form grooves 25 and 26 adapted to receive the flanges 19 and 21 of the case proper. This plate operates as a slide which slides along said flanges and when the case is closed, occupies the position shown in Fig. 2. For the purpose of manipulating the said cover, a bead 27 is formed at one end thereof which also serves as a stop for limiting the movement of the said cover along the flanges 25 and 26.

The slide mechanism 12 within the case 10 includes two ways 28 and 29 which are constructed of bars of metal rectangular in cross section. These ways rest upon the bottom 14 of the case and are disposed along the side walls 17 and 18. Near the center of the case are provided two bearing blocks 31 and 32 which are secured to the case by means of screws 33 which extend through the bottom 14 and are threaded into said blocks. These blocks are further constructed with rabbets 34 at the corners thereof which receive the two ways 28 and 29. When the screws 33 are tightened down the said ways are held in position upon the bottom of the case and against the side walls 17 and 18 thereof. The ways 28 and 29 are preferably constructed of a length equal to the distance between the end walls 15 and 16 of the case so that the same become held in position within the case solely through the two bearing blocks 31 and 32.

The bearing blocks 31 and 32 are constructed with aligning bores 35 and 36 which are adapted to receive and journal a spindle 37. A collar 38 encircles the said spindle at the center thereof and is attached to the spindle by means of a pin 39 which extends jointly through said spindle and collar and is riveted in place. The collar 38 fits snugly between the two bearing blocks 31 and 32 and restrains axial movement of the spindle with respect to said bearing blocks. The spindle 37 is of substantially the length of the case 10 and the intermediate portions 41 and 42 thereof are constructed with right and left hand threads respectively. The extreme ends of the said spindle are provided with wrench heads 43 and 44. Suitable openings 45 and 46 in the end walls 15 and 16 of case 10 and concentrically disposed with respect to the axis of the spindle 37 give access to the wrench heads 43 and 44. By means of this construction a wrench

45 may be applied to either of the heads whereby the spindle 37 may be rotated from either end of the case.

Within the case 10 are disposed two runners 47 and 48. These runners are constructed with rabbets 49 which receive the two ways 28 and 29 and which serve as bearing surfaces for guiding the said runners for movement along said ways. At the centers of said runners are formed bosses 50 and 51 which are provided with right and left hand threads respectively to screw upon the threaded portions 41 and 42 of the spindle 37. When the spindle 37 is rotated the two runners 47 and 48 are slid longitudinally of the case along the ways 28 and 29 and are either moved simultaneously toward or from each other depending upon the direction of rotation of said spindle.

The toggle linkage 11 consists of two crossed lower levers 52 and 53 which are pivoted to one another at their centers and at their lower ends to the runners 47 and 48. The said linkage further includes two upper crossed levers 54 and 55 which are also pivoted to one another intermediate their ends and at their lower ends to the upper ends of the levers 52 and 53. The lifting head 13 previously referred to is carried by the upper end of these last named levers. The construction and method of connection of these levers to one another and to the slide mechanism 12 will now be described in detail.

Lever 52 is constructed in the form of a channel having a web 56 and flanges 57 and 58 depending therefrom. This lever is formed at the center thereof with an opening 60 and at one end with another opening 61. Lever 53 is constructed similar to the lever 52 in the shape of a channel having a web 62 and flanges 63 and 64 depending therefrom. This lever is somewhat narrower than the lever 52, being of a width such that the same is freely received within the opening 60 of said lever. When these two levers are assembled, the same may occupy the relative positions shown in Fig. 3. A pintle 65 extends jointly through the flanges 57, 58, 63 and 64 of the said levers 52 and 53 and is disposed at the centers of said flanges and at the middle of said levers. Due to the formation of the slot 60 the two levers may swing from positions such as shown in Fig. 3 to substantially the same plane as disclosed in Fig. 2, whereby the height of the structure when the levers are collapsed become a minimum.

Issuing upwardly from the runners 47 and 48 are lugs 66 and 67 which are drilled to receive pintles 68 and 69. The lugs 67 are spaced apart a distance substantially equal to the distance between the flanges 57 and 53 of lever 52 and the pintle 69 extending through the same also passes through said flanges of the lever. The lugs 66 are spaced closer together and the distance apart substantially equal to the distance between the flanges 63 and 64 of lever 53 and pintle 68 which extends through these lugs also extends through the said flanges of lever 53. By means of this construction the two levers are pivoted at their lower ends to the two runners 47 and 48 and when the runners are moved toward and from each other through the action of the spindle 37 the upper ends of said levers are raised or lowered as the case may be.

