

April 21, 1959

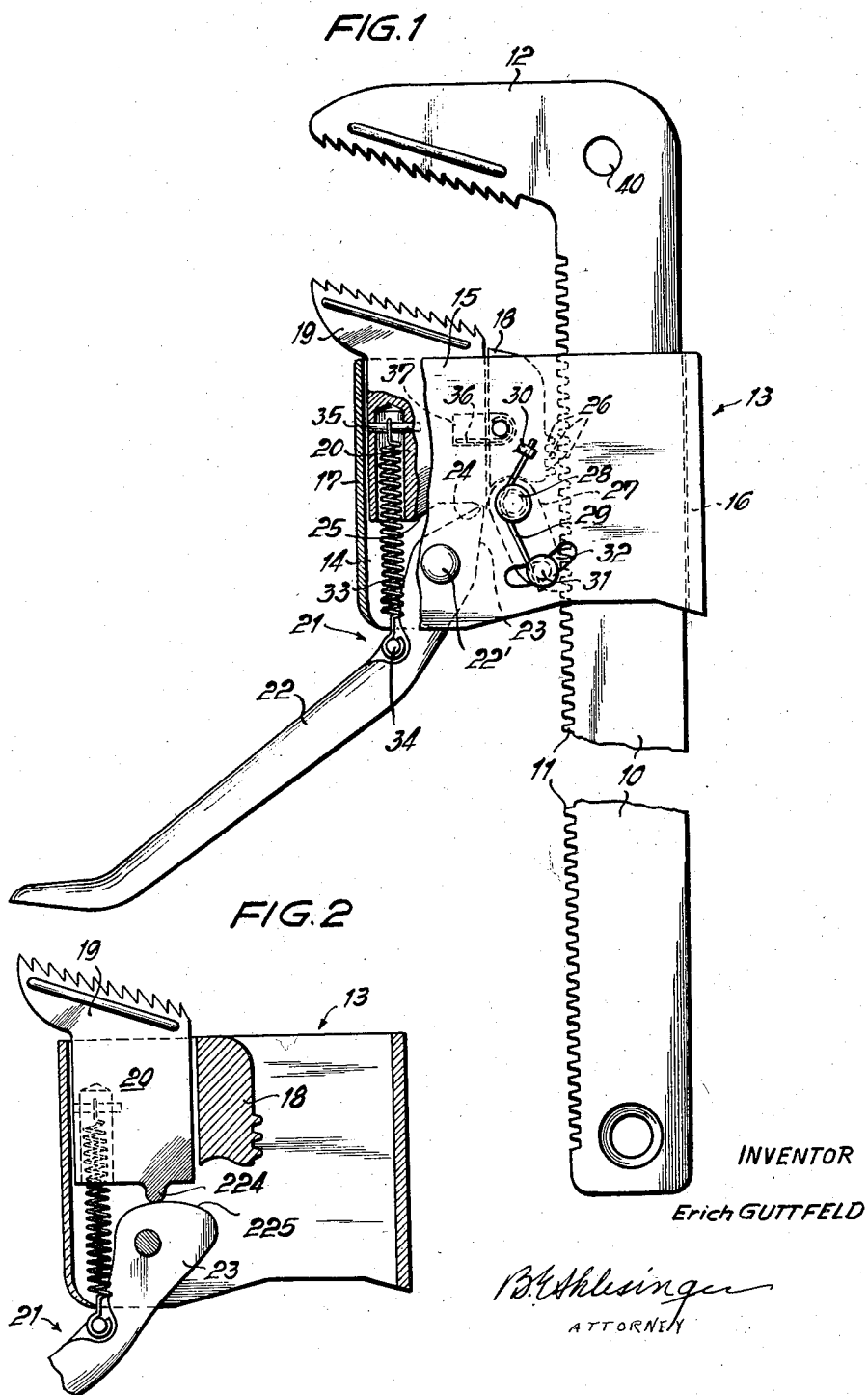
E. GUTTFELD

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CAM-LEVER ACTUATED, SLIDABLE JAW HAND TOOL

