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(73) Proprietor: **ING. HANS ERLER GmbH & Co.,
ELEKTROANLAGEN KG
Thomas Mann Strasse 61A
D-90471 Nürnberg (DE)**

(72) Inventor: **Norton, Harry William
Hunter's Moon,
Sheet Road
Ludlow,
Shropshire SY8 1LH (GB)**

(74) Representative: **Russell-Rayner, Albert Patrick
Business Centre
Avenue One
Business Park
Letchworth Garden City
Hertfordshire SG6 2HB (GB)**

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Description

This invention relates to a foldable/stowable support apparatus as defined in the pre-characterising portion of Claim 1 for facilitating the support of other apparatus with respect to a location at which the action that is to be performed by said other apparatus can be carried out.

A support apparatus of this type is known from US-A-2832241.

In particular, the present invention is concerned with the mounting of machines such as electric drills or the like in such manner that the associated tool engages with a wall, element etc., to be machined at a required position and such that the direction of operational advance of the tool involved is similarly along a required direction.

A particular use of the apparatus of the present invention is to the formation of recesses/holes etc., in walls of buildings.

It will be appreciated that when a manually holdable hammer drill or the like is to be used there is often a considerable weight to be supported, particularly in the case of electrical drills of a size for accommodating relatively large diameter drills such as masonry drills of up to, for example, 40 millimetres diameter, and larger in the case of particularly large size hole requirements that this weight makes it particularly difficult to hand hold the drill in the correct position for ensuring that the axis of the drill is maintained at right angles to the wall, or at a desired angle other than at right angles if such is a requirement.

It is known from US-A-2832241 to provide a foldable support assembly for carrying a hand tool such as a drill or the like in such a manner that when the drill or the like is in use the operational axis of the drill or the like is located at a required position and orientation with respect to a surface to be drilled or otherwise machined.

It is also known from DE-U-89 04 991 to provide arrangements by means of which it is possible to limit the movement of the tool of the machine such as a drill bit to a permissible drilling depth in a workpiece, said arrangements enabling automatic machine operation cut-off when the drill bit has penetrated to a desired depth.

It is an object of the present invention to provide apparatus for facilitating the handling of apparatus such as hand holdable drills.

According to the invention there is provided a foldable/stowable support apparatus for carrying a support assembly for carrying a hand tool such as a drill or the like in such a manner that when the drill or the like is in use the operational axis of the drill or the like is located at a required position and orientation with respect to a surface to be drilled or otherwise machined, the support assembly having

arrangements by means of which it is possible to limit the movement of the tool of the machine such as a drill bit to a permissible drilling depth in a workpiece, characterised in that the apparatus includes a support column, support elements pivotable between a closed/stowed position and a support column supporting position which enables the support column to mount the support assembly for carrying a machine for use in corners of a room or the like, the support assembly also including first and second parts relatively displaceable with respect to each other, with one part being adapted for selective displacement lengthwise of the column and with the other part being adapted for selective displacement towards and away from the one part; said two support elements being pivotally connected with the column and positionally located at right angles with respect to each other and the column, and in that the support assembly is further characterised by arrangements for enabling the fine positional adjustment of the support assembly lengthwise of the support column, by arrangements for enabling automatic machine operation cut-off on completion of a predetermined extent of machine operation such as the drilling of a hole of a particular predetermined depth, and by a tension producing arrangement for exerting a displacement force between the first and second parts for maintaining machine operational contact with its associated workpiece.

For a better understanding of the invention and to show how to carry the same into effect reference will now be made to the accompanying drawings in which:-

Figure 1 is a part exploded perspective view of an embodiment of a machine support apparatus incorporating the features of the invention;

Figure 2 schematically illustrates left and right hand modes of setting-up the apparatus of Figure 1 in relation to the corners formed by two walls or other surfaces meeting at right angles;

Figure 3 is fragmentary side view of details of the apparatus of Figure 1, and when an electric drill is mounted to the apparatus;

Figure 4 is a fragmentary view of the apparatus of Figure 1 when carrying an electric drill and, in particular, of a mechanism for automatically stopping operation of the drill on completion of a required drilling operation; and

Figure 5 is a schematic cross section of an arrangement for switching OFF the drill on completion of a drilling operation.

Referring now to the drawings and more particularly to Figure 1, the apparatus 1 of the invention incorporates a main support column 2 comprising two side-by-side vertical members 3 and 4 intercoupled at their upper ends 5 by a cross-piece 6 and mounted at their lower ends to a triangular

base plate 7.