The lever 55 is similar to the lever 52, being formed with a web 71 and flanges 72 and 73 depending therefrom. This lever is of the same

width as the lever 52 and the web 71 thereof is constructed with an opening 74 extending across the said lever at the center thereof and toward the left hand end of the same, and another opening 70 at one end of said lever similar to opening 61 of lever 52. Lever 54 is similar to lever 53, being formed with a web 75 and flanges 76 and 77 depending therefrom. This lever is of the same width as the lever 53 and is adapted to extend through the opening 74 in lever 55. A pintle 78 passes jointly through the flanges of both the levers 54 and 55 and pivots the same together intermediate the ends thereof. The two levers 54 and 55 are somewhat shorter than the levers 52 and 53. However, the pintle 78 is situated the same distance from the lower ends of said levers as the pintle 65 is disposed with reference to the ends of the levers 52 and 53 which are hinged together thereby. This leaves the upper portions 81 and 82 of said levers 54 and 55 somewhat shorter than the lower portions thereof. The flanges 72 and 73 of lever 55 are pivoted to the flanges 63 and 64 of the lever 53 by means of a pintle 83 which extends there-through while the flanges 76 and 77 of lever 54 are pivoted to the flanges 57 and 58 of the lever 52 by means of a pintle 84 extending through said flanges. These pintles are disposed at the extreme ends of said flanges. Due to the relative dimensions of the various parts, the flanges 63 and 64 are received between the flanges 72 and 73 and the flanges 76 and 77 are received between the flanges 57 and 58. To allow the parts to collapse the openings 60, 61 and 74 are provided in the various levers into which the corresponding portions of the other levers extend when the parts are arranged as shown in Fig. 2.

The lifting head 13 is best shown in Fig. 5 and is constructed from a plate having an elongated body portion 85. For supporting this lifting head the webs 71 and 75 of the levers 55 and 54 respectively are separated from the flanges thereof and turned upwardly to provide upwardly inclined lugs 86 and 87. These lugs are constructed with transverse slots 88 and 89 which are disposed above the uppermost surfaces of said webs. The body portion 85 of the lifting head 13 is received within the said slots. The lifting head 13 is held attached to the structure by means of a notch 91 which is formed in a projecting portion 92 on the side of the body 85 of the said lifting head. This notch engages the lugs 86 at the end of the slot 88 thereof and restrains longitudinal movement of the lifting head with respect thereto. A rounded corner 93 on said lifting head permits of swinging the said lifting head into the slot 88. By means of a shoulder 94 formed on the body 85 of the lifting head 13 a part is formed which is complementary to the slot 91 and which engages the lug 86 at the other end of the slot 88 thereof. In the assembly of the device the lifting head 13 is first applied to the two levers 54 and 55 before the pintle 78 has been inserted. After this structure is in place the pintle 78 may be applied whereupon the lifting head becomes permanently attached to the jack without the use of special fastening means.

The operation of the invention is as follows: In normal position the parts are arranged as shown in Figs. 1, 2 and 4. When it is desired to use the jack the cover 22 is slid off the case 10 by engaging the bead 27 thereof and drawing the same along the flanges 19 and 21. A wrench such as indicated at 46 is then applied to one of the wrench heads 43 or 44 of spindle 37 and the

same rotated. This draws the two runners 47 and 48 toward each other which swings the levers of the toggle linkage 11 in such a manner that the lifting head 13 is elevated. At first, movement of the head 13 is very great and very little force is procured. However, as the linkage straightens out the leverage increases and the rate of elevation of the head decreases. The jack is so designed that this occurs when the lifting head engages the axle or other part of the automobile to be elevated. Upon continued rotation of the spindle 37 the lifting head may be elevated sufficiently to bring the parts of the automobile to which it is applied to the proper elevation. In removing the jack the wrench 46 is turned in the opposite direction and the lifting head lowered. When the user is through with the jack, the entire linkage and head may be enclosed within the case 10 and the cover reapplied.

My invention is highly advantageous in that an extremely simple and practical construction is provided. The jack can be constructed with a base having a substantial area and when the jack is in retracted position the same occupies a minimum height. The case in which the toggle linkage of the jack is disposed is used not only for containing the parts of the invention when retracted, but as a base for supporting the jack on the ground. With my invention, there are no intricate or delicate parts to get out of order and the jack will operate indefinitely without trouble. Due to the particular construction of the lifting head and levers of the toggle linkage the jack can be constructed out of sheet metal stampings pressed in the desired form.