Filed Dec. 26, 1956

5 Sheets-Sheet 1



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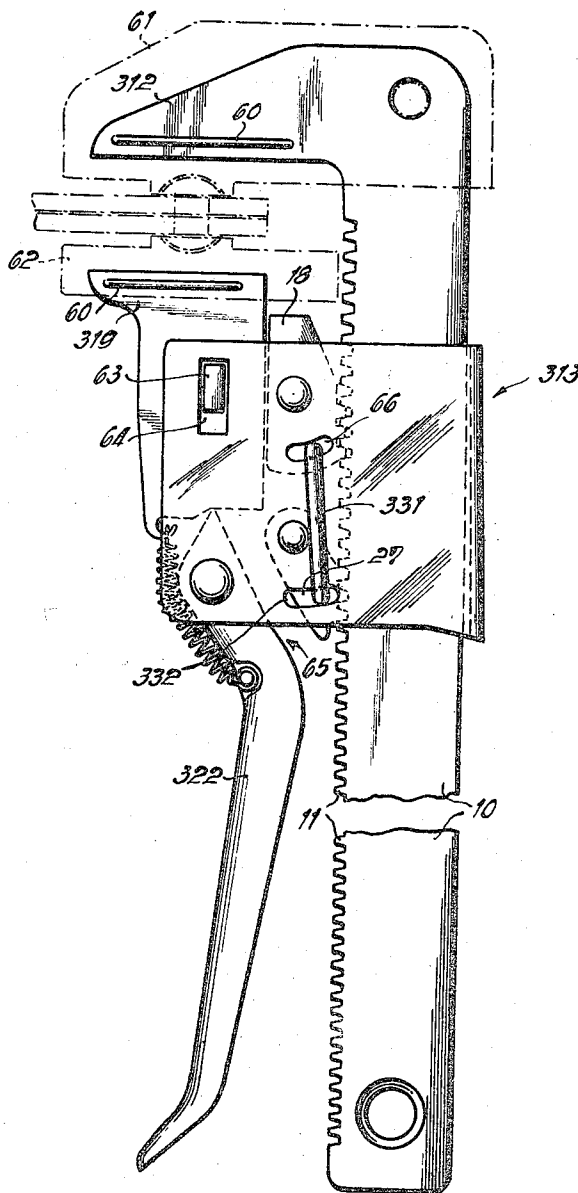
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FIG. 3



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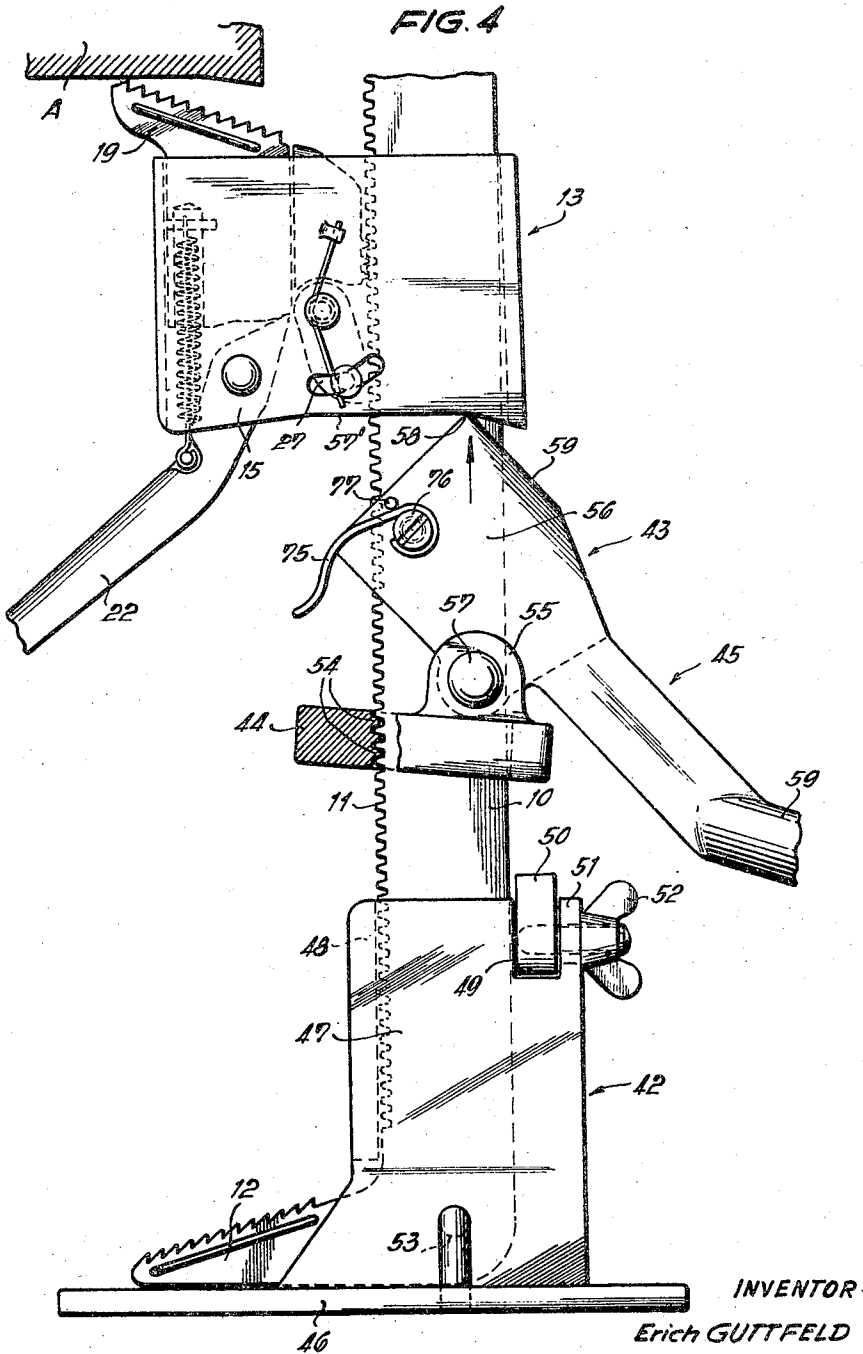
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CAM-LEVER ACTUATED, SLIDABLE JAW HAND TOOL