With this arrangement the two members 3 and 4 effectively combine to form a guide for a positionally adjustable support 8 for receiving and positionally mounting an electric drill or other article (not shown in Figure 1) to be carried by the support. The support 8, as will be discussed hereinafter, is vertically positionally adjustable/movable lengthwise of the members 3 and 4 and is lockable in any required/adjusted position along the length of these members.

The column 2 is supported in a vertical position by support leg structures 9 and 10, each such structure being pivotally connected with the support column for pivotal movement between a stowed/folded position and a column supporting position as is shown in Figure 1.

The support leg structure 9 includes an inclined member 11 pivotally connected at its upper end with a connecting and locating bracket 12 projecting outwardly from the outside face of the upright member 3 whilst its lower end connects with one end of a horizontally extending member 13 whose other end pivotally connects with a peg 14 projecting upwardly from the base plate 7. The pivotal connections between the leg structure 9 and the upright member 3 and peg 14 are such that the two members can be swung about an axis parallel to the length of the upright member 3.

The support leg structure 10 is of similar construction to that of the leg structure 9 in that it includes an inclined member 15, and a horizontally extending member 16, and is similarly pivotally connected to the other upright member 4 by way of bracket 17 and peg 18 upstanding from the plate 7. The Figure additionally illustrates the pivotable connection elements between the inclined members and the associated brackets 12 and 17. These connection elements include in each case a pivot pin 19 and associated locking nut 20. Also the Figure illustrates the structure 10 in exploded arrangement with respect to its pivotal connection locations 17, 18.

In use, the two pivotally mounted leg structures 9 and 10 are positionally located and set at right angles with respect to each other and to the support column in such manner that one structure is set perpendicular to the plane of the column and the other at right angles to this plane, by means of a tray assembly 21 which is such that it is simultaneously engageable with both of the horizontally extending members and with a third peg 21A upstanding from the plate 7.

In the Figure the tray assembly 21 is not shown in its actual position of attachment to the leg structures but for the purposes of clarity at a location raised well above such installation position.

One embodiment of the construction of and mode of mounting the tray like assembly 21 is shown in Figure 1. As can be seen the tray comprises a open framework with side rails 22, 23 a front rail 24 and a shorter rear rail 25. A load support mesh 26 is secured to the four rails. The two side rails 22 and 23 are set by the construction of the tray frame at right angles to each other. The lengths of the front and rear rails are set by the geometry of the system which requires, as has been mentioned, that the two leg support members should be perpendicular to each other when the apparatus is in use.

The side rail 22 is tubular and of such bore as to be slidably engageable over the support structure horizontal member 16 prior to the latter's pivotal connection with its associated bracket 18.

The other side rail 23 is in the form of an inverted channel section and is intended to engage over the other horizontal member 13. The relative dimensioning between the rail 23 and the horizontal member 13 is such that a firm fit is possible between the rail and the horizontal member. A bore (not shown) is associated with the rail 25, the bore being engaged by the peg 21A when the tray assembly 21 is fitted.

Figure 2 very schematically illustrates two possibilities for the positioning of the leg structures 9 and 10 with respect to the column assembly 2. The Figure illustrates the settings for left and right hand corner.

The construction of the support 8 will now be considered in greater detail. The support 8 includes two main parts 8A and 8B. The part 8A is intended to be mountable for positional adjustment relative to the support column members 3 and 4 and the part 8B is intended to be positionally adjustable relative to the part 8A. The part 8A includes a pair of parallel spaced apart tubular members 27 and 28 mounted to a slide assembly 29 including face to face support plates 29A and 29B so as to project at right angles thereto. The support plate 29A is of channel section having a base 30 with a centrally positioned through bore 30A and two side walls 31. The support plate 29A is dimensioned so as to be bridgingly engageable with the upright members 3 and 4 to provide a guide channel which is slidable lengthwise of both upright members.

The plate 29A is connected by a series of bolts and wing nut assemblies 32 to the plate 29B which is of a form similar to the plate 29A by having a main body 35, with a central through bore 36 and side walls 37. The slide assembly plates 29A and 29B are interconnected in such manner that the upright members 3 and 4 are sandwiched therebetween.

In use, the wing nut assemblies 32 would be loosened and the channel guide assembly 29 dis-

placed lengthwise of the members 3 and 4 until the support part 8A and thus the support 8 has been moved to a required setting after which the wing nut assemblies 32 are retightened.

The support part 8B includes two hollow rods 38 which telescopically engage with the members 27 and 28, and which are connected at their inner ends by a yoke arrangement 39 which is adapted to engage with the chuck end of the casing of a hand holdable electric drill (not shown in Figure 1) and are interconnected at their other ends by means of a cross pin arrangement 40.

