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(54) Workbench with pivotable support member

(57) A workbench has two pairs of support members (2, 16) which each carry a jaw (14). The members (2, 16) may be moved pivotally between two orthogonal po-

sitions and automatically locked into either of these positions. A manually operable arm (18) co-operates with a specially shaped channel (26) in order to allow this operation to occur.

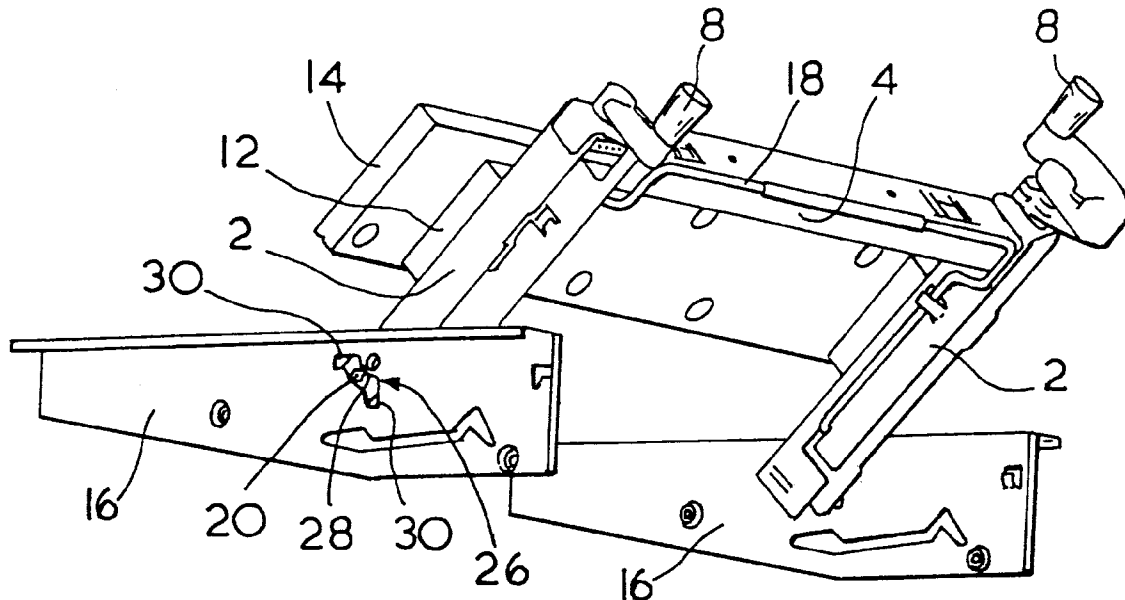


FIG. 2

Description

The present invention relates to a workbench including: a first support member pivotally coupled to a second support member and wherein one of the first and second support members is formed with detent-engaging means: detent means mounted on the other of the first and second support members and co-operable with the detent-engaging means thereby to selectively permit or prevent relative pivotal movement between the first and second support members.

A device of the kind described above has been manufactured by the applicant for several years now. Such a device comprises a main frame in the form of two pairs of legs, each pair having mounted at its upper end a support member. The support members each carry a pair of jaws which extend laterally across the support members. The support members each have a threaded rod running therethrough which co-operates with correspondingly threaded rings formed on the undersurface of each side of each of the pair of jaws. In this way the user of the workbench can cause the pair of jaws to move together or to separate by rotation of each threaded rod.

The support member for each of the jaws comprises a pair of metallic arms. One of the support members has a hole punched through each of its metallic arms and the other of the support members has two holes punched therethrough. These holes are arranged so that when the first and second support members are moved in pivotal relationship with one another, the holes are aligned both when the support members lie in the same plane and when they lie in orthogonal planes. Furthermore, the support member which has only one hole punched through its metallic arms, also carries a manually operable drive pin which may be selectively pushed through this hole and which then also travels through whichever one of two holes carried by each metallic arm of the other support member with which it is aligned. This then serves to lock the support members in either the same or orthogonal planes. The drive pin itself is caused to be either driven through or retracted from these holes by way of a simple sprung cam mechanism. In this manner, the user manually rotates the cam mechanism thereby causing the drive pin to move.

A shortcoming of the above device is that the user needs to perform two separate operations in order to alter the pivotal relationship between the two support members. Firstly the drive pin needs to be withdrawn from its current hole, then the pivotal relationship between the support members must be changed and finally the drive pin must be driven through the other wholes for locking the arrangement in its new state. Furthermore, it is advantageous to utilise an equally efficacious device which uses components of cheaper cost than that of a cam-driven drive pin.

It is thus an object of the present invention to at least alleviate the above-mentioned shortcomings by provid-

ing a workbench of the type described in the opening paragraph, characterised in that the detent-engaging means comprises a channel formed in the said one of the first and second support members, which channel defines first and second regions, one of which first and second regions allows the detent means limited movement therewithin and the other of the first and second regions restrains movement of the detent means. By utilising a channel so formed, the need for a separate cam-driven drive pin is obviated and hence a cheaper, more simple to operate device is achieved than has hitherto been the case.

Preferably at least one of the first and second regions of the channel is substantially arcuate, thereby to cause the detent to follow an arcuate path in sympathy with the relative pivotal movement between the first and second support members. In this way the detent is always within the detent-engaging means itself and so there is not need for the operator of the workbench to have to align holes as is the case with the prior art.

Alternatively, the other of the first and second regions of the channel defines a stop for the detent means thereby to prevent relative pivotal movement between the first and second support members. In this way, the support members can readily be held in the desired relative orientation.

Preferably the stop is formed tangentially to the arcuate region of the channel. Alternatively the stop may be substantially linear.

Additionally, there may be two of the other of the first and second regions, each of the two of the other of the first and second regions flanking the first region. This allows for the detent means to be held in, for example, two positions at 90° separation.

In a preferred embodiment, the detent means is biased towards one of the first and second regions. This allows for the detent to be automatically urged into its restrained position within the detent-engaging means.

The detent means could be biased towards the other of the first and second regions. Also the detent means could be biased by way of a spring member. The detent means could comprise a manually operable bar.

The manually operable bar is preferably urged towards the or each stop by the spring member.

Additionally or alternatively when the biasing of the bar coincides with the bar being positioned within the channel directly over the or each stop, then the bar is restrained within said the or each stop hence preventing relative pivotal movement between the first and second support members.

The channel may be formed as a recess within the one of the first and second support members. Alternatively, the channel may be formed as a hole within the one of the first and second support members. Preferably the first and second support members each support a pair of jaws of the workbench. The first and second support members may each be formed on respective legs of the workbench. Preferably the first and second sup-

port members each comprise a pair of supports.