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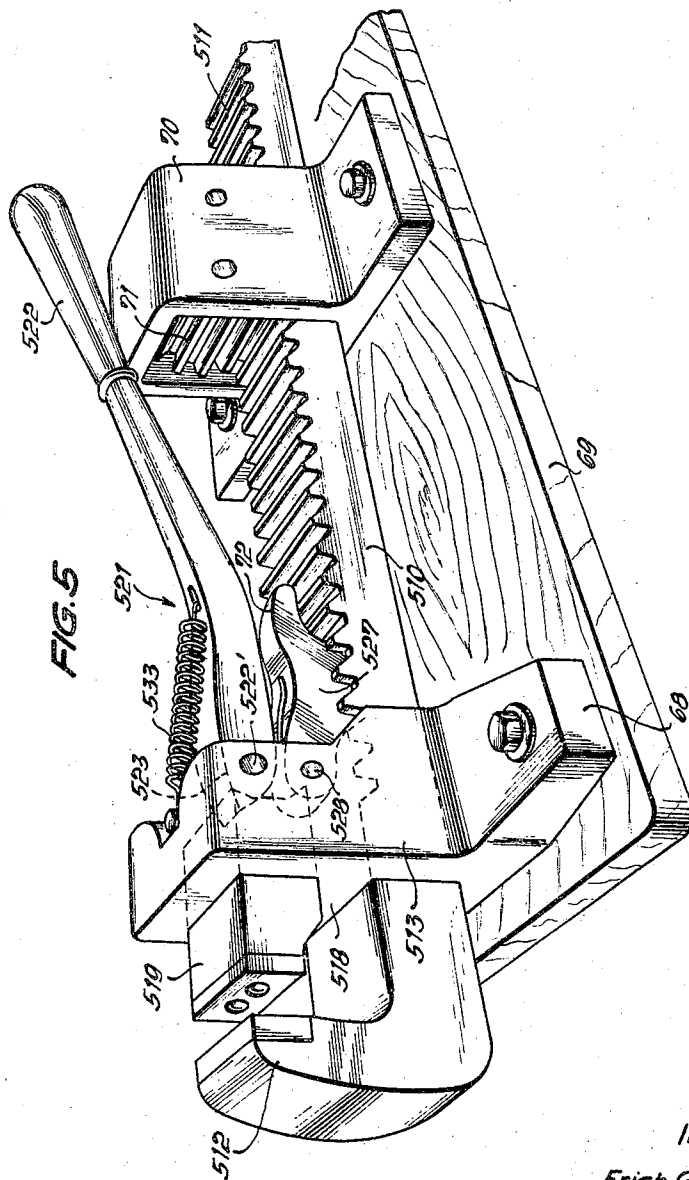
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CAM-LEVER ACTUATED, SLIDABLE JAW HAND TOOL

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CAM-LEVER ACTUATED, SLIDABLE JAW HAND TOOL

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FIG. 6

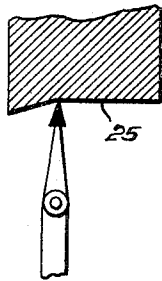


FIG. 7

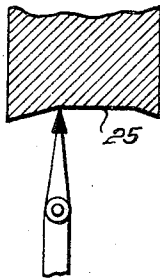


FIG. 8

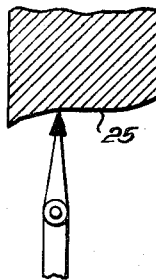


FIG. 9

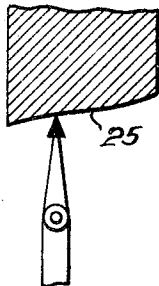


FIG. 10

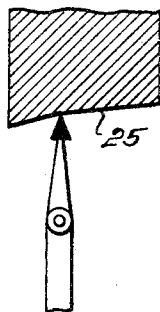


FIG. 11

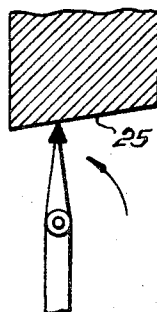


FIG. 13

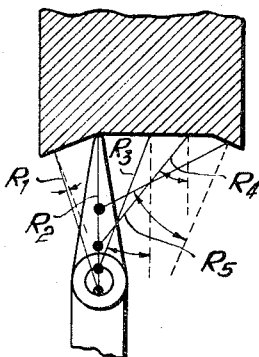
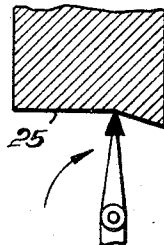


FIG. 12



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CAM-LEVER ACTUATED, SLIDABLE JAW HAND TOOL

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Application December 26, 1956, Serial No. 630,523

11 Claims. (Cl. 81—139)

My invention relates to a cam-lever actuated, slidable jaw hand tool, and more particularly to a convertible implement capable of alternative use either as a gripping tool or as a jack at the option of the operator.

