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(54) Apparatus for manual lifting and moving of loads around and near the earth base, in particular well covers or manhole covers

(57) Apparatus for lifting and moving by means of manual power of objects around and near the earth base that is easily transportable, characterized in that two levers with supporting points on the earth base, which stand in an angle and opposite each other relative to the perpendicular line from the earth base, with minor exertion of force, in any case by means of a transmission, are moved towards each other in such a way that the angle in between is decreased, as a result of which hoisting lines that are connected to these levers and which form an angle relative thereto and which, in their turn, are connected to the object that is to be lifted, are pulled upwards, after which the object by a tilting movement of the apparatus relative to the supporting points or movement of the supporting points on the earth base can be moved.

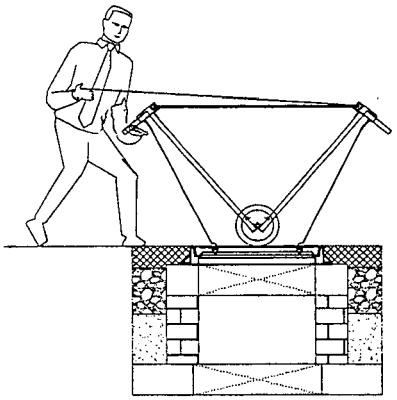

figure 3b.

EP 2 452 913 A1

Description

[0001] Compact and easily transportable mechanical apparatus with the object of making possible the move by manual power of heavy loads, for instance well covers, around and near the earth base, in a manner that is ergonomically warranted.

Explanation

[0002] In the professional practice and in private operations objects regularly have to be moved around and near the earth base, for instance the removal and placing back of well covers and operations involving paving materials.

[0003] Location and weight of the parts that are to be moved often provide ergonomic drawbacks. The lifting of heavy object leads to many physical complaints and incapacity for work. The dimension and shape of well covers and the risk of falling into the shaft after removal of the cover lead to movements that are ergonomically unwarranted, while also the risk of injury to the feet is involved. In the case of well covers also plays a role, that these are often stuck to the edge of the well because of rust or the inclusion of dirt, so that extra exertion of force is required in order to loosen these.

[0004] The appliances that are available for a part are voluminous, for a part are less easy to handle, or are suitable only in special situations. The practice therefore is, that these are often not used although these have indeed been made available for use within the organisation. The professional practice carries with it that strong men would rather exert some extra force than use a complicated appliance. This however results in overburdening of the body, which, in the course of time or in the case of unexpected movements (for instance the shooting loose of a well hook) can lead to physical problems, illness absenteeism, or incapacity for work.

[0005] Starting point in the development of the invention was that the simplicity has to invite the use thereof, that the apparatus can easily be adapted or is self-adjusting to a large variety of objects that are to be lifted, for instance for various types of well covers each having its own shape and own type of points of application.

description of invention

[0006] The invention makes use of the principle that tilting with a long lever in combination with small move of a load relative to a balance point requires little force. The apparatus consists of one or more levers that are supported by the ground surface directly or by means of other parts and one or more hoisting lines or hoisting braces that are fastened to the object that is to be lifted and moved and are connected to the lever. The connecting point, the point of application to the object and the supporting point of the lever or levers form an imaginary triangle. Tilting of the lever or levers relative to their supporting point in opposite direction of the point of application to the object leads to heightening of the point of application and by means thereof of the object. The apparatus according to the invention combines two or more of these sets with fixed albeit pivotable supporting points relative to each other with a mechanical aid to move the levers towards each other, by means of which the exertion required for the lifting of the object is reduced to a minimum. A movement in a direction sidewards can be achieved by having the supporting points of the levers contact wheels, gliding elements. rails or other means.

[0007] The ergonomic advantage is in particular achieved, when, by means of the correct choices of lengths of lever, angles of lifting, hoisting braces and moving aid in the supporting point, all adapted to the object that is to be moved, operation can take place in a correct posture.

Technical description

[0008] The mobile apparatus for the manual lifting and moving of loads around and near the earth base can for example have the following embodiment, see drawing. Figure 1 shows a side view with schematically indicated a hoist set (1) connected to the fastening points (2) to two levers (5), each consisting of two legs (13) that are rotatably connected to a mounting plate with handgrip (4). The legs of the levers are pivotably connected to supporting points (17) to which the axles (8) of the wheels (7) are fastened. The legs of the levers are fixed in the folded out position by the expanding device (15), which is connected to one of the legs at a rotating point (14) and connects to the other leg to a coupling connection (16). The hoisting lines (6) are movably coupled to the mounting plate with hand grip (4) in fastening point (3) in such a way that the length of the hoisting line can be adjusted and they are fastened in the hoisting eye (10) of the cover (11) by means of hook (9).

[0009] In elucidation of the operation here below follows a description of the professional practice and the application of the lifting apparatus according to the invention. In an operation a cast iron round well cover having a diameter of 76 cm and a weight of 86 kg has to be removed from the well edge. The cover has an individual height of ca 8 cm. The usual course of events is that one or two labourers hook well hooks into the cover, place the feet at both sides of the cover and lift the covers with strong exertion of force, step aside and lower the cover onto the ground. Placing back of the cover takes place in the same manner, whereby often the positioning of the cover requires extra pulling and lifting exertions.

