Sept. 16, 1947. O. PETERSON 2,427,472

RATCHET OPERATED EXPANSION OR COMPRESSION CLAMP

Filed Aug. 30, 1944 2 Sheets-Sheet 1

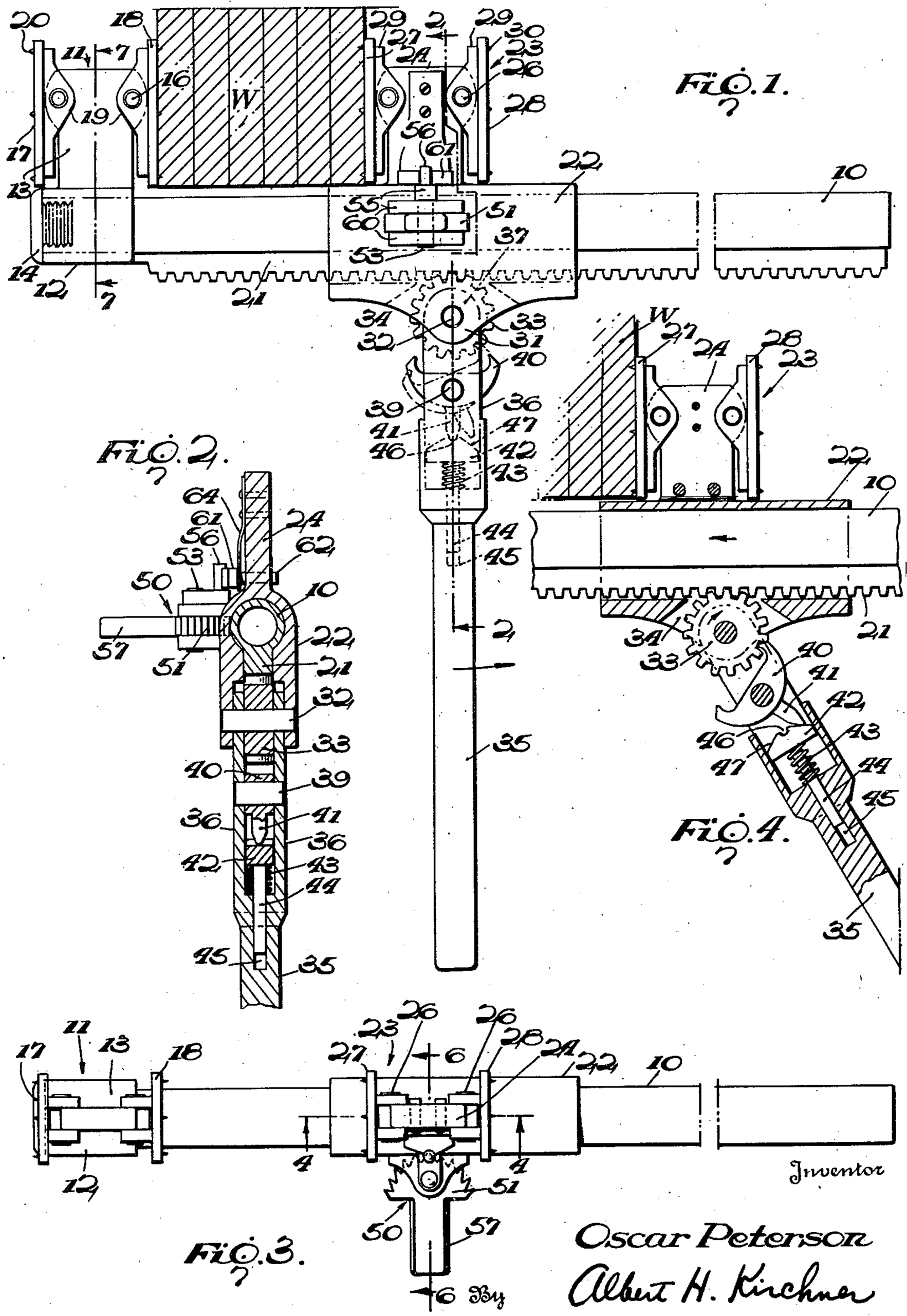

FIG. 1.

FIG. 2.

FIG. 4.

FIG. 3.