The objects of my invention are to provide an implement of the character indicated which is of simple and rugged structure and capable of easy manipulation in a manner producing an extremely high pressure with a minimum of physical effort on the part of the operator; to provide a gripping tool which may be used as an adjustable wrench or as pliers or as a vise but may be easily converted for use as a jack by the incorporation therein of two simple gadgets.

Further objects of my invention will appear from a detailed description of various embodiments of my invention following hereinafter with reference to the accompanying drawings and the features of novelty will be pointed out in the appended claims. It is to be understood, however, that my invention is in no way restricted to such embodiments but is capable of numerous modifications within the scope of the appended claims. Moreover it is to be understood that the terms and phrases used in such detailed description have been chosen for the purpose of explanation rather than that of restriction or limitation of my invention.

In the accompanying drawings

Fig. 1 is an elevation of the novel gripping tool which may be used as an adjustable wrench, the frame accommodating the lower jaw member and the latter being shown partly broken away to more clearly illustrate the disposition of a restoring spring.

Fig. 2 is a sectional view of the frame shown in Fig. 1 equipped with a modified jaw member and with a modified hand lever.

Fig. 3 is an elevation of another gripping tool differing from that shown in Fig. 1 in various respects, the hand lever being shown in actuated position.

Fig. 4 is an elevation of the implement shown in Fig. 1 converted into a jack with the aid of two additional gadgets.

Fig. 5 is a perspective view of my novel implement constructed as a vise.

Figs. 6-12 are diagrammatic representations of various forms of the cam surface provided on one of the jaws, the cam follower cooperating therewith being diagrammatically indicated by an arrow.

Fig. 13 is a view similar to that of Fig. 7 drawn on an enlarged scale showing various positions of the cam follower relative to the cam.

The implement shown in Fig. 1 is a gripping tool capable of use as an adjustable wrench and convertible into the jack shown in Fig. 4. When fixed up as a gripping tool as shown in Fig. 1 the implement comprises a rack 10, preferably of rectangular cross section, provided, preferably throughout its length, with teeth 11 on its narrow front side and with a fixed jaw 12 projecting forwardly from its front side; a frame 13 composed of a

pair of substantially spaced parallel cheek plates 14 and 15 straddling the rack 10, of end plates 16 and 17 rigidly connecting the cheek plates 14 and 15 at their ends and of a core member 18 mounted between the cheek plates and rigidly connected thereto; a jaw member 19 having an actuated portion 20 which is slidably guided in the frame 13 for movement lengthwise of the rack 10 between the front side of the core member 18 and the back of the end wall 17; and a two-armed lever 21 mounted on a pivot 22' between the cheek plates 14, 15 of the frame 13, the lower arm 22 of lever 21 constituting a handle and its upper arm constituting an actuating portion 23. One of the two portions 20 and 23 forms a cam while the other one forms a cam follower. In the embodiment shown in Fig. 1 it is the actuated portion 20 of the jaw member 19 which is formed as a cam, whereas the actuating member 23 constitutes the cam follower being tapered and having a slightly rounded edge 24 which makes a substantially linear contact with the cam face, although strictly speaking the contact area is a narrow elongated zone which for sake of simplicity will be referred to hereinafter as a "line of contact." The ends of the pivot pin 22' rest in coaxial holes provided in the cheek plates 14 and 15 and are kept in place by rivet heads formed thereon.

The rearward end plate 16 of the frame 13 is slidably guided on the back of the rack 10, whereas the two cheek plates 14 and 15 are slidably guided on the broad sides of the rack 10. In this manner the frame 13 is mounted for relative guidance lengthwise of the rack 10. However, the frame is capable of a limited pivotal or tilting motion about the upper inner edge of the end wall 16. When the frame is turned about this edge in anti-clockwise direction with reference to Fig. 1 three teeth 26 provided on the back of the core member 18 will be brought into engagement with the rack teeth 11. Hence, the rack teeth 26 constitute detent means which may lock the frame 13 in any desired position on the rack 10.

In lieu of the teeth 26 or in addition thereto a locking dog 27 may be pivotally connected to the frame 13 in front of the rack 10 for engagement with the teeth 11 thereof. In the embodiment shown in Fig. 1 such locking dog is pivotally mounted between the cheek plates 14 and 15 on a pivot pin 28 extending through bores in the cheek plates and provided with rivet heads. The locking dog 27 is provided with three teeth for engagement with the rack teeth 11. A spring tends to keep the locking dog in engaging position. In the embodiment shown this spring is formed by a spring wire 29 wound around one of the pivot heads of the pin 28 and having one end held in fixed position by a tongue 30 punched out of the cheek plate 15 while the other end of the wire is bent around a pin 31 which is fixed to the end of the locking dog 27 and projects therefrom through a slot 32 provided in the cheek plate 15. The end of pin 31 projecting out of the slot may be used as a handle for disengaging the locking dog when it is desired to move the frame 13.

