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ARRANGEMENT FOR A HYDRAULIC LIFTING TABLE.

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References cited :
DE-A- 1 756 270
SE-A- 8 602 983

References cited :
SE-B- 450 486
US-A- 2 862 689
US-A- 2 937 852
US-A- 4 534 544

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Description

The present invention relates to an arrangement for a hydraulic lifting table of the scissor type with two pairs of mutually attached scissor arms, which at their ends are connected by means of pivots and rollers to a lower frame section and an upper table section, and are mutually and operatively connected to the pivotable connection, comprising a power transmission arrangement for raising and lowering the table section, wherein the power transmission arrangement contains for each pair of scissor arms a hydraulic cylinder pivotally mounted at said connection and wherein the piston rod of the hydraulic cylinder is so arranged as to interact during the raising and lowering movement of the lifting table via a roller and a shaft with at least two guide curves arranged in conjunction with the common bearing shaft for the scissor arms and operatively connected to the respective scissor arm.

A lifting table of the kind mentioned in the above introductory part is disclosed by SE-A-450 486. This lifting table has a combination of a roller and a guiding shaft cooperating with a quodding curve and an oval opening in one of the scissor arms respectively.

DE-A-1 756 270 discloses a scissor type lifting table in which lifting torque is transferred from a hydrantic cylinder to a scissor arm via a roller engaging an oval opening in a pressing piece connected to the scissor arm. These known lifting tables, however, are not suitable for the abovementioned use since their minimum height is not small enough for the mentioned kind of use.

In the case of those lifting tables which are intended to be used, for example in conjunction with a hand-operated truck or in vehicle workshops, for raising a vehicle to a comfortable working height for repair work to be carried out, it is of value for the lifting table to exhibit the minimum height possible. This is determined partly by the dimensions of the power transmission arrangement, since this must be enclosed by the table in its collapsed position, and partly by the mechanical construction of the table with regard to its intended carrying capacity and stability. On the other hand the lifting capacity of the table is determined by the maximum pressure available from the power transmission arrangement.

One objection of the present invention is to make available a hydraulic lifting table in which the above-mentioned disadvantages have been eliminated, which is made possible in that those scissor arms, which are pivotally connected to the frame section, consist of a beam of "U"-section open towards the top, in which the appropriate power transmission arrangement is arranged and that a transverse shaft is arranged on the upper end of the piston rod, bearing those rollers cooperating with the curves, which curves are provided onto cam members located within the U-section of the scissor arms.

According to a special characteristic of the invention the guide curves operatively connected to said scissor arm are linearly sloping. Thereby is achieved partly a compact and stable construction partly that the power transmission arrangement has a moment arm after only a short distance of movement along the guiding curves for achieving a lifting movement of the scissor arms.

The invention is described in more detail below with reference to the accompanying drawing, in which Fig. 1 is a perspective view illustrating an embodiment of a lifting table in accordance with the present invention. Fig. 2 illustrates a plan view from the side showing details of the interaction of the power transmission arrangement with the guide curves.

The designations 1a, 1b and 2a, 2b are used in Fig. 1 in respect of scissor arms connected together by means of shafts 1c, 2c for a hydraulic lifting table of the scissor type, which consists of a lower frame section 3 and an upper table section 4. The scissor arms 1a, 2a are mutually connected at their lower ends to a shaft 5 and are pivotally mounted about same relative to the frame section 3. The upper ends of the scissor arms 1b, 2b are pivotally mounted in the table section 4. The lower end of the scissor arm 1b and the upper end of the scissor arm 2b are executed with rollers 6, of which those at the upper end of the scissor arm 2b are not shown in the drawing. The purpose of the rollers 6 is to facilitate the movement of the aforementioned ends of the scissor arms along the frame sections and table sections, 3 and 4.