[0010] When using the lifting apparatus this will be done in a different manner, namely as follows (See figure 3a to 3e.). Fig. 3a shows the apparatus in the folded up situation. The legs of the levers are folded out and locked by means of the expanding device and the levers are pulled apart, and the apparatus is placed above the well cover while the two wheels each are placed on either

side of the middle of the cover adjacent the cover. The hoisting lines are fastened to the cover by means of hooks. By means of the hoisting set connected in between the levers these are pulled towards each other by means of one hand, while the operator holds one of the levers at a hand grip. The cover is now lifted with a little exertion for the pulling of the hoist and the balancing of the apparatus, until the cover knocks against the expanding device in between both of the levers. By means of this it is prevented that the apparatus, together with the weight of the cover, gets out of balance relative to the supporting points, in this case the wheels. After this the cover can be wheeled away. By letting the hoist veer out and loosening the hooks of the hoisting lines the cover can be laid down in the intended place. Placing back of the cover is done in the reverse order, whereby the movability on the two wheels simplifies the positioning.

Claims

1. Apparatus for lifting and moving by means of manual power of objects around and near the earth base that is easily transportable, **characterized in that** two levers with supporting points on the earth base, which stand in an angle and opposite each other relative to the perpendicular line from the earth base, with minor exertion of force, in any case by means of a transmission, are moved towards each other in such a way that the angle in between is decreased, as a result of which hoisting lines that are connected to these levers and which form an angle relative thereto and which, in their turn, are connected to the object that is to be lifted, are pulled upwards, after which the object by a tilting movement of the apparatus relative to the supporting points or movement of the supporting points on the earth base can be moved.

2. Apparatus for lifting and moving by means of manual power of objects around and near the earth base that is easily transportable according to claim 1, **characterized in that** more than two levers are brought in a direction towards each other so that the angles therein between are decreased and by means of this the object that is to be lifted and/or moved is lifted by means of more than two hoisting lines.

3. Apparatus for lifting and moving by means of manual power of objects around and near the earth base that is easily transportable according to claims 1 and 2, **characterized in that** wheels, or in any case gliders, or in any case other constructions are connected to the supporting points that allow the moving by means of less exertion of force.

4. Apparatus for lifting and moving by means of manual power of objects around and near the earth base that is easily transportable according to claims 1, 2 and 3, **characterized in that** the lifting takes place by means of hoisting braces that are movably connected in the connecting points and **characterized in that** these, by means of their rigidity, also maintain the distance between the connecting points.

5. Apparatus for lifting and moving by means of manual power of objects around and near the earth base that is easily transportable according to claims 1, 2, 3 and 4, **characterized in that** the apparatus consists of only one lever with two legs being fixated in an angle, wherein the lifting and moving takes place by positioning the supporting points at both sides of the object that is to be lifted at some distance from the perpendicular line out of the centre of gravity of the object, tilting the lever in the direction of the perpendicular line, fastening the hoisting line or in any case hoisting brace between the connecting point to the object and to the lever and thereupon tilting the lever in the opposite direction, whereby connecting point and thereby the object move along a parabolic shaped path.