The cam face 25 is kept in engagement with the cam follower 24 by means of a helical spring 33 which is anchored to a pin 34 projecting from the lever arm 22 beneath the frame 13 and extends upwardly into a bore of the actuated portion 20 of the jaw member 19 and is secured to a transverse pin 35 extending through the bore. In addition to the spring 33 or in lieu thereof, a spring may be provided which is carried by one of the members 18, 19 and engages the other one of these members tending to urge the jaw member into engagement with the two-armed lever. In the embodiment shown, this spring is a leaf spring 36 having a bent end inserted in a recess provided in the front face of the core member 18 and secured in position by a pin while its other end extends

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into a recess 37 provided on the back of the jaw member 19. When the jaw member 19 is in its lowermost position relative to the frame 13 as illustrated in Fig. 1, the two recesses register. When the jaw member 19 is lifted, however, the leaf spring 36 will be bent and will tend to restore the jaw member.

The shape of the cam face 25 is an important feature of my invention. This cam surface may take various shapes some of which are shown in Figs. 6-12. In Fig. 13 I have illustrated various relative positions of the cam and the cam follower. These positions are indicated by the representation of the radius extending from the axis of the pivot pin 22' to the line of contact, such radius in its various positions being designated R1, R2, R3, R4 and R5. Moreover I have drawn dotted lines through the lines of contact which extend at right angles to the cam surface constituting normals thereto. Moreover I have indicated the acute angle included between the radius and the associated normal. The cam shown in Fig. 1 comprises a central horizontal section and downwardly and outwardly inclined adjoining sections. As a result, the normal extending through the line of contact includes a comparatively small angle with a radius extending from the axis of the pivot 22' through the line of contact. In fact, such angle is smaller than the friction angle within a substantial range of pivotal movement of the lever. The term "friction angle" is understood to define the minimum angle through which a plane supporting surface must be tilted in order to cause an object supported by the surface to slide under the effect of gravity. When the condition is complied with that the angle included between the radius R and the normal is smaller than the friction angle, the hand lever 22 will be locked in any adjusted position by the friction.

The gripping tool shown in Fig. 1 is used as follows: After the operator has disengaged the dog 27 from the rack teeth 11 he will shift the frame 13 on the rack 10 to thereby space the jaws 12 and 19 from each other a distance slightly exceeding the size of the article to be gripped. Then the jaws 12 and 19 are slipped over the article to be gripped and the operator will then shift the frame in a direction towards the fixed jaw 12 until the jaws have been brought into intimate contact with the article. In this operation the locking dog 27 will freely ride over the teeth 11 and the frame will be kept by the operator in such angular position as to cause disengagement of the teeth 26 from the teeth 11. As soon, however, as the article has been firmly gripped between the jaws 12 and 19, which may be provided with gripping teeth on the opposed faces, a continued effort on the part of the operator to move the frame 13 towards the jaw 12 will tilt the frame 13 about the upper inner edge of the end wall 16 to thereby cause engagement of the teeth 26 with the teeth 11. Hence, the frame will be now firmly held in position on the rack by the teeth 26 and by the locking dog 27.

The operator will now grip the handle 22 which is movable in a plane extending through the rack 10 and will press the same towards the rack thereby causing the cam follower 24 to move from the R5 position shown in Fig. 13 towards the R1 position. As a result, a lifting force is exerted on the jaw 19 which increases as the cam follower 24 approaches the R1 position. I have found that in this manner a gripping force in the order of one ton may be easily produced without any excessive physical effort.

In Fig. 2 I have illustrated a modification of the jaw 19, 20 and of the two-armed lever 21 shown in Fig. 1 in that the cam follower 224 is formed by the actuated portion 20 of the jaw member 19, whereas the cam surface 225 is provided on the upper shorter arm 23 of the two-armed lever 21. The frame 13 and the other elements of the gripping tool are identical with those described herein-

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above with reference to Fig. 1 and therefore are not illustrated in Fig. 2.

For the purpose of conversion of the gripping tool shown in Fig. 1 into a jack, the rack 10 is provided with a hole 40 at its upper end and two additional gadgets are provided which will now be described with reference to Fig. 4.

One of these gadgets comprises a foot 42 for carrying the rack 10 in inverted erect position, while the other gadget 43 comprises a frame 44 and a two-armed lever 45 pivotally connected thereto.

The foot 42 is composed of a bottom plate 46 adapted to be placed on the ground and a bracket 47 mounted thereon and shaped to accommodate the fixed jaw 12 of the rack 10. The bracket may be in the form of an upright channel member having arms spaced slightly in excess of the thickness of the rack 10, the lower portion of the web 48 of the channel member being cut away to permit introduction therethrough of the jaw 12. The arms of the channel member have registering recesses 49 adapted to accommodate a pivotal locking bar 50 having a pivot pin integral therewith which projects through a hole provided in an ear 51 of the bracket 47, a nut 52 being screwed on such threaded pivot pin, whereby the bar may be fixed in position. After loosening the nut 52 the operator may swing the bar upwardly, whereupon the rack 10 may be pulled out of the bracket 47 by movement towards the right with reference to Fig. 4. Moreover the arms of the channel member constituting bracket 47 may be provided with registering bores 53 which upon insertion of the rack 10 register with the bore 40 thereof permitting a pin to be introduced through the registering bores which may be secured in positioned by any suitable means.