Each of the scissor arms 1a and 2a consists of a beam of 'U'-section open towards the top, in which there is arranged, pivotally mounted on the shaft 5, a hydraulic cylinder 7a and 7b for raising and lowering of the table section 4. Each of the scissor arms 1b and 2b is manufactured from two flat steel profiles connected together at their respective ends by means of cross-pieces.

Since the power transmission from the cylinders 7a and 7b to the pairs of scissor arms 1a, 1b and 2a, 2b are executed in an identical fashion, only the power transmission belonging to the cylinder 7a is described below with reference to Fig. 2.

Three rollers 9a, 9b and 9c are arranged on a common shaft 10 at the outer end of the piston rod 8a of the hydraulic cylinder 7a. The roller 9b interacts with a guide curve 11b, which is operatively connected to the scissor arm 1b. The rollers 9a and 9c, which are arranged to either side of the roller 9b in order to achieve a symmetrical load distribution, interact with two guide curves 11a and 11c, which are operatively connected to the scissor arm 1a. The guide curves 11a and 11c constitute a linear gradient, and their primary function is to provide a moment arm, designated by 12 in Fig. 2, between the point of engagement of the roller 9b with the guide curve 11b and the common angle of pivoting 1c of the pair 1a,

1b of scissor arms.

The fact that the force necessary for lifting is divided between two hydraulic cylinders 7a, 7b enables these dimensions to be kept within limits such that the lifting table has a very small minimum height. A contribution to this is also made by the characterizing feature of the invention, that is to say that the guide curves 11a, 11b and 11c against which the lifting force acts are arranged at the common support for the respective pair of scissor arms.

Claims

1. Arrangement for a hydraulic lifting table of the scissor type with two pairs of mutually attached scissor arms (1a, 1b; 2a, 2b), which at their ends are connected by means of pivots and rollers to a lower frame section (3) and an upper table section (4), and are mutually and operatively connected to the pivotable connection (5) to the frame section (3), comprising a power transmission arrangement (7, 8, 9, 11) for raising and lowering the table section (4), wherein the power transmission arrangement (7, 8, 9, 11) contains for each pair of scissor arms (1a, 1b; 2a, 2b) a hydraulic cylinder (7a; 7b) pivotally mounted at said connection (5) and wherein the piston rod (8a, 8b) of the hydraulic cylinder (7a; 7b) is so arranged as to interact during the raising and lowering movement of the lifting table via a roller (9a, 9b, 9c) and a shaft (10) with at least two guide curves (11a, 11b, 11c) arranged in conjunction with the common bearing shaft (1c, 2c) for the scissor arms (1a, 1b; 2a, 2b) and operatively connected to the respective scissor arm (1a, 1b; 2a, 2b), **characterized** in that those scissor arms (1a, 2a), which are pivotally connected to the frame section (3), consist of a beam of "U"-section open towards the top, in which the appropriate power transmission arrangement (7, 8, 9, 11) is arranged and that a transverse shaft (10) is arranged on the upper end of the piston rod (8a), bearing those rollers (9a, 9b, 9c) cooperating with the curves, which curves are provided onto cam members located within the U-section of the scissor arms.
2. Arrangement according to claim 1, **characterized** in that the guide curves (11a, 11c) operatively connected to said scissor arm (1a, 2a) containing the hydraulic cylinder are linearly sloping.