A toggle action lever mechanism 41 is connected between the two parts 8A and 8B and in particular between the slide assembly 29 and the yoke arrangement 39. The toggle mechanism 41 is used for holding the support part 8B and thus any drill or the like mounted there on in the position shown in Figure 3, which position can be regarded as the start position for the support part 8B and thus the drill or other machine on the support part 8B. The mode of operation of lever mechanism 41 will be discussed hereinafter.

A tension spring system 42 is operationally coupled between the two parts 8A and 8B in particular between the slide assembly 29 and the pin 40 in such manner as to be able resiliently to urge the part 8A towards the slide assembly 29 and thus the drill or other machine drill when positioned on the part 8B towards the column 2 by causing the tubes 38 to slide forwardly lengthwise of the members 27 and 28. In other words, the tension spring system is able to produce sufficient force as to advance the drill progressively in the drilling direction as drilling takes place as to maintain a required drilling pressure necessary to achieve drilling action throughout the drilling operation.

Referring now to Figure 3, this Figure illustrates a drill 43 mounted to the support part 8B.

The drill 43 is held in place by introduction of the neck 44 of the drill (the portion of the drill casing immediately adjacent to the chuck 43 thereof) into the yoke arrangement 39 and by then tightening the yoke arrangement about the neck 44.

The handle end 48 of the drill is effectively held in position by a retaining means 45 shown in exploded view in Figure 1. Briefly, this retaining means includes a pin 46 engageable with lugs 47 upstanding from the tubes 38.

When mounting the drill to the support part 8B, the pin 46 is removed and the handle end 48 of the drill is placed in the position shown in Figure 3. The pin 46 is then replaced and is held in place by a spring clip 46A engaging in a through bore (not shown) provided in the end 46B of the pin 46.

The support part 8B and the drill now mounted thereto is retracted against the action of the tension

spring system 42 to the position shown in the Figure 2 and is held there by moving the lever mechanism 41 from the position shown in Figure 1 to that shown in Figure 3 in which the elements 50 and 51 of the lever mechanism are moved into a generally line setting with respect to each other, the toggle action effectively retaining the elements 50 and 51 locked in their in-line setting.

The drill 43 is provided with a drilling operation depth gauge arrangement 54 (Figure 5) which is intended to detect when a hole has been drilled to a required depth and then to switch-OFF the drill 43 thereby to prevent further advance of the drill. The arrangement 54 includes a rod 55 extending axially through the tubes 27,38. The end 56 of the rod 55 nearest to the drill bit serves as a probe. The other end 56A of the rod connects with a positionally adjustable hole depth adjustment unit 57 including a depth adjustment locking screw 58 and a trip hook 59. This trip hook 59 is arranged to be engageable with a start/stop lever 60 of the drill. The probe 55 effectively serves as the depth gauge in that its position relative to the tube 27 is used to determine the drilling depth. In operation, the advance of the drill relative to the tubes 27,38 during the drilling of a hole progressively moves a trip lever 60 carried by an extension to the drill on/off lever, schematically shown at 61 into operational contact with the trip hook 59. Further advance of the drill causes the trip to displace the trip lever to displace the on/off lever of the drill to its drill switching off position.

Once the drill has been mounted to the support part 8B the apparatus is positionally set so that the drill bit or other tool is correctly set so as to produce a hole at the required place. This operation involves, for example, bodily positioning the complete apparatus so that the drill bit is set to the correct vertical plane/line. After which the support 8 is heightwise adjusted relative to the column 2 by means of the wing nut assemblies 32 and is locked to the column at the desired height. Figure 3 shows a relatively low level setting.

The toggle lever mechanism 41 is then released so that the tension spring arrangement 42 is able to exert a sufficient tension upon the assembly of the tubes 38, yoke arrangement 39, and the drill 43 that the latter is urged in the direction towards the column to bring the bit tip into contact with the surface to be drilled. The precise position of the tip point can be checked and any positional adjustments that may be necessary are made.

The depth gauge arrangement 54 is then set to the required depth of hole to be drilled. After which the drill is switched ON.

As is conventional for electric drills of the kind suitable for mounting in the cradle 8 the conventionally provided ON/OFF switches are located in

the handle of the drill.

The previously mentioned toggle like lever 48 is displaced in the direction of the arrow 49 to switch-ON the drill and to hold it in its switched-ON setting.

Since the apparatus of the invention is clearly required to be relatively portable when in use and when folded the apparatus is provided with carrying and positioning handles 62.

For convenience, of indicating the direction of relative movements of components of the apparatus of the invention arrow headed lines without references have been introduced in the Figures 3, 4 and 5.