The frame 44 of the gadget 43 is in the form of a flat rectangular frame having teeth 54 on the back of its front section for engagement with the teeth 11 of the rack 10. The side sections of the frame 44 are provided with upstanding ears 55 which are spaced from the broad sides of the rack 10. The two-armed hand lever 45 is bifurcated, its bifurcations 56 constituting the shorter arm of the lever and straddling the rack 10 and having a substantially rectangular shape, the lower corners extending between the rack 10 and the ears 55 and being connected with the latter by pivot pins 57. The common axis of the two pivot pins 57 extends through the rack, as will appear from Fig. 4. The upper corner of each of the two rectangular bifurcations 56 constitutes a cam follower 58 co-operating with a cam surface 57' formed at the bottom of the cheek plates 14 and 15 of the frame 13. Here again the cam surface is so shaped that a normal thereto extending through the cam follower 58 includes an acute angle with a radius extending from the axis of the pivot 57 through the follower 58, said angle being smaller than the friction angle within a substantial range of the pivotal movement of the hand lever 45.

The lower arm of the hand lever 45 is formed by a short bar 59 of circular cross section. If desired, the operator may place a short length of tube upon such rod 59 to extend the lever arm.

The operation of the jack illustrated in Fig. 4 is as follows: After the operator has withdrawn the frame 13 from the rack 10 shown in Fig. 1 and has turned the rack around with the fixed jaw 12 downwardly, he will place the rack 10 with the fixed jaw 12 into the foot 42 securing the same in position by holding down and fixing the swingable bar 50 and by introducing a pin through the bores 53. Then he will place the two frames 44 and 13 upon the rack 10 in the position shown in Fig. 4, moving the same all the way towards the bottom. Then he will bring the jack with the frame 13 beneath the object A to be lifted. The next step consists in lifting the frame 13 into contact with the object A. In that position the frame 13 will be held by the locking dog 27 engaging the

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teeth 11 of the rack 10. Then the operator will lift the hand lever 45 with the frame 44 pivoted thereto to the uppermost position in which the side 59 bears against the central portion of the cam face 57'. In this position the teeth 54 of the frame 44 will engage the teeth 11. Then the lifting operation commences being effected by the operator by a depression of the lever arm 59 causing the follower 58 to move towards the position shown in Fig. 4, thereby lifting the frame 13 and the object A resting upon the jaw member 19 carried by frame 13. In its upper position so attained the frame 13 will be arrested by the dog 27. Then the operator will lift the lever 45 and the frame 44 pivoted thereto another step until the side face 59 will bear against the cam surface 57'. When that has been accomplished, another lifting stroke is performed by depression of lever arm 59. This operation may be repeated until the object A has reached the desired level. The frame 13 may be lowered again by disengagement of the locking dog 27. Preferably, the handle 22 of hand lever 21 is so shaped that in its innermost position it bears against the locking dog 27 to lock the same in engaging position, as will be described later with reference to Fig. 3. Therefore, when the operator has lifted the object A to the highest level, he may depress the handle 22 inwardly to the right with reference to Fig. 4 to thereby lock the dog 27 as a safeguard. In Fig. 4 the frame 44 is shown in slightly inclined position in which the teeth 54 engage the rack. When the operator starting from the position shown in Fig. 4 lifts the handle 59 turning the two-armed lever 45 anti-clockwise, the bifurcations 56 will engage the top of the frame 44 and the frame 44 may then be turned horizontal. In that position the teeth 54 may be disengaged from the rack permitting the gadget 43 to be lifted as a whole. For the purpose of facilitating this operation, a leaf spring 75 is fixed to one of the bifurcations 56 by means of a screw 76 and a pin 77. This leaf spring is so shaped that upon anti-clockwise rotation of the two-armed lever 45 it will engage over the front section of the frame 44 for the purpose of tilting the same into the locking position shown in Fig. 4 upon renewed depression of the handle 59.

The gripping tool illustrated in Fig. 3 is similar to that shown in Fig. 1 differing therefrom in the following respects only:

While the gripping tool is shown in Fig. 1 as having jaw faces inclined with respect to the rack 10 and having inclined gripping teeth as desirable when the tool is to be used as a wrench for tightening nuts, for instance, the jaws 312 and 319 shown in Fig. 3 have gripping faces extending at right angles to the rack 10. As in Fig. 1, the jaws are provided with any suitable means such as beads 60 serving to retain caps 61 and 62 which may be slipped upon the jaws for the purpose of holding specific workpieces between them in a manner well known in the art.

