

(19) **DANMARK**

(10) **DK/EP 3706959 T3**



(12) **Oversættelse af  
europæisk patentskrift**

Patent- og  
Varemærkestyrelsen

- 
- (51) Int.Cl.: **B 25 F 1/00 (2006.01)** **B 05 C 17/01 (2006.01)** **B 66 F 1/06 (2006.01)**  
**B 66 F 13/00 (2006.01)**
- (45) Oversættelsen bekendtgjort den: **2022-04-11**
- (80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2022-01-26**
- (86) Europæisk ansøgning nr.: **19715264.8**
- (86) Europæisk indleveringsdag: **2019-02-07**
- (87) Den europæiske ansøgnings publiceringsdag: **2020-09-16**
- (86) International ansøgning nr.: **NO2019000003**
- (87) Internationalt publikationsnr.: **WO2019160424**
- (30) Prioritet: **2018-02-16 NO 20180251**
- (84) Designerede stater: **AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**
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- (54) Benævnelse: **Håndholdt løfte-/nivelleringsværktøj**
- (56) Fremdragne publikationer:  
**CN-A- 102 815 641**  
**DE-U1-202012 004 735**  
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# DESCRIPTION

## Field of invention

[0001] The invention relates to a hand tool more specifically to hand operated jacking tool that can be used for a number of task like lifting and levelling of objects, tightening of ropes or straps, separation of things etc.

## Background

[0002] A caulking gun is well known in the tool industry and has been on the market for several decades. They include a pumping or jacking mechanism for example described in US 4009804. This mechanism is cheap and easy to produce and has minimal friction. In view of the invention according to claim 1, CN102815641A does not disclose that the tool is hand-held and the jacking mechanism is a caulking gun jacking mechanism. Other examples of devices are also shown in US5622355A, US2012/266428A1 or DE202012004735U1.

[0003] In the building industry the need for a combination of lifting, holding and levelling of objects like doors, windows or beams is often encountered. A toe jack may be used for this purpose, but is only found in heavy duty versions. A toe jack is usually a jack with two fixed outer feet and a middle foot that can be jacked in an upward and sometimes downward direction. Up to now it has not been possible to find a lightweight hand held toe jack that can be operated with one hand. This invention represents a cheap and easy solution to this problem.

## Summary of invention

[0004] The invention describes a hand held jacking/levelling-tool comprising a jacking shaft and a frame moving relative to each other during jacking action, and a caulking gun jacking mechanism providing the jacking action. It further comprises two outer legs fastened to one of the frame and the jacking shaft. The jacking tool further comprises one middle leg fastened to the other of the frame and the jacking shaft, and is positioned between a left and right outer leg. The jacking-tool further comprises a foot fastened at a right angle to each leg and pointing in the same directions. The jacking action causes the jacking shaft to move downward through the frame.

## Brief description of the drawings

[0005] For better understanding of the invention the device will be described with reference to

the figures. Like numerals describe like parts in the different figures. The figures illustrates examples of the invention

**Fig. 1a, b, c and d**, shows a jacking shaft with a middle foot, and also two outer feet to be fastened to the frame from different perspectives.

**Fig. 2a, b and c**, shows the jacking shaft and three legs fastened to a caulking gun jacking mechanism.

**Fig. 3** shows an embodiment wherein the middle foot has a support plate attached.

**Fig. 4** shows an embodiment wherein the middle foot ha a rear support attached.

**Fig. 5** shows an embodiment wherein all three feet having the same shape.

**Fig. 6** shows a jacking shaft with jagged edges.

#### **Detailed description of preferred embodiments.**

**[0006]** In this text we shall assume that the hand held jack is standing upright with the feet down. Left and right is as seen from the rear. The handle is at the rear and the feet are pointing forward. We will not describe the caulking gun jacking mechanism in detail as this is well known to a skilled person.