Inventor

Oscar Peterson

Albert H. Kirchner

By

Attorney

Sept. 16, 1947. O. PETERSON 2,427,472

RATCHET OPERATED EXPANSION OR COMPRESSION CLAMP

Filed Aug. 30, 1944 2 Sheets-Sheet 2

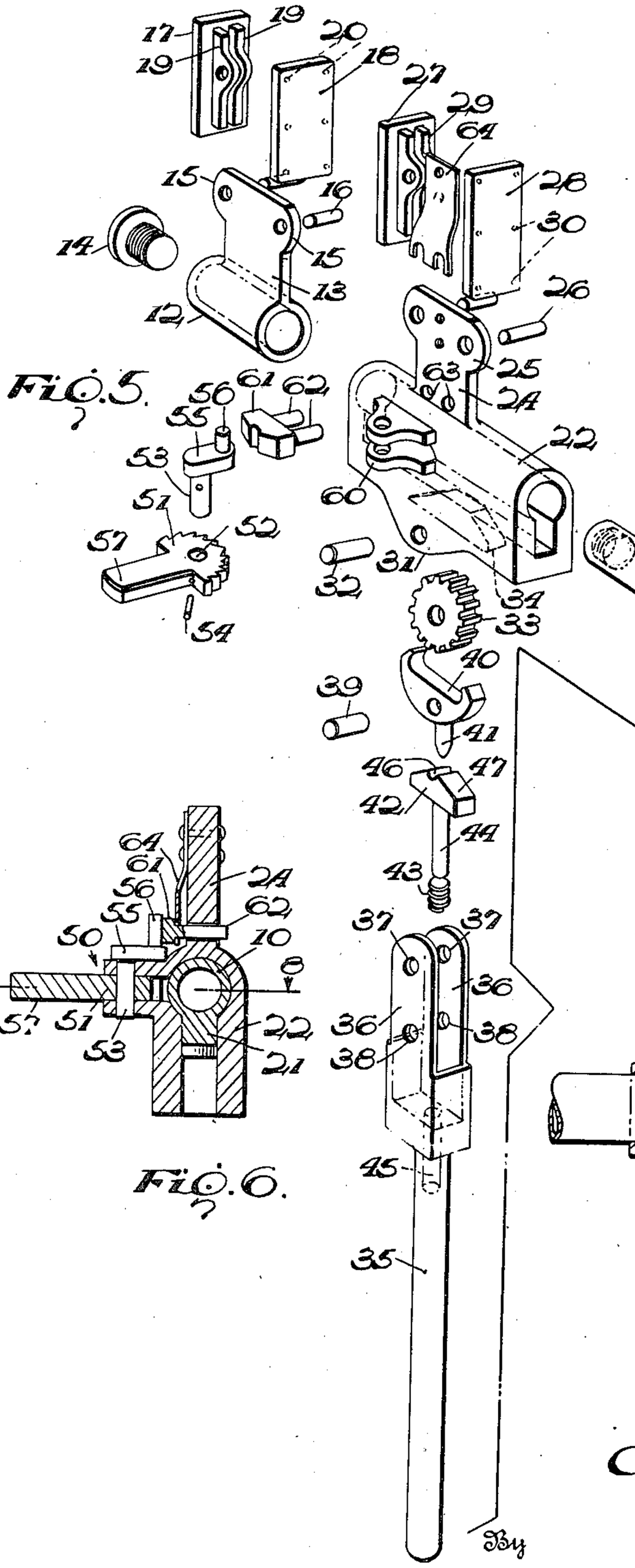

FIG. 5.

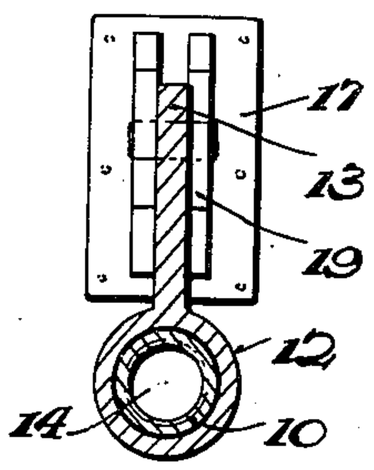

FIG. 7.

FIG. 6.

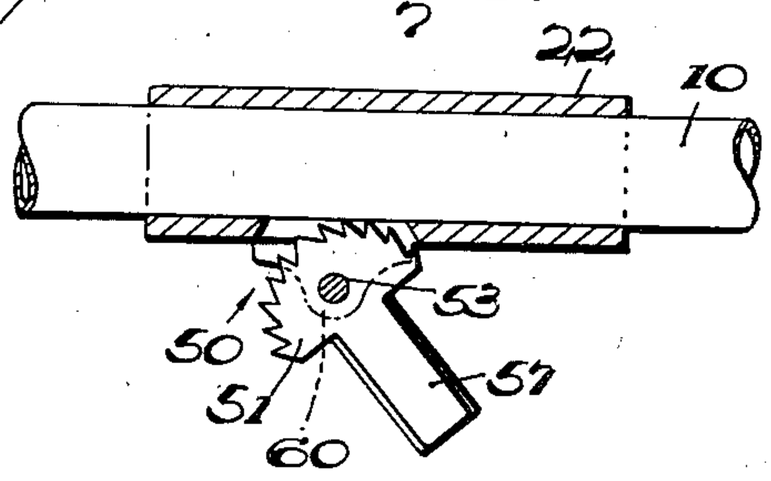

FIG. 8.