The frame 313 differs from the frame 13 by the absence of the front end wall 17. For proper guidance of the jaw member 319 the same is provided with lateral rectangular projections 63 slidably guided in elongated slots 64 provided in the cheek plates of the frame 313 and extending parallel to the rack 10.

The handle 322 of the two-armed lever is so bent that its portion 65 will engage the dog 27, when the lever assumes its innermost position in a manner mentioned hereinabove with reference to Fig. 4.

The pin 331 secured to the locking dog 27 and extending through the slot 332 is formed as a handle that may be conveniently gripped for the purpose of disengaging the dog and, for this purpose, is bent to extend parallel to the cheek plate of the frame 313, its end engaging a slot 66 provided in the upper cheek plate.

In Fig. 5 I have illustrated my novel pressure-exerting implement in a form specifically adapted for use as a vise.

The rack 510 is of rectangular cross section being pro-

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vided with the teeth 511 on its broad upper side and is integral with the fixed jaw 512. Here again a member is movable lengthwise of the rack and is formed with an actuated portion, such member constituting the movable jaw 519. A frame 513 surrounds the rack and is shaped for relative lengthwise guidance thereon. In this embodiment the frame 513 is stationary having feet 68 fixed to a table 69. A hand lever 521 is pivotally mounted on a horizontal pivot pin 522' extending through the frame 513 and fixed thereto, the longer arm of the two-armed lever forming a handle 522, whereas the shorter arm 523 is tapering to form a cam follower cooperating with a cam surface formed on the right-hand end face of the member 519. A restoring spring 533 is anchored to the frame 513 and extends to the handle 522, having its end fixed thereto. A locking dog 527 is pivotally mounted on a horizontal pin 528 fixed to the frame and overlies the rack 510 and has locking teeth for engagement with teeth 511. The frame 513 is integral with a core portion 518 interposed between the rack 510 and the member 519 for the purpose of guiding them lengthwise. For improved guidance of the rack 510 the same may extend through an auxiliary frame 70 secured to the table 69 and encasing a pair of rotatably mounted pinions, such as 71, which engage the rack 511 and act as anti-friction rollers. The cam surface provided on the end face of the member 519 is so shaped that a normal thereto extending through the contact line with the follower includes an acute angle with a radius extending from the axis of the pivot 522' through the line of contact, such angle being smaller than the friction angle within a substantial range of pivotal movement of the lever 521.

In operation the article to be clamped in the vise is placed between the jaws 512 and 519. Thereupon the rack 510 is pushed towards the right until the article is tightly positioned between the two jaws. In this sliding operation the locking dog 527 will freely ride over the teeth of the rack 510. During the sliding movement the lever 522 is lifted by the operator. After the clamping jaws 512 and 519 have been brought into contact with the object, the operator will depress the handle 522 thereby causing the follower to act on the cam face shifting the member 519 to the left with a great force. During this operation the rack 510 is retained in position by the locking dog 527. Preferably, the left-hand sides of the teeth 511 extend at right angles to the rack so as to preclude an accidental disengagement of the locking dog. For the purpose of disengaging the rack the operator may lift the dog 527 which for this purpose has a tail portion 72 which is spaced from the rack so that it may be easily gripped.

From the above description it will appear that all of the various embodiments of my invention comprise a rack, a frame, such as frame 13 in Fig. 1 or frame 44 in Fig. 4, surrounding the rack and shaped for lengthwise guidance thereon and having detent means, such as 26 or 27, or 54 respectively, for engagement with the teeth of the rack, a member movable lengthwise of the rack and formed with an actuated portion, such as the member 19 in Fig. 1 or the member 13 in Fig. 4, a hand lever, such as 21 in Fig. 1 or 45 in Fig. 4 having an actuating portion, one of the portions constituting a cam and the other one constituting a cam follower, such as 24, 224 or 58, and a pivot connecting the hand lever to the frame, such a pivot 22' in Fig. 1 or 57 in Fig. 4.

From the above description of various embodiments of my invention it will appear that my novel implement excels by its versatility in that it may be employed as an adjustable wrench or as pliers or as a vise or as a jack or, broadly speaking, for any purpose where a high pressure must be exerted by manipulation. When the cam is shaped in the manner illustrated in Fig. 13 in which the R2 position is the dead-center position, R2 coinciding with the normal, the actuating lever may be swung beyond the dead-center position into the R1 position exerting an

increasing pressure capable of firmly holding an article between the two opposed jaws or when the implement is used as a jack, capable of lifting a very heavy weight.

Where my novel implement is used as pliers as shown in Fig. 3 to hold a workpiece, it is a material advantage of my invention that the operator may hold and actuate the gripping tool with one hand while machining the workpiece with his other hand.

Owing to the lengthwise guidance of the frame on the rack the jaws may be quickly brought together into close proximity with the object to be clamped. This is of particular advantage, where the implement is used as a vise, for instance in the manner illustrated in Fig. 5.