**[0007]** The invention describes a hand held jacking/levelling-tool comprising a jacking shaft 2 and a frame 3 moving relative to each other. The jacking tool further comprises a jacking mechanism 1 providing jacking action between the jacking shaft and frame 3. Furthermore the jacking tool comprises two outer legs 5, 7 fastened to one of the frame 3 and the jacking shaft 2, and one middle leg 6 fastened to the other of the frame and the jacking shaft, and being positioned between the outer legs 5, 7. The jacking tool also comprises a foot (8, 9, 10) fastened at a right angle to each leg 5, 6, 7 and pointing in the same directions,

**[0008]** In other words we have two configurations of the legs 1. One leg fastened to the jacking shaft and two fastened to the frame. 2. Two legs fastened to the jacking shaft and one fastened to the frame. In configuration 1 the jacking shaft 2 and middle leg 6 is integrated with each other. Whilst in configuration 2 the difference between the legs and the shaft becomes apparent.

**[0009]** The relation between the feet, legs, jacking shaft and frame is depicted in **fig. 1a-d** and configuration 2 is not shown.

**[0010]** A preferred embodiment of the jacking mechanism 1 is a caulking gun jacking mechanism as shown in different perspectives in **fig. 2a-c**. This is very light weight and has

almost no friction. Almost all energy spent operating a handle 4 will be transferred to movement of the jacking shaft 2. The cross section of the jacking shaft may be square, rectangular, circular or oval. In a preferred embodiment the jacking shaft is a rounded flat bar. The cross section of such a jacking shaft is a rounded rectangle with a shorter rear and front side. The jacking shaft has the same cross section along its entire length. Obviously the jacking shaft is oriented with the longer sides of the cross section parallel with a rear to front direction.

**[0011]** However the caulking gun mechanism may slip when subjected to vibrations or chocks. This can be mitigated by using small teeth, a jagged edge or similar shapes on a rear and / or front side of the jacking shaft 2, as shown in fig. 6. Normally it would be the rear side of the jacking shaft which engages with the jacking mechanism. The jagged edge should have shapes corresponding to jacking parts in the caulking gun jacking mechanism. The shaft may have jagged edges on one or both of the front and rear side.

**[0012]** In a preferred embodiment the middle leg is fastened to the jacking shaft. This is the simplest configuration due to the construction of the caulking gun jacking mechanism. When operating the jacking mechanism the jacking action causes the middle leg 6 fastened to the jacking shaft 2 to move away from the frame 3. If the middle leg is fastened to the frame the left and right leg must be fastened to the jacking shaft. This puts restrictions on the movement of the jacking shaft because the middle leg would come into conflict with the jacking shaft and/or outer legs. Hence this is a less preferable embodiment.

**[0013]** In another embodiment the jacking mechanism comprises mating threads on the jacking shaft and a nut fastened to the frame. In yet another embodiment the jacking mechanism comprises a pitch rack on the jacking shaft. A pinion of suitable configuration must be connected to the rack or nut in the respective embodiments. These two embodiments may easily be powered by hydraulics, electricity or pneumatics.

**[0014]** In one embodiment the hand held jacking-tool is used for tightening a rope. For this purpose the middle foot 9 has an indent 11a, 11b on each side, preferably close to the leg describing half a circle and wherein each of the left 8 and right 10 foot has a corresponding indent 12b, 12a on their respective left and right sides, as seen in fig. 1d. If a rope is looped under the middle foot 9 and over the outer feet 8, 10, then the rope will be tightened if the middle leg is pushed downward. To ease the threading it is advantageous if an initial position comprises the middle foot being positioned closer to the frame than the left and right foot. A strap may also be tightened with or without the indents. A distance between the feet will allow easy threading of ropes or straps.

**[0015]** In one embodiment an upper part of the frame including the jacking mechanism and jacking handle is rotably mounted to a lower part of the frame and may rotate around the jacking shaft. This feature is simple to include if the jacking shaft is round.

**[0016]** In another embodiment the handheld jacking/levelling-tool has a support plate (14) attached in same plane as the feet as shown in fig. 3. The support plate may surround the two

outer feet. The support plate will distribute the weight to a wider area and provide increased stability. In another embodiment, the middle foot 9 is provided with a rear support (13) as shown in fig. 4. The rear support is a plate attached to the rear of the middle foot and extends towards the sides in the same plane as the feet. Fig. 5 shows an embodiment with three feet of same shape.