Claims

1. A foldable/stowable support apparatus for carrying a support assembly (8) for carrying a hand holdable machine such as a drill (43) or the like in such a manner that when the drill or the like is in use the operational axis of the drill or the like is located at a required position and orientation with respect to a surface to be drilled or otherwise machined, the support assembly (8) having arrangements by means of which it is possible to limit the movement of the tool of the machine such as a drill bit to a permissible drilling depth in a workpiece, characterised in that the apparatus includes a support column (2), support elements (9,10) pivotable between a closed/stowed position and a support column supporting position which enables the support column to mount the support assembly (8) for carrying a machine (43) for use in corners of a room or the like, the support assembly (8) also including first and second parts (8A, 8B) relatively displaceable with respect to each other, with one part (8A) being adapted for selective displacement lengthwise of the column (2) and with the other part (8B) being adapted for selective displacement towards and away from the one part (8A); said two support elements (9,10) being, pivotally connected with the column (2) and positionally located at right angles with respect to each other and the column, and in that the support assembly (8) is further characterised by arrangements (29) for enabling the fine positional adjustment of the support assembly (8) lengthwise of the support column (2), by arrangements (55-61) for enabling automatic machine operation cut-off on completion of a predetermined extent of machine operation such as the drilling of a hole of a particular predetermined depth, and by a tension producing arrangement (42) for exerting a displacement force between the first and second parts

(8A,8B) for maintaining machine operational contact with its associated workpiece.

2. A foldable/stowable support apparatus as claimed in claim 1, and characterised in that the first part (8A) of the support assembly includes a slide assembly (29) adapted for selective displacement lengthwise of the support column (2), and a pair of tubular members (27,28) projecting from the slide assembly (29), and in that the second part (8B) of the support assembly includes a pair of tube members (38) slidable lengthwise of the tubular members (27,28), and mounting means (39) for enabling mounting of the machine thereto.
3. A foldable/stowable support apparatus as claimed in claim 1 or 2, and characterised in that an adjustable probe member (55) is provided for enabling the extent of travel of the second assembly part (8B) relative to the first assembly part (8A) to be selectively set to a desired extent of advance, and in that means (57-61) are provided for automatically switching-Off the machine (43) when the probe (55) has indicated that the preset advance has been attained.
4. A foldable/stowable support apparatus as claimed in claim 3, and characterised in that a toggle action lever arrangement (50) is provided for restraining the support assembly second part (8B) against advancing movement during the setting of the probe position.
5. A foldable/stowable support apparatus as claimed in any one of the preceding claims, and characterised in that the support elements (9,10) are retained in their column support positions by a member (21) which is pivotally mounted to one support element (9) and is adapted so to latch with the other support element (10) that when it is latched the support elements (9,10) are arranged perpendicular to each other, the arrangement being such as to facilitate the positioning of the apparatus into a corner between two walls or the like.

Patentansprüche

1. Zusammenlegbares, wegräumbares Gerüst mit einem Support (8) für eine Handbohrmaschine (43) oder eine ähnliche Maschine, welcher diese an der gewünschten Stelle und in der gewünschten Ausrichtung bezüglich der Fläche, in welcher gebohrt oder die andersartig bearbeitet werden soll, hält, wobei der Support (8) Mittel aufweist, welche den Vorschub der Ma-

schine, wie zum Beispiel einer Bohrmaschine, und damit die Eindringtiefe des Bohrers begrenzt,

dadurch gekennzeichnet, dass das Gerüst einen Ständer (2) mit schwenkbaren Stützen (9,10) aufweist, welche zum Wegräumen voll zusammenklappbar sind oder spreizbar sind, so dass sie den Support (8) für die Bohrmaschine (43) halten und dieser in einer Ecke eines Raumes einsetzbar ist, dass der Support (8) zwei Teile (8A,8B) umfasst, die relativ zueinander verschiebbar sind, wobei der Teil (8A) eine einstellbare Verschiebung entlang des Ständers (2) erlaubt und Teil (8B) vom Teil (8A) weg- oder zum Teil (8A) hinbewegt werden kann, dass die schwenkbar mit dem Ständer (2) verbundenen Stützen (9,10) mit dem Ständer einen rechten Winkel einschliessen, dass der Support (8) mit einem Schlitten (29) versehen ist, mit dem er entlang dem Ständer (2) einstellbar ist, dass Mittel (55-61) angebracht sind, welche die Bohrmaschine selbsttätig abschalten, wenn ein Bohrloch eine vorbestimmte Tiefe erreicht hat und, dass zugaussübende Mittel (42) angebracht sind, welche die Teile (8A,8B) relativ zueinander verschieben und dadurch die Maschine an das Werkstück pressen.