Patentansprüche

1. Anordnung für einen hydraulischen Hubtisch vom

Scherentypus mit zwei Paaren von gegenseitig aneinander angreifenden Scherenhebeln (1a, 1b; 2a, 2b), die an ihren Enden mittels Gelenken und Rollen mit einem unteren Rahmenteil (3) und einem oberen Tischteil (4) verbunden sind und die gegenseitig mit einem Gelenkanschluß (5) an Rahmenteil (3) in Wirkverbindung stehen, umfassend eine Kraftübertragungseinrichtung (7, 8, 9, 11) zum Anheben und Absenken des Tischteiles (4), wobei die Kraftübertragungseinrichtung (7, 8, 9, 11) für jedes Scherenhebelpaar (1a, 1b; 2a, 2b) einen Hydraulikzylinder (7a; 7b) aufweist, der an dem genannten Anschluß (5) gelenkig gelagert ist, wobei die Kolbenstange (8a, 8b) des hydraulischen Zylinders (7a; 7b) derart angeordnet ist, daß sie während der Hub- und Senkbewegung des Hubtisches über eine Rolle (9a, 9b, 9c) und eine Achse (10) mit wenigstens zwei Kurvenführungen (11a, 11b, 11c) zusammenwirkt, die in Verbindung mit der gemeinsamen Lagerachse (1c, 2c) für die Scherenhebel (1a, 1b; 2a, 2b) angeordnet ist und mit den jeweiligen Scherenhebeln (1a, 1b; 2a, 2b) in Wirkverbindung steht, dadurch gekennzeichnet, daß jene Scherenhebel (1a, 2a), die mit dem Rahmenteil gelenkig verbunden sind, aus einem Balken mit nach oben offenem U-Profil bestehen, in welchem die entsprechende Kraftübertragungseinrichtung (7, 8, 9, 11) angeordnet ist, und daß eine Querachse (10) am oberen Ende der Kolbenstange (8a) angeordnet ist, die jene Rollen (9a, 9b, 9c) trägt, welche mit den Kurvenführungen zusammenarbeitet, wobei die Kurvenführungen an Nockenelementen vorgesehen sind, die innerhalb des U-Profiles der Scherenhebel angeordnet sind.

2. Anordnung gemäß Anspruch 1, dadurch gekennzeichnet, daß die Kurvenführungen (11a, 11c), die mit dem Scherenhebel (1a, 2a), welcher den Hydraulikzylinder enthält, in Wirkverbindung stehen, linear abfallen.

Revendications

- 1.- Dispositif de table élévatrice hydraulique du type ciseaux comprenant deux paires de bras de ciseaux (1a, 1b.; 2a,2b) reliés à leurs extrémités par des pivots et des galets à une partie inférieure formant socle (3) et à une partie supérieure formant table (4), et reliées entre elles et de façon fonctionnelle par une liaison pivotante (5) au socle (3), ledit dispositif comprenant un dispositif de transmission de puissance (7,8,9,11) pour relever et abaisser la partie formant table (4), le dispositif de transmission de puissance (7,8,9,11) comprenant pour chacune des paires des bras en ciseaux (1a,1b ; 2a,2b), un cylindre hydraulique (7a,7b) monté de façon pivotante sur

ladite liaison (5a), la tige de piston (8a,8b) du cylindre hydraulique (7a,7b) étant disposée de telle façon qu'elle entraîne le mouvement de soulèvement et d'abaissement de la table élévatrice, par l'intermédiaire d'un galet (9a,9b,9c) monté sur un arbre (10), et d'au moins deux cames curvilignes (11a,11b,11c) disposées conjointement avec l'arbre d'articulation commun (1c,2c) des bras en ciseaux (1a,1b,2a,2b) et reliées de façon fonctionnelle aux bras en ciseaux respectifs (1a,1b ; 2a,2b) caractérisé :

en ce que ces arbres en ciseaux (1a,2a), qui sont reliés de façon pivotante à la partie formant socle (3), comprennent un profilé à section en "U" ouvert vers le haut, dans lequel est logé le dispositif de transmission de puissance approprié (7,8,9,11) et

en ce qu'un arbre transversal (10) est disposé sur l'extrémité supérieure de la tige de piston (8a), cet arbre supportant les galets (9a,9b,9c) coopérant avec les cames, lesquelles cames sont situés à l'intérieur de la section en U des bras en ciseaux.

2.- Dispositif selon la revendication 1, caractérisé :

en ce que les cames curvilignes (11a,11c) reliées de façon efficace au dit arbre en ciseaux (1a, 2a) contenant le cylindre hydraulique, sont inclinées de façon linéaire.