**Inventory****[0017]**

1. 1 Jacking mechanism
2. 2 Jacking shaft
3. 3 Frame
4. 4 Handle
5. 5 Left leg
6. 6 Middle leg
7. 7 Right leg
8. 8 Left foot
9. 9 Middle foot
10. 10 Right foot
11. 11a, b Right and left indent on middle foot
12. 12a, b Indents on right and left feet
13. 13 Rear support
14. 14 Support plate

**REFERENCES CITED IN THE DESCRIPTION****Cited references**

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**Patent documents cited in the description**

- US4009804A [0002]
- CN102815641A [0002]
- US5622355A [0002]
- US2012266428A1 [0002]
- DE202012004735U1 [0002]

## Patentkrav

1. Håndholdt løfte-/nivelleringsværktøj omfattende:

5 en løftestang (2) og en ramme (3), der bevæger sig i forhold til hinanden under en løftehandling,

en fugemassepistolløftemekanisme (1), der tilvejebringer løftehandlingen, hvor

to ydre ben (5, 7) er fastgjort til en af rammen (3) og løftestangen (2),

10 et midterben (6) er fastgjort til den anden af rammen og løftestangen og er anbragt mellem det ydre ben (5, 7),

en fod (8, 9, 10) er fastgjort vinkelret på hvert ben (5, 6, 7) og peger i samme retning,

hvor løftehandlingen får løftestangen (2) til at bevæge sig nedad gennem rammen (3).

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2. Løfte-/nivelleringsværktøj ifølge krav 1, **kendetegnet ved, at** de to ydre ben (5, 7) er fastgjort til rammen (3), og det ene midterben (6) er fastgjort til løftestangen (2).

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3. Løfte-/nivelleringsværktøj ifølge krav 1, **kendetegnet ved, at** en støtteplade (14) er fastgjort til midterfoden og omgiver begge de to ydre fødder.

4. Løfte-/nivelleringsværktøj ifølge krav 1 og 2, **kendetegnet ved, at** midterfoden har en bagunderstøtning (13), der strækker sig i det samme plan som midterfoden.

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5. Løfte-/nivelleringsværktøj ifølge krav 1, **kendetegnet ved, at** løftestangen er en afrundet flad stang.

30

6. Løfte-/nivelleringsværktøj ifølge krav 1, **kendetegnet ved, at** en startposition omfatter, at midterfoden er anbragt tættere på rammen end den venstre og den højre fod.

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7. Løfte-/nivelleringsværktøj ifølge krav 1, **kendetegnet ved, at** midterfoden har en fordybning (11a, 12a) på hver side nær ved det ben, der beskriver en

halvcirkel, og hvor hver af den venstre (8) og den højre (10) fod har en tilsvarende fordybning (11b, 12b) på deres respektive højre og venstre side.

5 **8.** Løfteværktøj ifølge krav 1, **kendetegnet ved, at** alle fødder har det samme tværsnit.

10 **9.** Løfteværktøj ifølge krav 1, **kendetegnet ved, at** løftestangen har et tværsnit som en afrundet rektangel med en kortere bag- og forside, og hvor de længste sider er parallelle med en retning fra bagerst til forrest.