Changes in the specific form of my invention, as herein disclosed, may be made within the scope of what is claimed without departing from the spirit of my invention.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A jack comprising a base, a toggle linkage mounted on said base and including upper crossed levers pivoted together, said levers having openings therethrough, a lifting head comprising a plate extending through said openings and slidable along one of said openings, and means for operating said linkage to swing said levers.

2. A jack comprising a base, toggle linkage mounted on said base and including upper and lower crossed levers, said levers being constructed as channels, the alternate levers thereof being formed with openings to form cross bars on opposite sides thereof and the other of said levers extending through said openings, pivot means extending through the flanges of the cross levers for pivoting said levers together intermediate the ends thereof, and pivot means extending through the flanges of the upper and lower levers for connecting said levers together at their ends, a lifting head carried by said levers, and means for operating said linkage to swing said levers.

3. A jack comprising a base, toggle linkage mounted on said base and including upper crossed levers, said levers being constructed as channels, one of said levers having an opening through the web thereof and the other of said levers being of a width less than the distance between the flanges of said first named lever and being received within said opening, pivot means extending through the flanges of said levers, the uppermost portions of the webs of said levers being turned upwardly and being formed with transverse slots, a lifting head comprising a plate extending through said slots and slidable along 75

one of said slots, and means for operating said linkage to swing said levers.

4. A jack comprising a base, toggle linkage mounted on said base and including upper crossed  
5 levers, said levers being constructed as channels, one of said levers having an opening through the web thereof and the other of said levers being of a width less than the distance between the flanges of said first named lever and being received within said opening, pivot means extending  
10 through the flanges of said levers, the uppermost portions of the webs of said levers being turned upwardly and being formed with transverse slots, a lifting head comprising a plate  
15 extending through said slots and slidable along one of said slots, said plate having a notch therein engaging the web of said levers having the other slot and restraining sliding movement of said lifting head with respect to said slot, and  
20 means for operating said linkage to swing said levers.

5. A jack comprising a case open at the top and provided with side and end walls and a bottom connected to said walls and serving as a  
25 base, a pair of ways resting upon said bottom and disposed along said side walls of the case, bearing blocks attached to the bottom of the case, said bearing blocks holding the ways in position within the case, a threaded spindle journaled in said bearing blocks, runners slidable  
30 along said ways and threaded to receive the spindle, and toggle linkage carried by said runners.

6. A jack comprising a case open at the top and provided with side and end walls and a bottom connected to said walls and serving as a base, a  
35 pair of ways resting upon said bottom and disposed along said side walls of the case, spaced bearing blocks attached to the bottom of the case, said bearing blocks holding the ways in position within the case, a spindle journaled in said  
40 bearing blocks, a collar on said spindle disposed between said bearing blocks and holding said spindle from axial movement, the ends of said spindle projecting outwardly beyond said bearing  
45 blocks and being provided with right and left

hand threads, runners slidable along said ways, said runners being threaded to screw upon the ends of said spindle, and toggle linkage connected to said runners and operated thereby.

7. A jack comprising a case open at the top  
5 and provided with side and end walls and a bottom connected to said walls and serving as a base, a pair of ways resting upon said bottom and disposed along said side walls of the case, spaced bearing blocks attached to the bottom of the case, 10 said bearing blocks holding the ways in position within the case, a spindle journaled in said bearing blocks, a collar on said spindle disposed between said bearing blocks and holding said spindle from axial movement, the ends of said  
15 spindle projecting outwardly beyond said bearing blocks and being provided with right and left hand threads, runners slidable along said ways, said runners being threaded to screw upon the ends of said spindle, toggle linkage connected  
20 to said runners and operated thereby, the end walls of said case having openings therein concentric with the axis of said spindle, and wrench heads formed on the ends of said spindle and accessible through said openings. 25

8. A jack comprising a base, a pair of spaced ways on said base, spaced bearing blocks attached to the base near the center of the ways, said bearing blocks having aligning bores therein, a spindle threaded at its ends and formed near  
30 its middle with a shaft-like portion adapted to be journaled in the bores of said bearings, one of the threaded ends of the spindle being of a diameter not in excess of the diameter of said shaft-like portion to permit of endwise insertion  
35 of the spindle through the bores of the bearings to bring the shaft-like portion of the spindle into the bearings, a detachable collar mounted on said spindle and disposed intermediate said bearings, runners threaded to receive the threaded ends of  
40 the spindle, said runners extending across said base and resting upon said ways to take the strain off from said spindle, and a toggle mechanism carried by said runners. 45

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