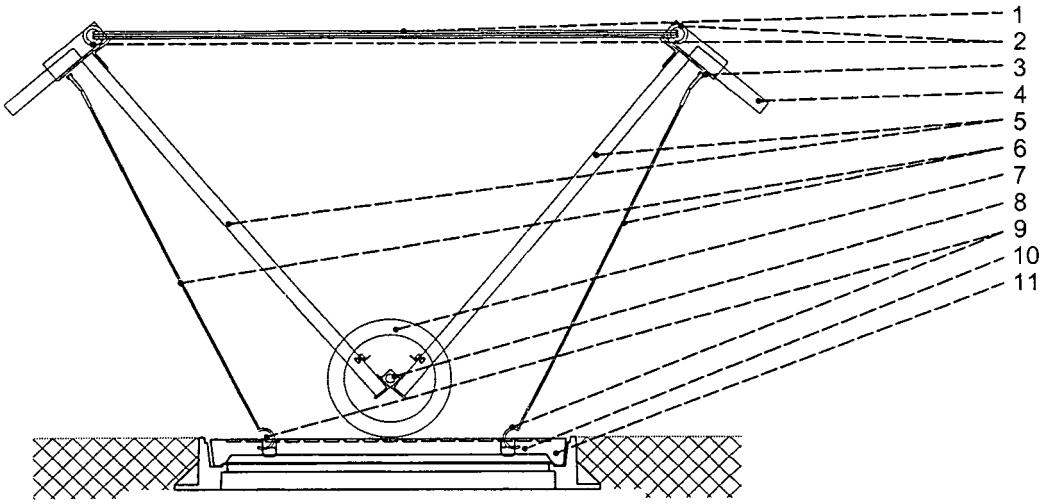

figure 1

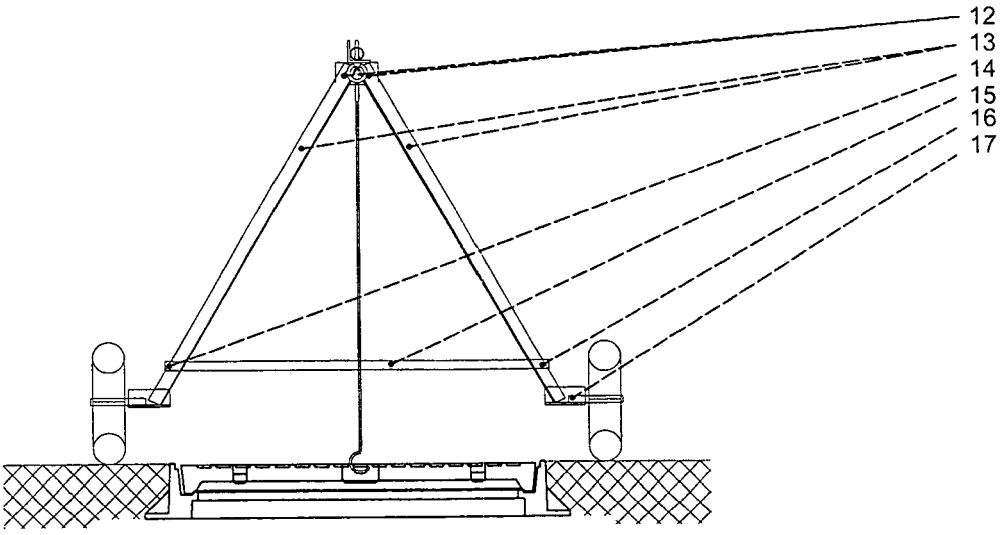

figure 2

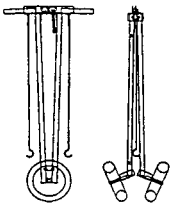

figure 3a.

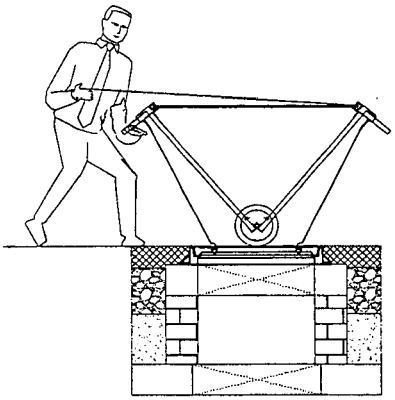

figure 3b.

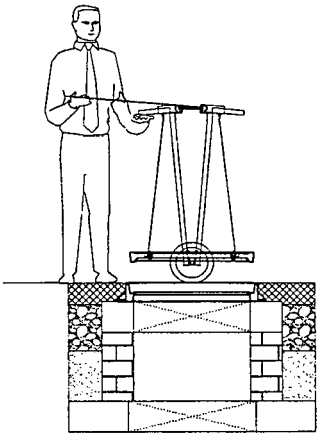

figure 3c.

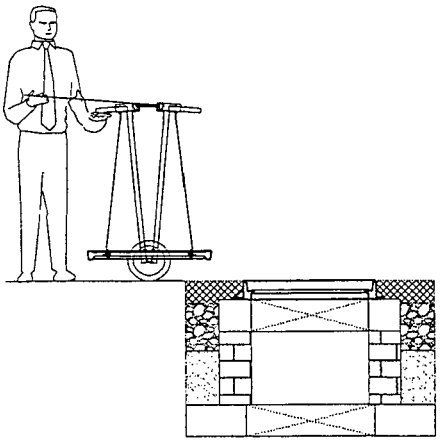

figure 3d.

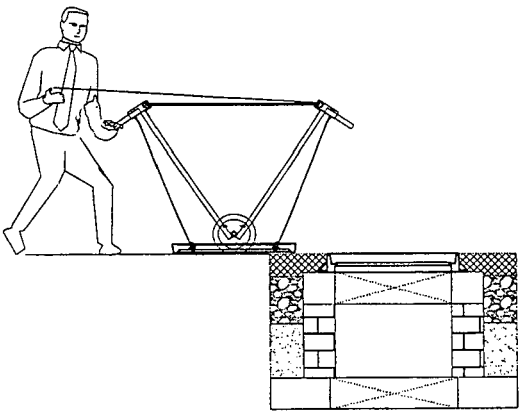

figure 3e.

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EUROPEAN SEARCH REPORT

Application Number
EP 11 00 5976

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 43 33 246 A1 (LEMKE KLAUS [DE]) 6 April 1995 (1995-04-06) * the whole document *	1-4	INV. B66F19/00
A	EP 0 254 752 A1 (MOCHIZUKI MOTOR [JP]) 3 February 1988 (1988-02-03) * abstract; figures 2a,2b,3,18a,19a *	1-4	
A	JP 48 060353 U (UNKNOWN) 1 August 1973 (1973-08-01) * figures *	1	

TECHNICAL FIELDS SEARCHED (IPC)

B66F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	24 April 2012	Verheul, Omiros

CATEGORY OF CITED DOCUMENTS

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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24-04-2012

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