**10.** Løfteværktøj ifølge krav 1, **kendetegnet ved, at** løftestangen har en riflet kant på en eller begge sider.

# DRAWINGS

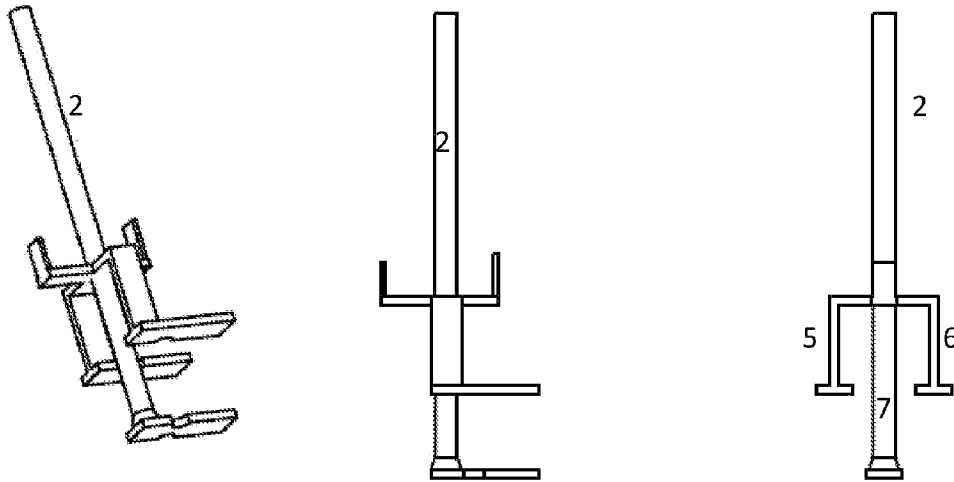


FIG. 1a, b and c

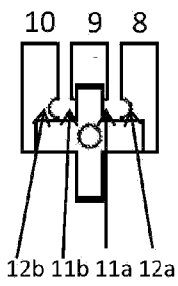


FIG. 1d

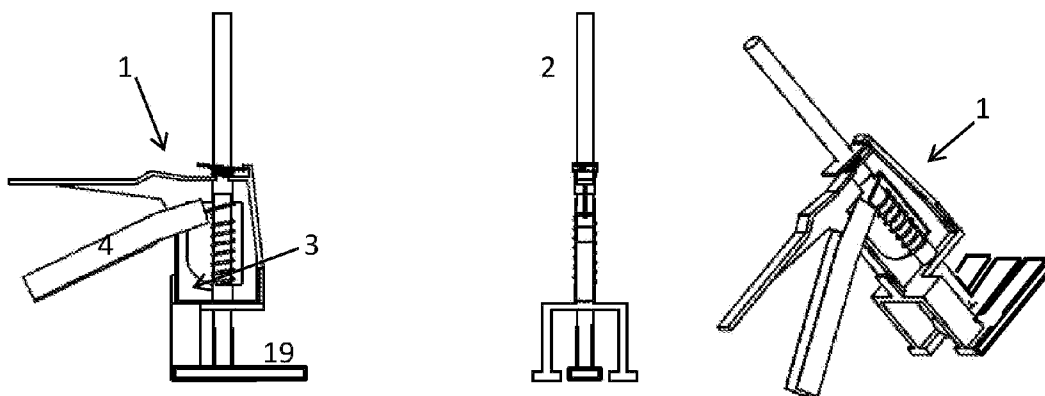


FIG. 2a, b and c

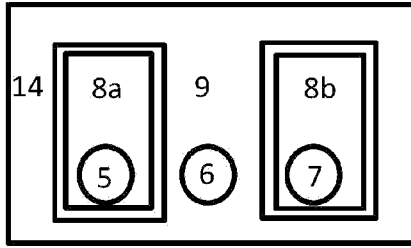


FIG. 3

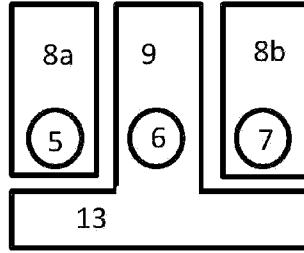


FIG. 4

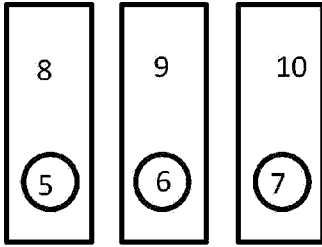


FIG. 5

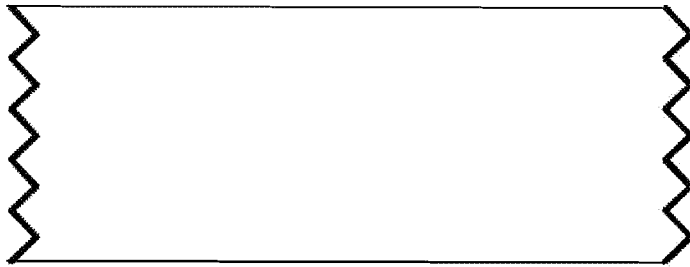


FIG. 6