The invention will now be described, by way of example only, and with reference to the accompanying drawings, of which:

Figure 1 shows an exploded view of part of a workbench in accordance with the present invention;
 Figure 2 shows a perspective view from one side of the workbench of Figure 1;
 Figure 3 shows a perspective view from below of the workbench shown in Figure 2;
 Figure 4 shows a plan view from the underside of the workbench;
 Figure 5 shows in detail the area of Figure 4 ringed "A";
 Figure 6 shows a plan view from above of the workbench of the present invention;
 Figure 7 shows a side view of part of a workbench with the support members lying in the same plane;
 Figure 8 shows a side view of part of a workbench with the support members of Figure 7 moving in pivotal relationship with each other;
 Figure 9 shows a side view of part of a workbench with the support members lying in orthogonal planes, and
 Figure 10 shows an entire workbench in accordance with the present invention.

Referring firstly to Figures 1, 2 and 3 it can be seen that a part of a workbench in accordance with the present invention comprises a first support member, in this example a pair of bars (2), interconnected via a support bar (4). Each of the bars (2) of the pair are adapted to receive therewithin a threaded vice screw (6). At one end, the vice screw (6) is connected to an arm handle (8) so that a user of the workbench may rotate the vice screw (6). The remainder of the length of the bar (2) carries a thread and the rotation of the screw (6) via the handle (8) causes the thread to move a spigot-bearing ring (10) coupled to the screw (6) along the length thereof in known manner. The upper surface of the spigot-bearing ring (10) (the spigot itself) couples with the underside of a block (12). The upper surface of block (12) itself engages with a jaw (14). In this way, rotation of either of the arm handles (8) by the user causes that side of the jaw (14) to move, as is known in the art. It will also be seen that the two arm handles (8) as shown in the Figures can both be caused to rotate by coupling them together via a transmission belt (15). This is simply for ease of use as, if the jaw (14) is required to be moved backwards or forwards along the length of the thread of the vice screws (6) without any lateral or angular disposition, then this mechanism allows this to be achieved without the need for both arm handles (8) to be rotated. Each bar (2) of the pair is pivotally coupled to a second support member, in this example a pair of brackets (16). It can be seen from the example shown in the figures that each bar (20) of the pair couples pivotally with a

respective bracket (16) of the pair of brackets (16).

Although not shown in the Figures for the sake of clarity, the brackets (16) themselves support a further jaw in addition to jaw (14). This pivotal relationship between the two pairs of support members - the bars (2) and the brackets (16) - thus allows these two jaws to be in any relative orientation between lying in the same plane to lying in orthogonal planes, as will be described below.

Referring now also to Figures 4, 5 and 6 it will be seen that the bars (2) of the pair are adapted to hold a detent means, in this example a spring-biased arm (18). The arm (18) is shaped so as to define two projecting ends (20) and a longitudinally extending operable surface (22). In its rest state, the arm (18) is biased in the direction of the arrow shown in Figure 5 by way of spring members, here coiled metal springs (24).

The projecting ends (20) of the arm (18) co-operate with a detent-engaging means, in this example shaped punched channel (26) shown in Figures 7, 8 and 9, formed in each bracket (16) of the pair of brackets. The co-operation between the arm (18) and the shaped channel (26) governs the relative pivotal movement between the bars (2) and the brackets (16) and will be described in detail below.

Paying particular attention to the shape of the channel (26) and Figures 7, 8 and 9 for the present, it can be seen that it is formed in a generally arcuate shape being flanked by two end portions. The arcuate portion (28) subtends a right-angle and is so shaped to permit the projecting end (20) of arm (18) which co-operates with its respective channel (26) to travel therewithin. It will be understood that travel of the projecting end (20) within the arcuate portion (28) of the channel (26) is possible when the user of the workbench causes relative pivotal movement to occur between the pair of bars (2) and the pair of brackets (16). It will be apparent that the reason the arcuate portion (28) has been chosen to subtend a right-angle is to permit the jaws (14) (and the other jaw supported on the pair of brackets (16) but not shown) to lie either in the same or orthogonal planes.

The two end portions of the channel (26) which flank the arcuate portion (28), in this example linear end stops (30) which are formed tangentially to the arcuate portion (28), serve both to restrict the travel of the projecting end (20) within the channel (26) and hence, therefore, to limit the extent of relative pivotal movement between the pair of bars (2) and the pair of brackets (16). As explained above, the spring (24) serves to urge the arm (18) in the direction of the arrow shown in Figure 5 and this translates, when viewing the relationship between the channel (26) and projecting end (20), into meaning that the arm (18) will be biased by the spring (24) so that the projecting ends (20) are urged into the end stops (30). Thus, when the projecting ends (20) are aligned with either end stop (30) (rather than arcuate portion (28)) then, in the absence of any user force against the arm (18) along the longitudinally extending surface (22)

in the opposite direction to the arrow of Figure 5, the projecting ends (20) will be forced into and held within the end stops (30). In this manner, the pair of bars (2) and the pair of brackets (16) (and hence their respective jaws) can be locked into their relative pivotal positions, i.e. lying in the same plane, or lying in orthogonal planes.

Referring again to Figures 7, 8 and 9, the relationship between the arm (18) and the channel (26) and the manner in which they co-operate to enable working of the present invention will be described. In Figure 7, the pair of bars (2) and the pair of brackets (16) are lying in the same plane. Thus the jaw (14) carried by the pair of bars (2) and the jaw (not shown) carried by the pair of brackets (16) are also lying in the same plane.

From Figures 5 and 7 it can be seen that the arm (18) is biased towards the right hand side of Figure 7 and because the pair of bars (2) and the pair of brackets (16) are lying in the same plane, then the projecting end (20) is aligned with the end stop (30) and is hence urged thereinto. Thus the pair of bars (2) and the pair of brackets are effectively locked into this position because whilst the projecting end (20) is constrained within the end stop (30), then no relative pivotal movement between the pair of bars (2) and the pair of brackets (16) is possible.

If, however, a user of the workbench applies a force to the arm (18) in the direction of the arrow A (Figure 7) of sufficient magnitude to overcome the biasing force applied to the arm (18) by the spring (24), then the arm (18) will move to the left and hence the projecting end (20) will move out of the end stop (30) and become aligned with the arcuate portion (28). This can now be seen from Figure 8.

In this position shown in Figure 8, the user may then effect relative pivotal movement between the pair of bars (2) and the pair of brackets (16) by moving the pair of bars (2) upwards in the direction of arrow B. This is only possible because the projecting end (20) of arm (18) is able to travel within the arcuate portion (28) of the channel (26). Indeed, this relative pivotal movement may occur freely between either end stop (30) so long as the projecting end (20) does not align with either end stop and also, in this event, so long as the force applied to the arm (18) does not cease to act against and overcome the force applied to the arm (18) by spring (24).