2. Zusammenlegbares, wegräumbares Gerüst nach Anspruch 1, dadurch gekennzeichnet, dass der erste Teil (8A) des Supports einen Schlitten umfasst, der eine Einstellung entlang des Ständers (2) ermöglicht, dass am Schlitten (29) Rohre (27,28) befestigt sind und dass der zweite Teil (8B) des Supports Rohre (38) umfasst, die teleskopisch gleitend auf den Rohren (27,28) lagern und mit einem Klemmbügel (39) ausgerüstet sind, der die Bohrmaschine klemmend hält.
3. Zusammenlegbares, wegräumbares Gerüst nach den Ansprüchen 1 oder 2, dadurch gekennzeichnet, dass ein einstellbar gehaltener Stab (55) angebracht ist, der den gewünschten Vorschub des Teiles (8B) bezüglich des Teiles (8A) begrenzt, und dass Mittel (57-61) angebracht sind, welche die Bohrmaschine (43) abschalten, wenn der als Sonde dienende Stab (55) anzeigt, dass die gewünschte Bohrtiefe erreicht ist.
4. Zusammenlegbares, wegräumbares Gerüst nach Anspruch 3, dadurch gekennzeichnet, dass am Support ein Kniehebelsatz (50) angebracht ist, mit dessen Hilfe der zweite Teil (8B) gegen die Vorschubkraft gesperrt wird während der Einstellung des als Sonde die-

nenden Stabes (55).

5. Zusammenlegbares, wegräumbares Gerüst nach einem der Ansprüche 1-4, dadurch gekennzeichnet, dass die Stützen (9,10) in der Betriebslage, bei der sie den Ständer stützen, durch eine Plattform (21) gehalten werden, welche schwenkbar an einer Stütze (10) gelagert ist und auf der anderen Stütze (9) einschnappend gehalten ist, so dass die Stützen senkrecht zueinander verlaufen und ermöglichen, dass das Gerüst in einer Ecke zwischen zwei Wänden aufgestellt wird.

Revendications

1. Appareil de support pliable/escamotable destiné à supporter un dispositif de support (8) pour une machine pouvant être tenue à la main telle qu'une perceuse (43) ou une machine similaire, de manière telle que, lorsque l'on utilise la perceuse ou machine similaire, l'axe opérationnel de la perceuse ou machine similaire est situé dans une position et une orientation requises par rapport à une surface à forer ou à usiner d'une autre manière, le dispositif de support (8) présentant des dispositifs au moyen desquels il est possible de limiter le déplacement de l'outil, de la machine telle qu'une perceuse, à une profondeur de perçage admissible, dans une pièce d'oeuvre,

caractérisé en ce que l'appareil comprend d'une colonne de support (2), des éléments de support (9, 10) capables de pivoter entre une position fermée /escamotée et une position de support de la colonne, qui permettent de supporter le dispositif de support (8) afin de supporter une machine (43) devant être utilisée dans les angles d'une pièce ou d'un espace similaire, le dispositif de support (8) comprenant également une première et une seconde pièces (8A, 8B) que l'on peut déplacer relativement l'une par rapport à l'autre, une pièce (8A) étant adaptée pour se déplacer de manière sélective le long de la colonne (2) et l'autre pièce (8B) étant adaptée pour se déplacer de manière sélective en se rapprochant et en s'éloignant de la pièce (8A) ; lesdits deux éléments de support (9, 10) étant reliés à la colonne (2), avec possibilité de pivoter, et étant situés en formant un angle droit l'un par rapport à l'autre et par rapport à la colonne,

et en ce que le dispositif de support (8) est par ailleurs caractérisé par des dispositifs (29) permettant de régler avec précision la position du dispositif de support (8) le long de la colonne de support (2), à l'aide de dispositifs (55 à 61) prévus pour permettre l'arrêt

automatique de la machine, une fois achevée l'opération de la machine sur une certaine mesure prédéterminée, telle que le perçage d'un alésage d'une longueur prédéterminée, et à l'aide d'un dispositif produisant une tension (42) destiné à exercer une force de déplacement entre la première et la seconde pièces (8A, 8B) afin de maintenir la machine en contact opérationnel avec la pièce d'oeuvre correspondante.

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2. Appareil de support pliable/escamotable tel que revendiqué dans la revendication 1, et caractérisé en ce que la première pièce (8A) du dispositif de support comporte un dispositif de glissement (29) adapté pour un déplacement sélectif dans le sens longitudinal de la colonne de support (2), et une paire d'éléments tubulaires (27, 28) faisant saillie à partir du dispositif de glissement (29), et en ce que la deuxième pièce (8B) du dispositif de support comprend une paire d'éléments tubulaires (38) capables de glisser le long des éléments tubulaires (27, 28) et des moyens de montage (39) capables de recevoir la machine.