Moreover it will be understood that the cam so cooperates with the cam follower as to be self-locking. Therefore, the handle 22, 322, 522 and 45 will stay put in any one of its operated positions to which it has been brought by the operator upon initial depression. This greatly facilitates the operation and the practical use of my novel implement. Hence, when the operator relaxes his grip on the handle, this will in no way reduce the pressure acting on the jaws. This is important because it permits the operator to relax the manual pressure from time to time and thus prevent fatigue. Considering the continued stress to which the operator's hand is subjected in the use of ordinary pliers or an ordinary wrench, this property of my invention is a particularly valuable contribution to the art because my novel wrench is capable, owing to the immense pressure exerted thereby, of gripping a workpiece in any desired position no matter whether the workpiece is of polygonal or circular shape. Thus, my novel wrench may be used to grip wires or sheet metals or heavy articles or blocks, screws or nuts or pipes. After the operator has tightened the jaws of the wrench on the object to be gripped, he may use both hands to bring the rack 10 and the object clamped thereto into any desired position or may even take both hands off the wrench without risking any reduction of the clamping pressure.

While the invention has been described in connection with a number of preferred embodiments thereof, it will be understood that it is capable of further modification, and this application is intended to cover any variations, uses, or adaptations of the invention following, in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains, and as fall within the scope of the invention or the limits of the appended claims.

What I claim is:

1. In a pressure-exerting implement the combination comprising a rack, a frame surrounding said rack and shaped for relative lengthwise sliding movement thereon and having detent means for engagement with the teeth of said rack, a member movable lengthwise of the rack and formed with an actuated portion, a hand lever having an actuating portion, one of said portions constituting a cam and the other one constituting a cam follower engaging said cam in a contact line, and a pivot connecting said lever to said frame, said cam being so shaped that a normal thereto extending through said line includes an acute angle with a radius extending from the axis of said pivot through said line, said angle being smaller than the friction angle within a substantial range of pivotal movement of said lever.

2. In a pressure-exerting implement the combination comprising a rack, a frame surrounding said rack and shaped for relative lengthwise guiding movement thereon and having detent means for engagement with the teeth of said rack, a member movable lengthwise of the rack and formed with a cam, a hand lever having an edge for engaging said cam, and a pivot connecting said lever to said frame, said cam being so shaped that a normal thereto extending through said edge includes an acute angle with a radius extending from the axis of said pivot through

said edge, said angle being smaller than the friction angle within a substantial range of pivotal movement of said lever.

3. The implement claimed in claim 1 further comprising a locking dog pivotally connected to said frame in front of said rack for engagement with the teeth thereof.

4. The implement claimed in claim 1 in which said frame constitutes a guideway for said member movable lengthwise of the rack, said member constituting a movable jaw, said combination further comprising a fixed jaw fixed to said rack in opposed relationship to said movable jaw for cooperation therewith as a gripping tool.

5. A gripping tool comprising a rack, a jaw fixed to one end thereof, a frame surrounding said rack and shaped for relative lengthwise guiding movement and for a limited pivotal movement thereon, and provided with internal teeth for engagement with and disengagement from said rack by said pivotal movement, a jaw member disposed in opposed relationship to said fixed jaw and guided in said frame for movement substantially parallel to said rack and formed with a cam, a two-armed hand lever, one arm forming a handle and the other arm forming a follower for engaging said cam along a line, and a pivot connecting said hand lever to said frame, said cam being so shaped that a normal thereto extending through said line includes an acute angle with a radius extending from the axis of said pivot through said line, said angle being smaller than the friction angle within a substantial range of pivotal movement of said lever.

6. The gripping tool claimed to claim 5 further comprising a tension spring connecting said jaw member with said handle, the latter being movable in a plane extending through said rack towards and away from the latter.

7. The gripping tool claimed in claim 5 in which said frame comprises a pair of spaced parallel cheek plates straddling said rack and connected by at least one end plate engaging the back of said rack, said frame being formed with a core member disposed between said cheek plates and rigid therewith and disposed in front of said rack and having teeth on its back for engagement with the teeth provided on the front of said rack, the front face of said core member constituting guideway for said jaw member.

8. The gripping tool claimed in claim 7 in which said frame has a second end plate slidably engaging the front of said jaw member for guiding the latter.

9. A gripping tool as claimed in claim 7 further comprising a spring carried by one of said members and engaging the other one of said members and tending to urge said jaw member into engagement with said two-armed lever.

10. The gripping tool claimed in claim 5 further comprising a locking dog pivotally mounted on said frame for engagement with the teeth of said rack and a spring connecting said frame with said dog and tending to turn the latter into engaging position.

11. An implement comprising a rack, a frame surrounding said rack which guides the same for longitudinal sliding movement, a movable jaw guided by said frame for sliding movement lengthwise of said rack and formed with a cam, a fixed jaw integral with said rack and disposed in opposed relationship to said movable jaw, a hand lever having a follower for engaging said cam on a line, a pivot connecting said lever to said frame, said cam being so shaped that a normal thereto extending through said line includes an acute angle with a radius extending from the axis of said pivot through said line, said angle being smaller than the friction angle within a substantial range of pivotal movement of said lever.

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