Referring now to Figure 9, it can be seen that when the pair of bars (2) and the pair of brackets are lying in orthogonal planes, i.e. when the projecting end (20) has travelled the length of the arcuate portion (28) from its position in Figure 7 (through 90°), then when the arm (18) is released (in the direction of arrow C) and the projecting end is aligned with the other end stop (30), the pair of bars (2) and the pair of brackets are automatically locked into this position. The process may now be reversed when the user requires the jaws or the bars (2) and brackets (16) to once more lie in the same plane.

By referring now to Figure 10, an entire workbench in accordance with the present invention is shown. In

this Figure, the other jaw (15) of the pair (14, 15) is also shown whereas in all previous figures it was omitted for the sake of clarity. The workbench will not be described in any detail as it is of well-known construction to those skilled in the art. The pair of brackets (16) are themselves supported by a collapsible frame (32) which is coupled at its other end to a base support structure (34). Those skilled in the art will appreciate that the collapsible frame (32) permits the entire workbench to be folded for ease of storage when not in use.

It will be understood by those skilled in the art that the device described above provides a means by which relative pivotal movement between first and second members may be achieved easily and by which the members may be selectively locked in either of two predetermined positions.

Although in the above the channels (26) have been formed by punching a hole into the pair of brackets (16), these channels (26) could be equally well formed as recesses in the material of the brackets (16).

It will be appreciated by those skilled in the art that although in the above example the arm (18) is mounted on the bars (2) and the channel (26) is formed on or from the brackets (16), this is not necessary. They may each equally well be formed on the other of the bars (2) or brackets (16).

Although in the above example reference has been made to pairs of bars (2) and brackets (16), this is only by way of example. It will be understood that the invention is equally efficacious if a unitary member were to form either or both of these items.

Claims

1. A workbench including:

a first support member pivotally coupled to a second support member and wherein one of the first and second support members is formed with detent-engaging means; detent means mounted on the other of the first and second support members and co-operable with the detent -engaging means thereby to selectively permit or prevent relative pivotal movement between the first and second support members;

characterised in that the detent-engaging means comprises a channel formed in the said one of the first and second support members, which channel defines first and second regions, one of which first and second regions allows the detent means limited movement therewithin and the other of the first and second regions restrains movement of the detent means.

2. A workbench according to Claim 1 wherein one of

the first and second regions of the channel is substantially arcuate, thereby to cause the detent to follow an arcuate path in sympathy with the relative pivotal movement between the first and second support members.

3. A workbench according to Claim 2 wherein the other of the first and second regions of the channel defines a stop for the detent means thereby to prevent relative pivotal movement between the first and second support members. 10
4. A workbench according to Claim 3 wherein the stop is formed tangentially to the arcuate region of the channel. 15
5. A workbench according to Claim 3 or Claim 4 wherein the stop is substantially linear.
6. A workbench according to any one of the preceding claims wherein there are two of the other of the first and second regions, these two of the other of the first and second regions flanking the first region. 20
7. A workbench according to any one of the preceding claims wherein the detent means is biased towards one of the first and second regions. 25
8. A workbench according to Claim 7 when appendant to any one of Claims 3 - 6 wherein the detent means is biased towards the other of the first and second regions. 30
9. A workbench according to Claim 8 wherein the detent means is biased by way of a spring member. 35
10. A workbench according to any one of the preceding claims wherein the detent means comprises a manually operable arm. 40
11. A workbench according to Claim 10, when Claim 6 is appendant to Claim 3, wherein the manually operable arm tends to be urged towards the or each stop by the spring member. 45
12. A workbench according to Claim 11 wherein when urging of the arm coincides with the arm being positioned within the channel directly over the or each stop, then the arm is retained within said the or each stop hence preventing relative pivotal movement between the first and second support members. 50
13. A workbench according to any one of the preceding claims wherein the channel is formed as a recess within said one of the first and second support members. 55
14. A workbench according to any one of Claims 1 - 12

wherein the channel is formed as a hole within said one of the first and second support members.

15. A workbench according to any one of the preceding claims wherein the first and second support members each comprise a pair of supports.
16. A workbench according to any one of the preceding claims wherein the first and second support members each support a pair of jaws of the workbench.
17. A workbench according to any one of the preceding claims wherein the first and second support members each are formed on respective legs of the workbench.
18. A workbench substantially as hereinbefore described and with reference to the accompanying drawings.