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3. Appareil de support pliable/escamotable tel que revendiqué dans la revendication 1 ou la revendication 2, et caractérisé en ce qu'un élément palpeur (55) réglable est prévu pour permettre de régler sélectivement la course de déplacement de la seconde pièce (8B) du dispositif par rapport à la première pièce (8A) sur une distance choisie, et en ce que des moyens (57 à 61) sont prévus pour arrêter automatiquement la machine (43) lorsque le palpeur (55) a indiqué que la distance pré-réglée a été parcourue.

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4. Appareil de support pliable/escamotable tel que revendiqué dans la revendication 3, et caractérisé en ce qu'un dispositif à levier articulé (50) est prévu pour empêcher la seconde pièce (8B) du dispositif de support d'opérer un mouvement d'avance pendant le réglage de la position du palpeur.

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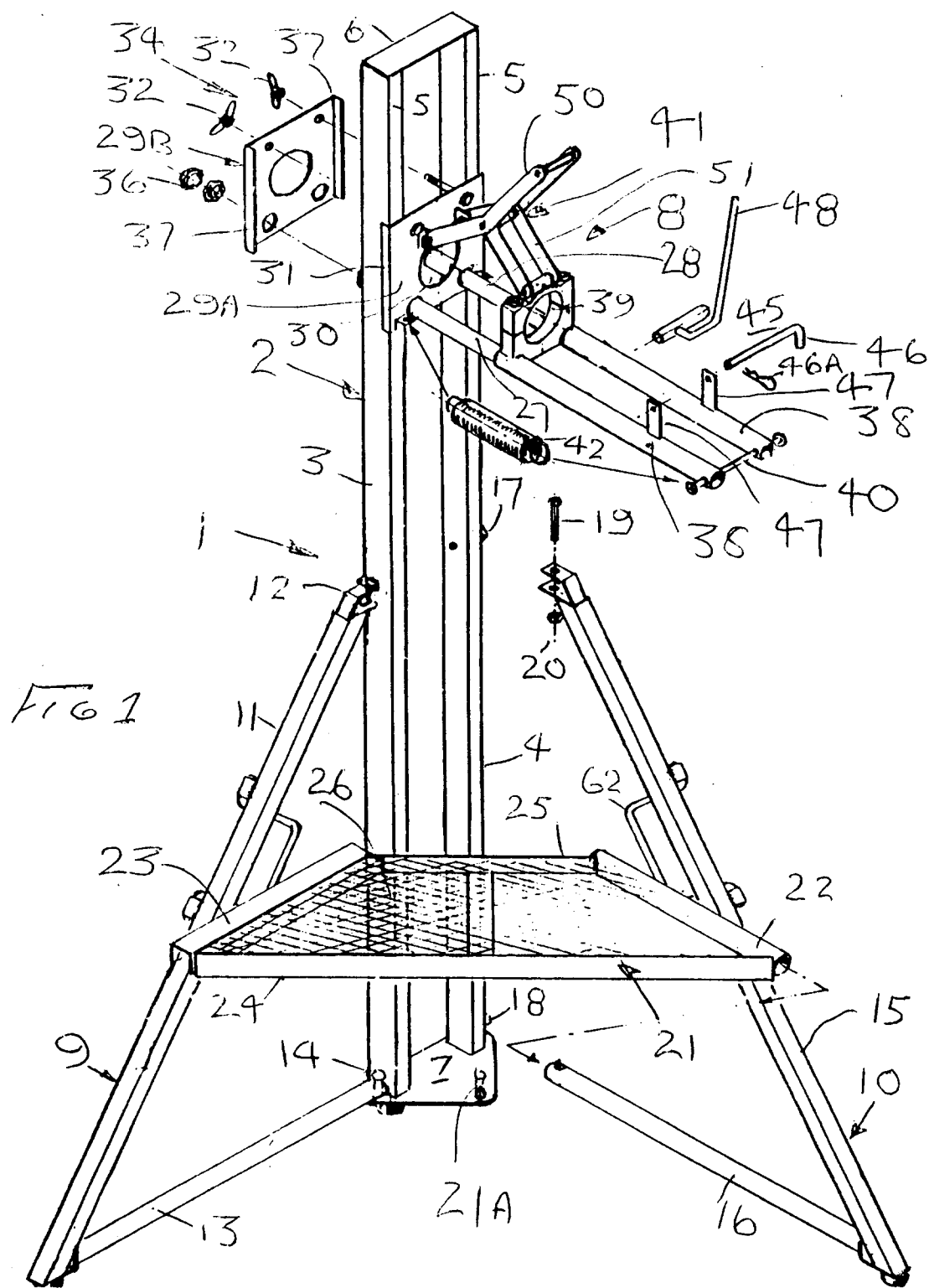
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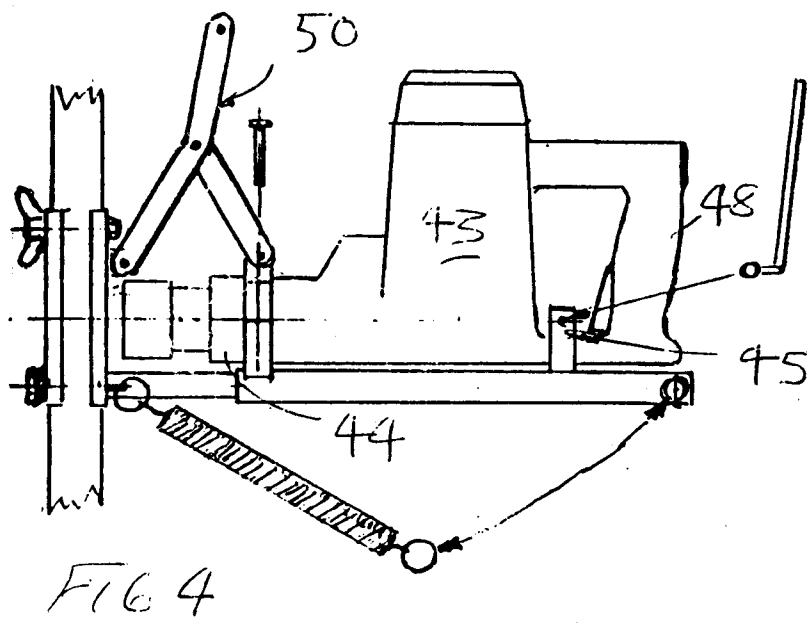
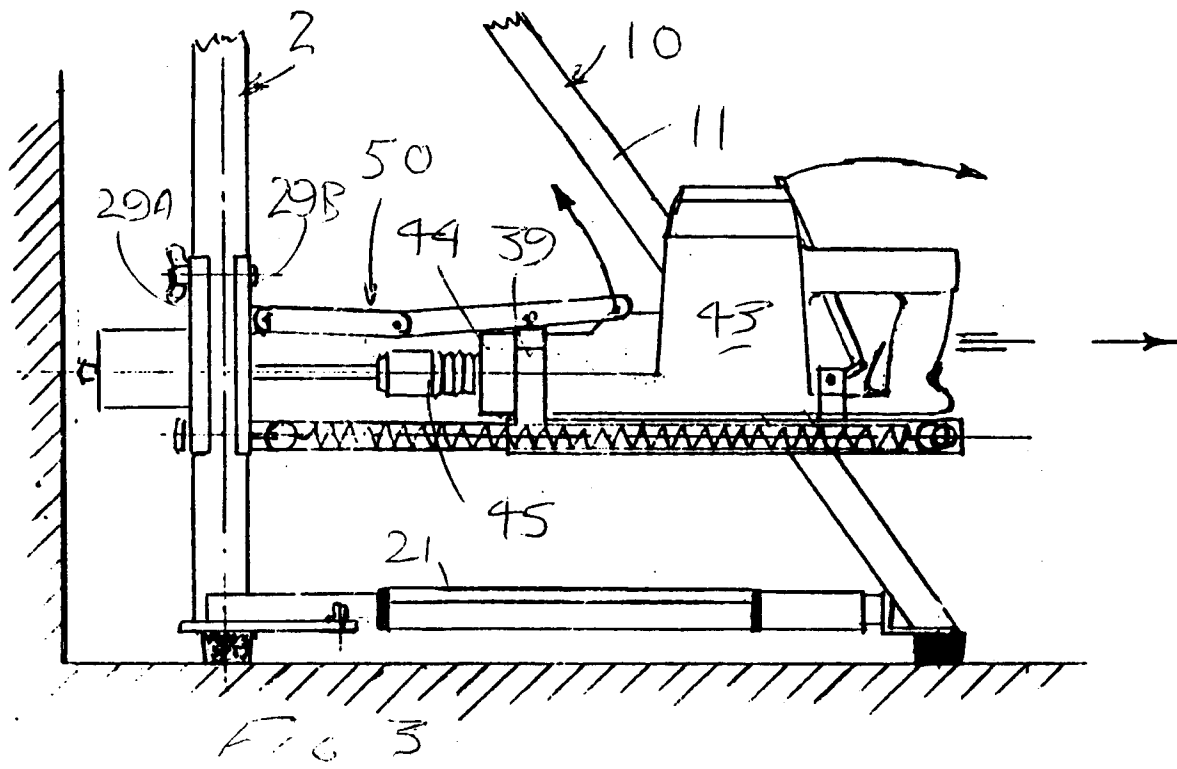
5. Appareil de support pliable/escamotable tel que revendiqué dans l'une quelconque des revendications précédentes, et caractérisé en ce que les éléments de support (9, 10) sont retenus dans leur positions de support de la colonne par un élément (21) qui est monté en pivot sur un élément de support (9) et qui est adapté de manière à s'encliqueter avec l'autre élément de support (10) de sorte que, lorsqu'il est encliqueté, les éléments de support (9, 10) sont disposés perpendiculairement l'un par