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FIG1

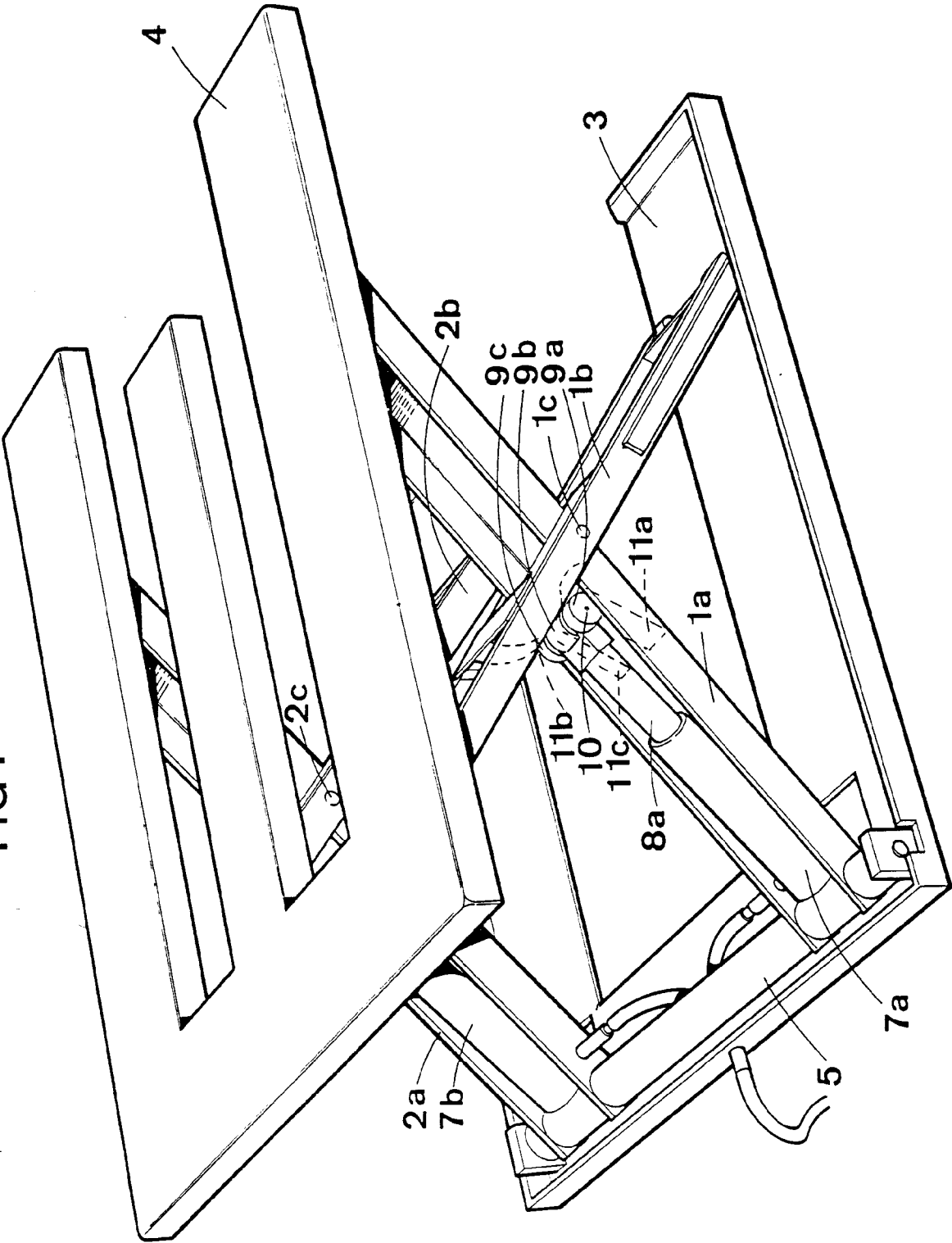


FIG 2