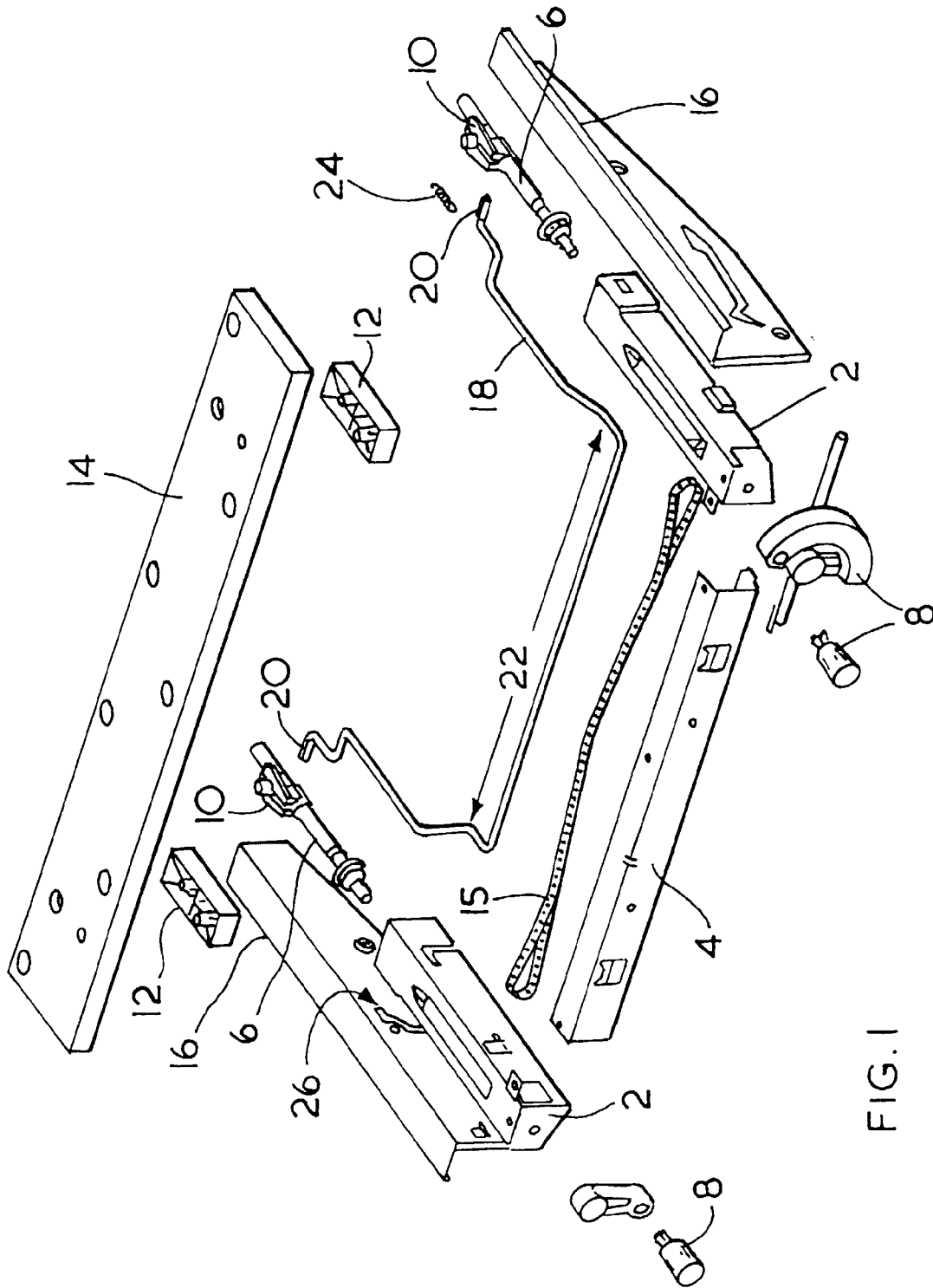


FIG. 1

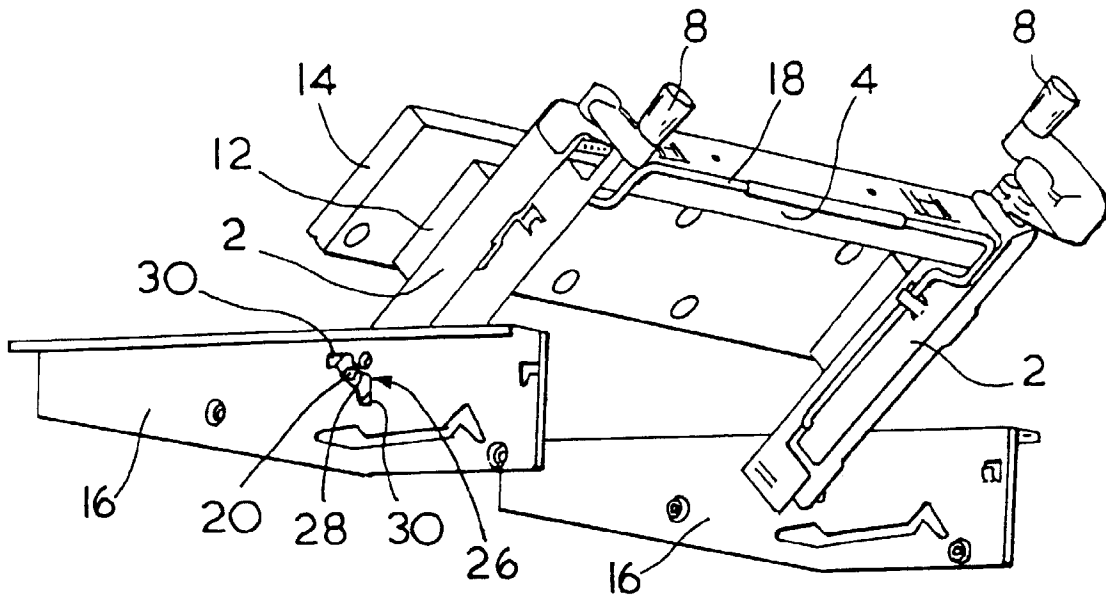


FIG. 2