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rapport à l'autre, la disposition étant telle qu'elle facilite le positionnement de l'appareil dans un angle compris entre deux murs ou deux éléments similaires.





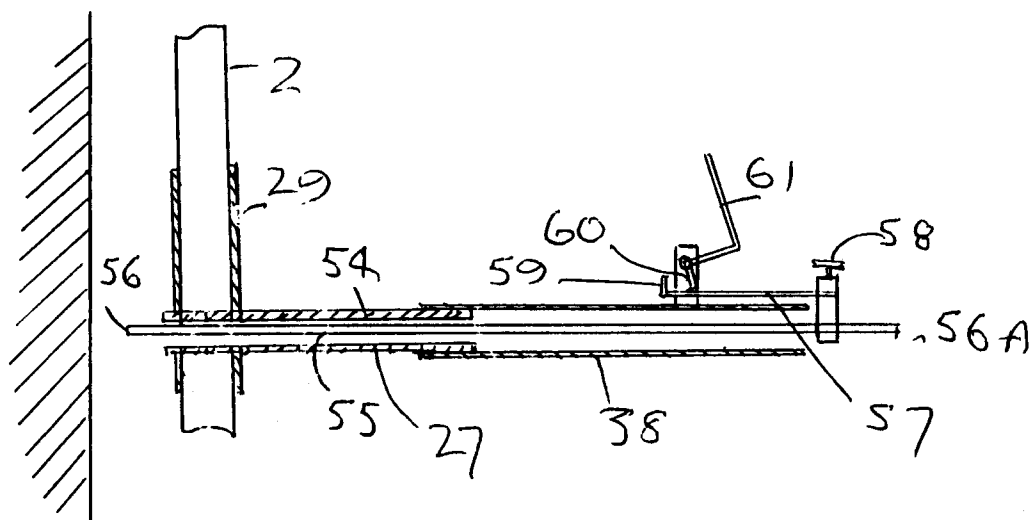
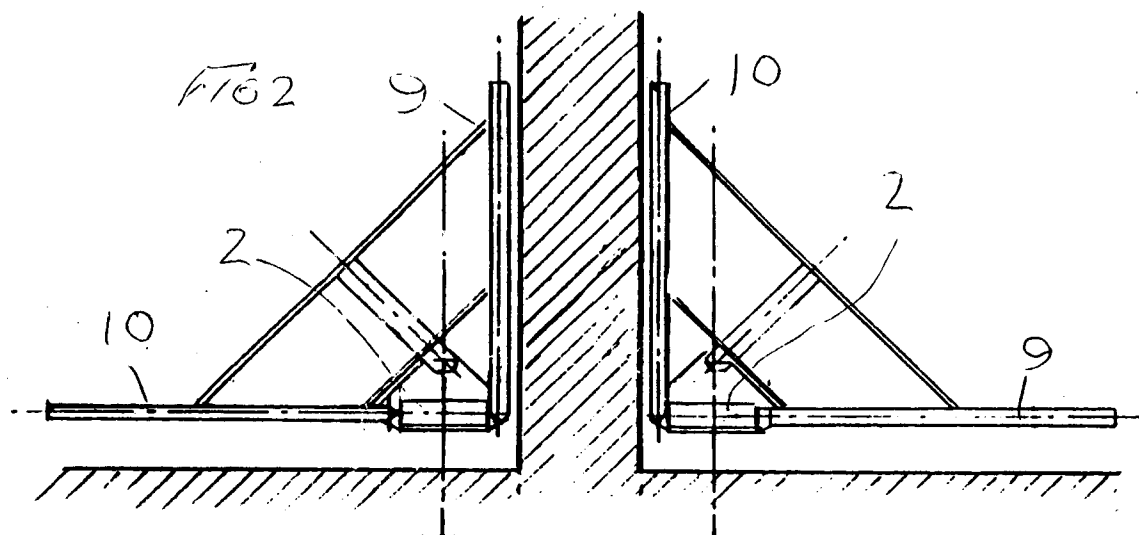


Fig 5