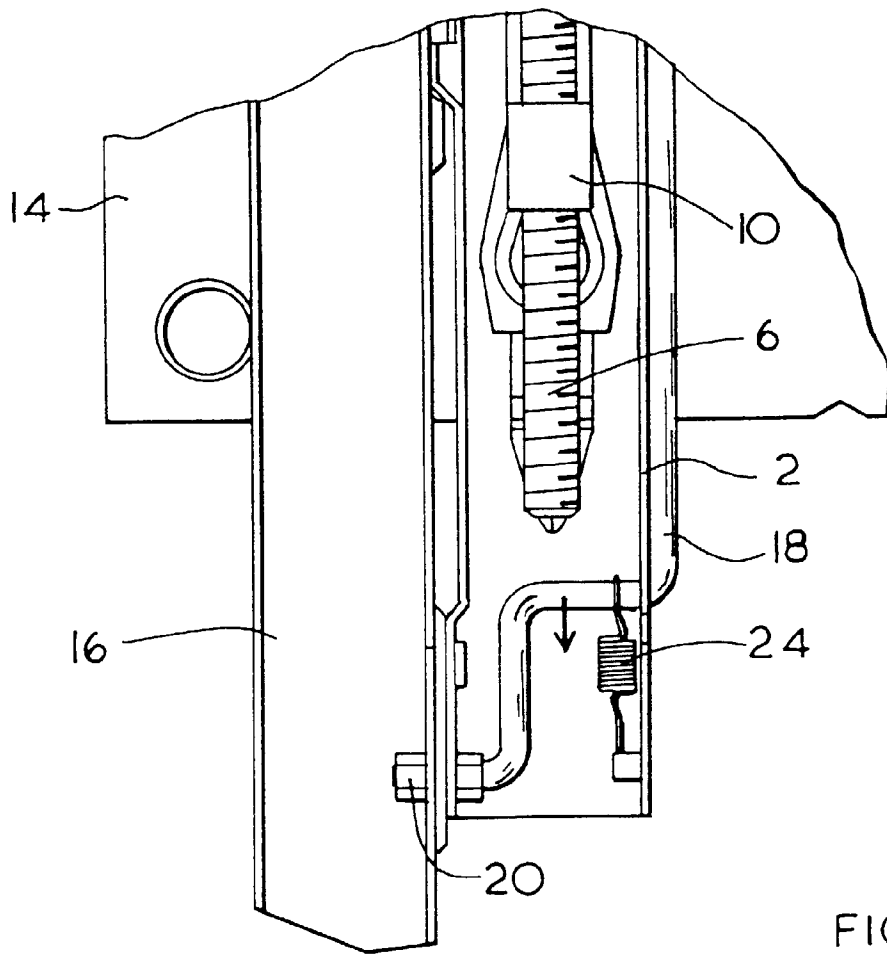


FIG. 5

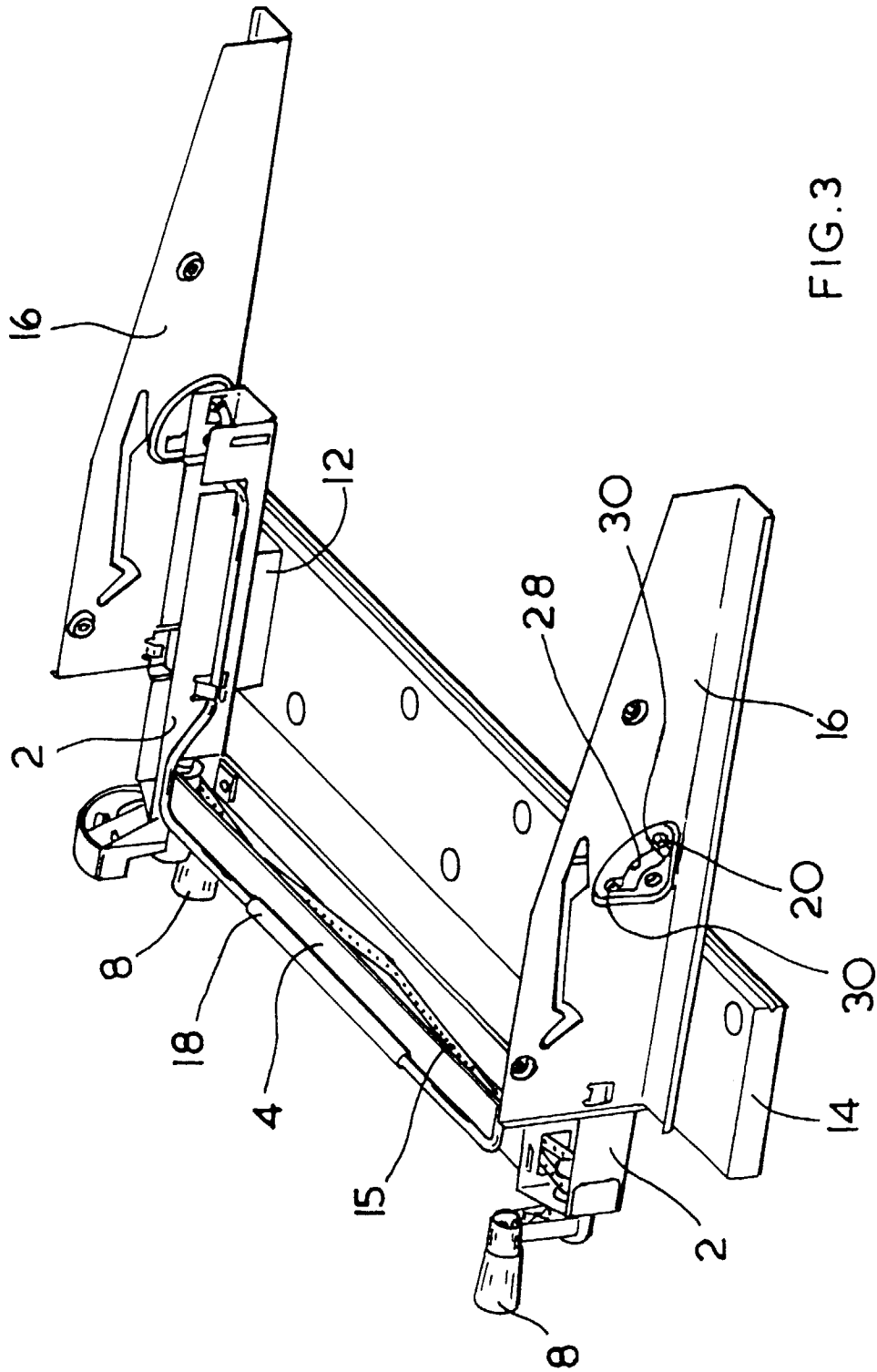
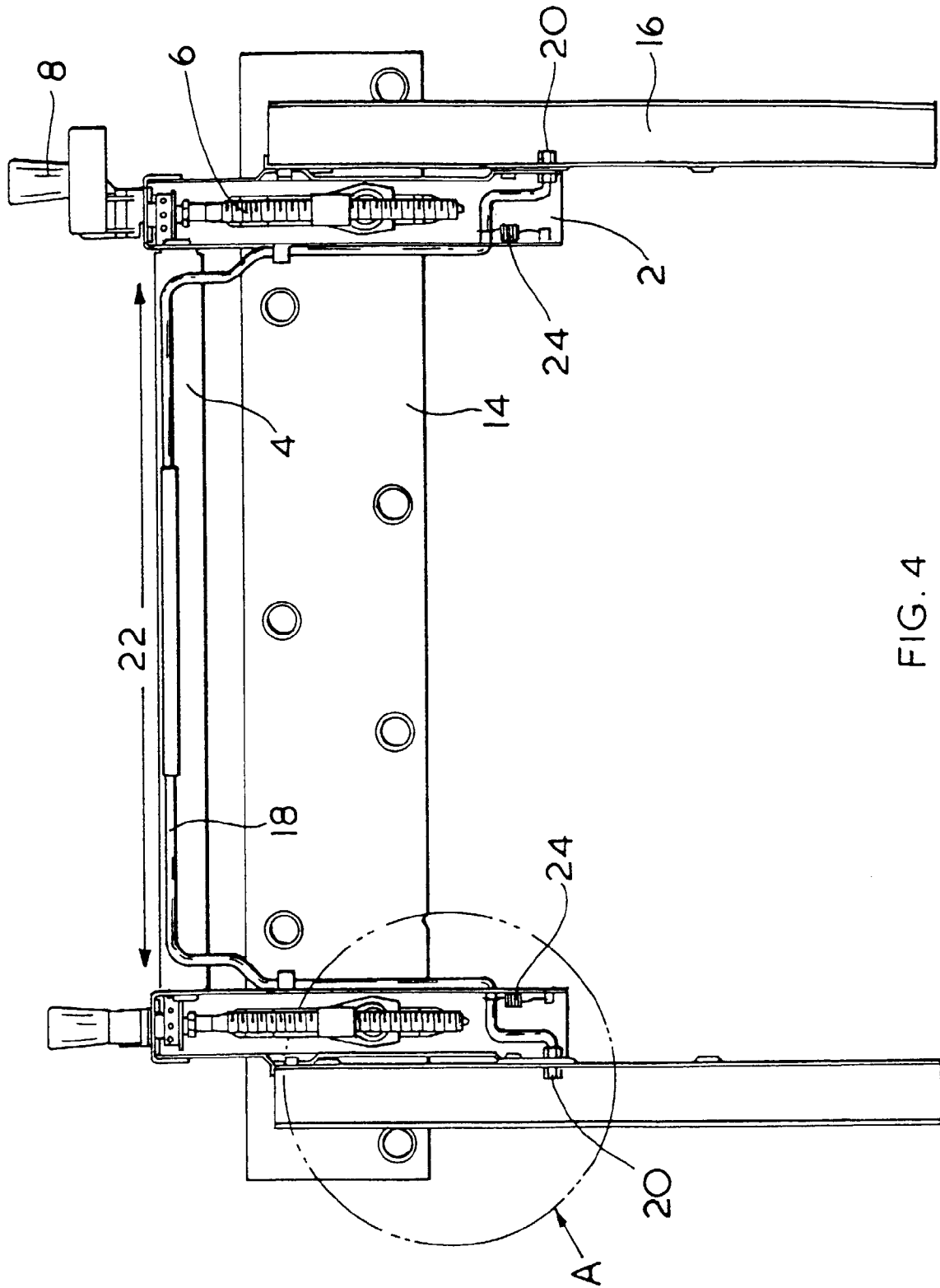


FIG.3



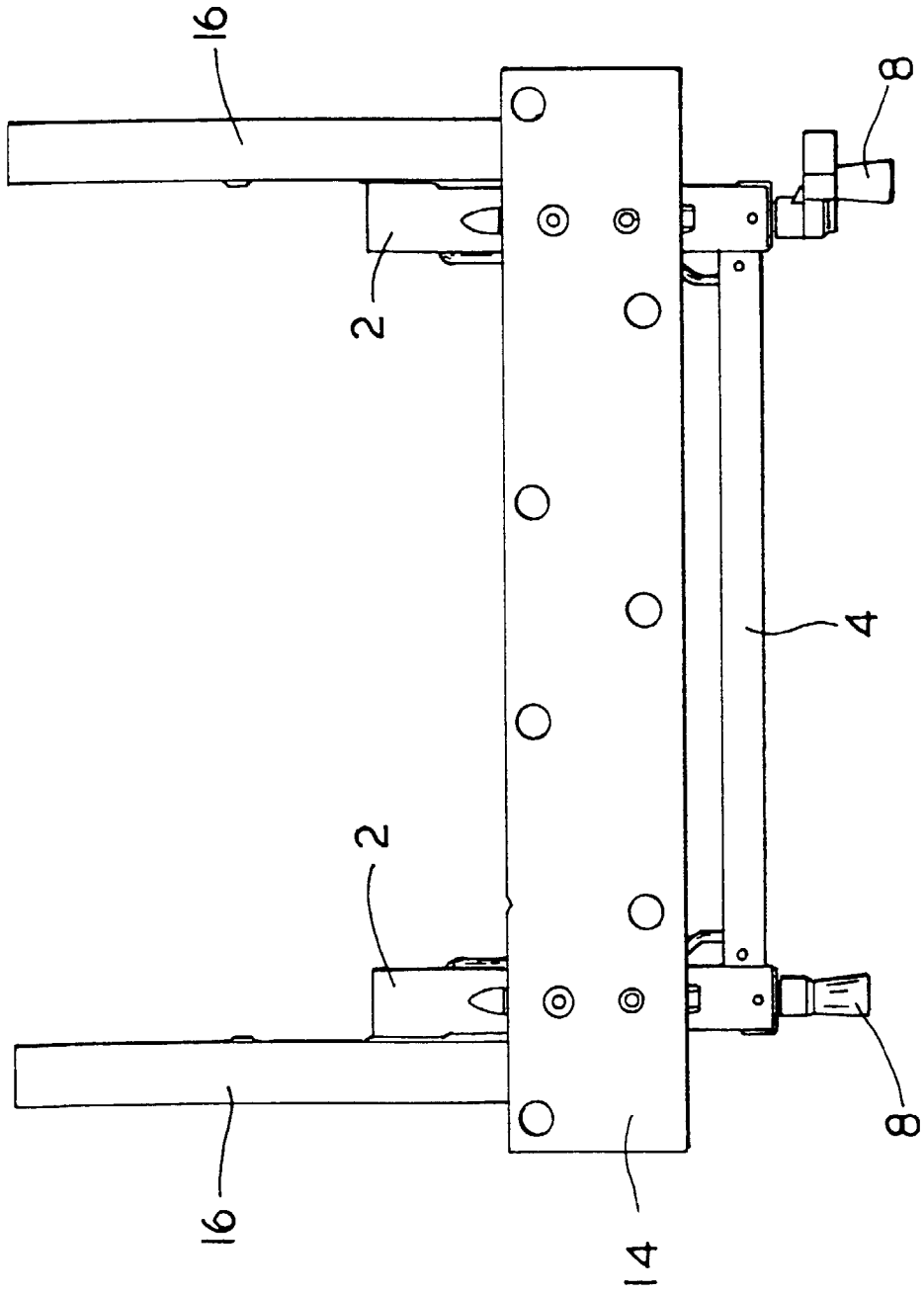


FIG. 6

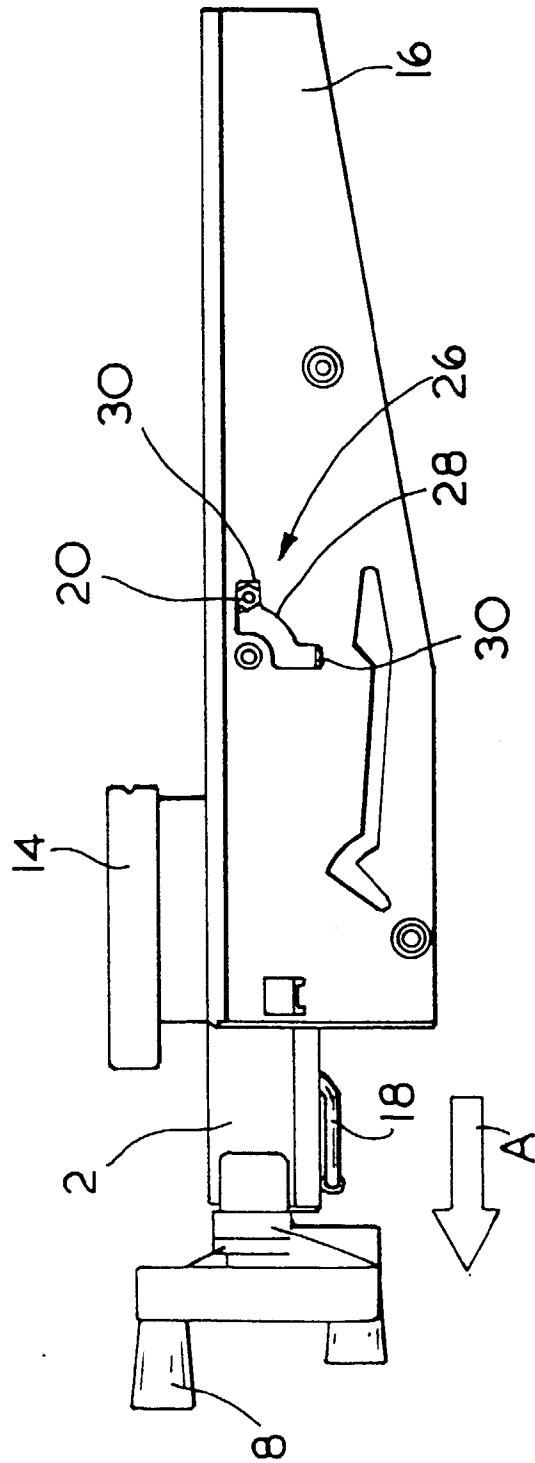


FIG. 7

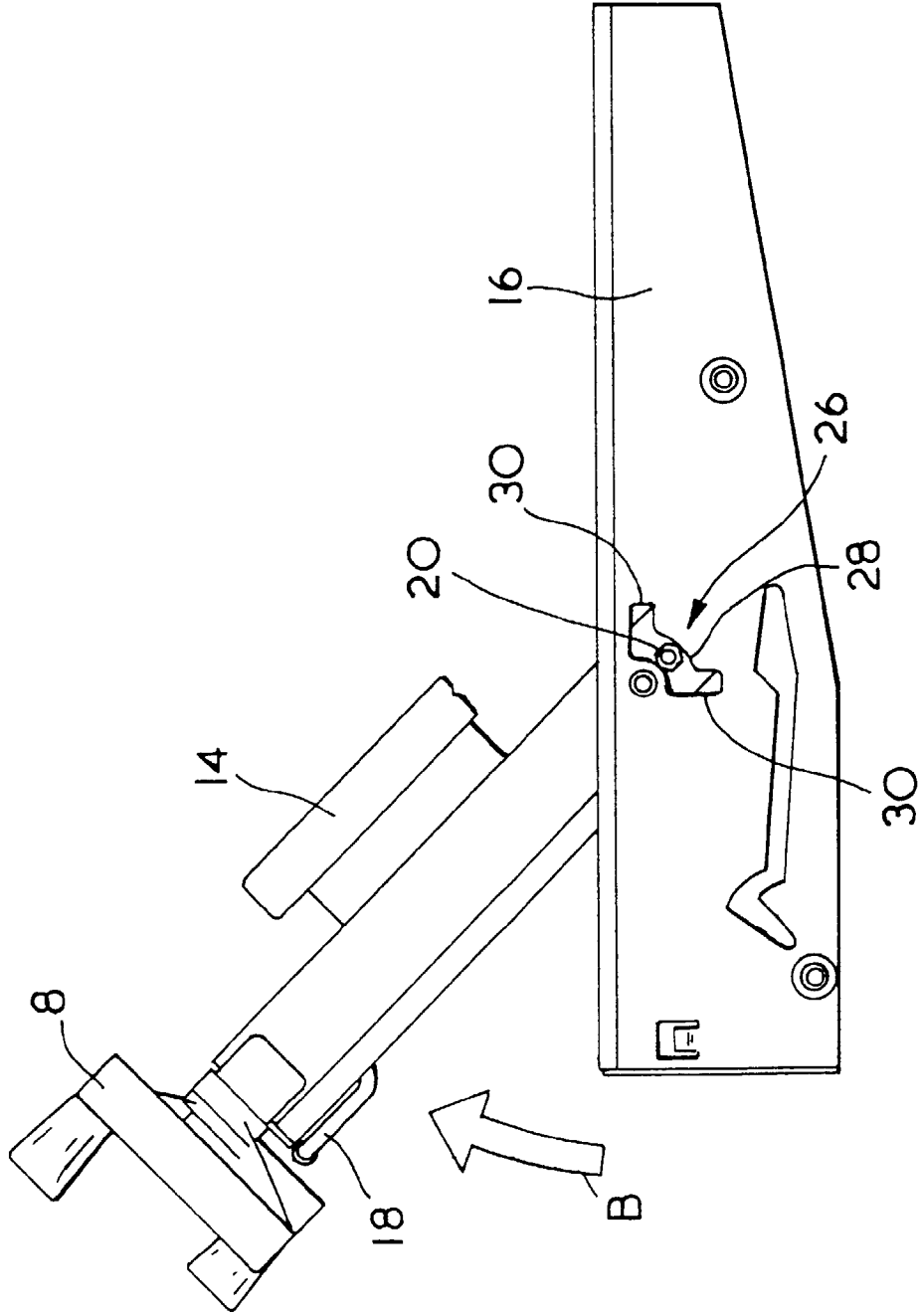


FIG. 8

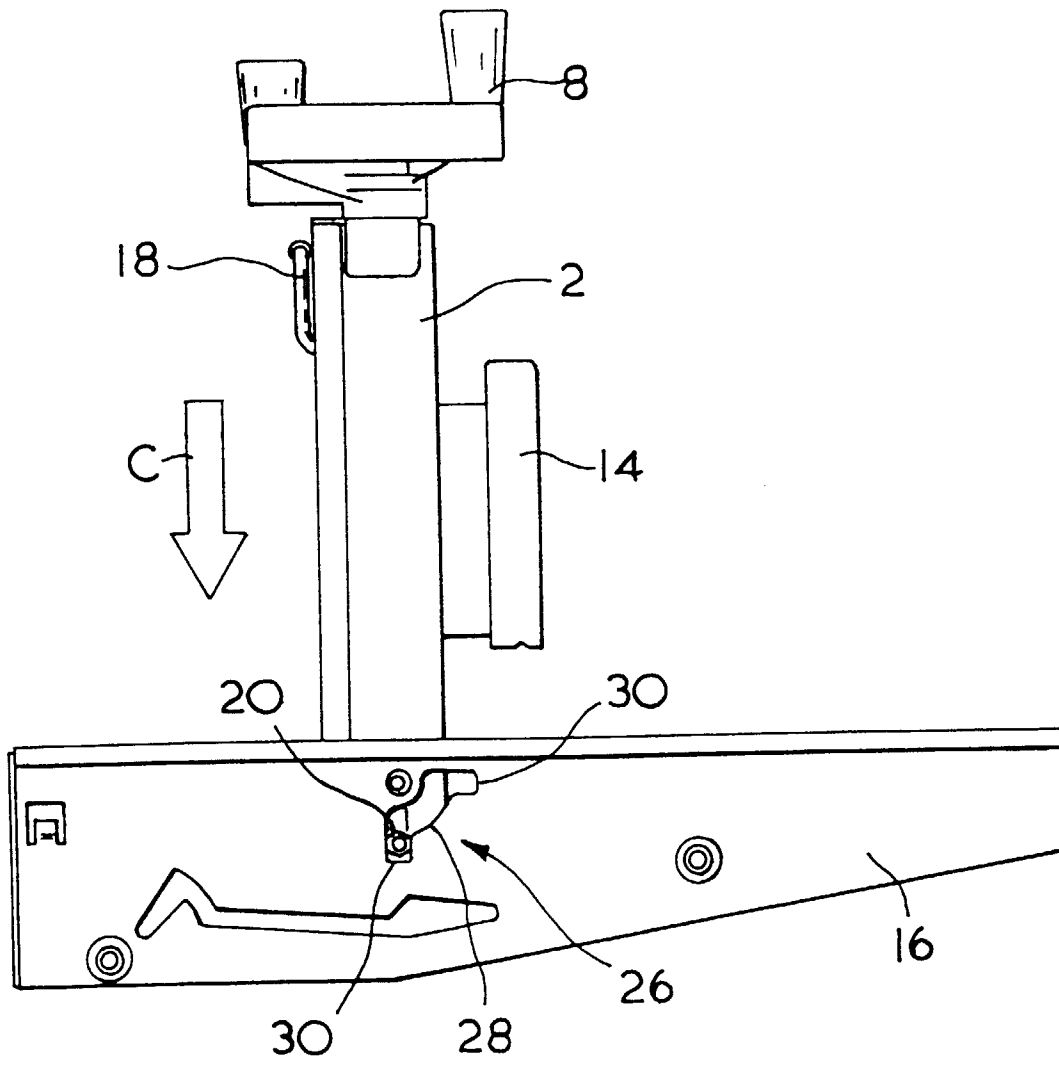


FIG. 9

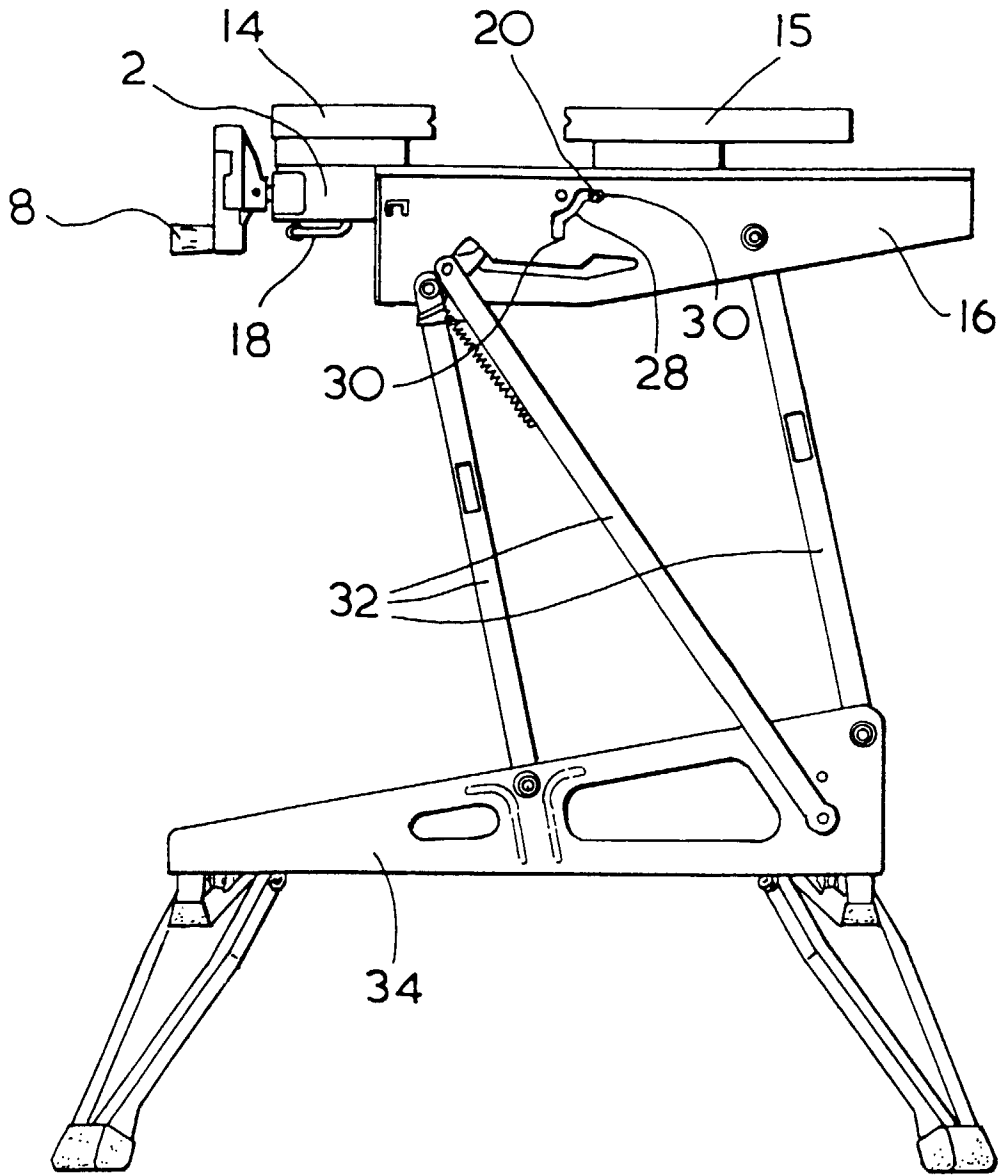


FIG.10



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 98 30 5842

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP 0 592 181 A (BAKER MFG CO) 13 April 1994 * the whole document *	1, 14, 15	B25H1/18 B25H1/04
A	US 4 154 435 A (ALESSIO LORENZO E) 15 May 1979 * the whole document *	1-3, 16, 17	
A	DE 89 01 527 U (CHENG, WEN HO) 3 May 1989 * the whole document *	1-5	
A	US 4 934 645 A (BRESLOW DAVID S) 19 June 1990 * abstract; figures 1, 6, 7 *	1, 9	
A	US 5 005 669 A (UMEBARA TAKAO ET AL) 9 April 1991 * column 5, line 59 - column 6, line 22; figures 1, 4 *	1	
A	GB 2 250 945 A (BLACK & DECKER INC) 24 June 1992 * abstract; figures 1, 6 *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	US 3 561 713 A (BERKOWITZ IRVING L) 9 February 1971 * abstract; figures 1, 4 *	1	B25H A47B E05D
A	US 4 350 098 A (SHIRONO JUNKICHI ET AL) 21 September 1982 * the whole document *	10	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 4 November 1998	Examiner Petersson, M.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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