Inventor

Oscar Peterson

By Albert H. Kirchner

Attorney

Patented Sept. 16, 1947 2,427,472

UNITED STATES PATENT OFFICE

2,427,472

RATCHET OPERATED EXPANSION OR COMPRESSION CLAMP

Oscar Peterson, Seattle, Wash.

Application August 30, 1944, Serial No. 551,907

4 Claims. (Cl. 144—303)

1

The present invention relates to tools and more particularly provides a device which will operate either as a clamp or a jack.

A representative field of use of the device is in carpentry or woodworking, especially in compressing the wooden deck planking of a ship. It has numerous other and further applications, including the clamping of any boards, timbers or other elements, as well as the expansion of a pair of members, i. e., it is useful also as a jack.

While the device can be made in any size and proportions to suit particularly intended uses, I prefer to make it, and for illustrative purposes in this application I have shown it so embodied, in the form of a substantially elongated member adapted to compress a number of elements of deck planking or the like, being adapted to have a considerable distance capacity between its compressing jaws, and being likewise adapted to be interposed between members spaced a considerable distance apart for expanding them.

General objects of the invention are concerned with producing a device of the character indicated which can be made largely from more or less standard pipe or bar stock and ordinary machine parts, which will be exceedingly rugged and substantial, and which will unfailingly discharge its several intended purposes.

Further objects are concerned with providing a ratchet operating mechanism, combined with leverage application producing compressing or expanding force of high value, so that the work to be accomplished may be practiced by several successive applications of leverage force between which applications the positions of the jaws between which the work is compressed or which are interposed to expand it remain unchanged.

A further object is to provide ratchet means to hold the jaws at any position of adjustment, as distinguished from the step by step ratchet holding means commonly employed in the prior art.

Another object is to provide operating means of very simple, rugged and durable character which will operate, by a readily made setting, to drive the movable jaw either toward the fixed jaw for compression or away from it for expansion.

Other and further objects of the invention will be apparent to those skilled in the art from the following description of a preferred embodiment.

The device may be used upright or inverted, like any conventional clamping tool or jack. For the purposes of illustration it will be assumed, in the accompanying drawing, that the device is

2

being used to clamp together a plurality of horizontally extending planks arranged side by side and standing on edge, so that Figure 1 of the drawing constitutes a side elevation of the tool. The other figures will be described correspondingly.

In the accompanying drawing which illustrates a preferred embodiment of the invention,

Figure 1 is a side elevational view of the device shown in operative compressing relation to work consisting of horizontally extending plank elements;

Fig. 2 is a vertical cross-section taken on the line 2—2 of Fig. 1, with the handle partly broken away for economy of space;

Fig. 3 is a top plan view;

Fig. 4 is a vertical longitudinal section taken through the carriage and a portion of the operating handle, along the line 4—4 of Fig. 3;

Fig. 5 is an exploded perspective view showing all parts of the device;

Fig. 6 is a detail vertical section taken through the carriage on the line 6—6 of Fig. 3;

Fig. 7 is a vertical sectional view taken through the fixed jaw, along the line 7—7 of Fig. 1; and

Fig. 8 is a horizontal sectional view taken through the carriage along the line 8—8 of Fig. 6.

Referring now to the drawing, the device comprises a stock 10 conveniently made in the form of an elongated pipe or bar section of stout metal. A fixed jaw 11 is mounted at one end of the stock and comprises a sleeve portion 12 welded or otherwise fixed to the stock and provided with an integral post 13 which outstands radially from the stock. The outer end of the sleeve 12 may be closed by a cap screw 14, and the post 13 is best made in the form of a plate extending in the plane of a diameter of the stock. This plate is provided with a pair of bosses 15 (see Fig. 5) which project from its side edges and are perforated to receive pins 16 which pivotally mount an outer jaw plate 17 and an inner jaw plate 18, both of which are provided with perforated ears 19 receiving the pins 16. If desired, the work-engaging surfaces of these jaw plates may be serrated, roughened, or provided with minute prongs 20 to make good anti-slip engagement with the work W.

Beginning at a point inwardly just beyond the sleeve 12, the stock 10 has welded or otherwise permanently secured to it, along a line diametrically opposite from the direction in which the fixed post 11 extends, a rack 21. This rack extends preferably to the extreme other end of the stock.

Sleeved about the stock with its rack, and slidable thereon, is a carriage 22 having a bore which more or less snugly fits the contour of the stock and rack and is thus in effect splined on the stock. Extending from the carriage, in the same direction as the fixed post 11 extends from the stock, is a movable jaw 23 comprising a post 24, similar to the post 13, having similar bosses 25 (see Fig. 5) receiving pins 26. Jaw plates 27 and 28 are mounted on these pins through the medium of perforated ears 29, exactly like the corresponding parts of the fixed jaw. In the same way, prongs or the like 30 may be formed on the movable jaw plates.

It will be obvious that the carriage may be moved toward or away from the fixed jaw to compress work between the two jaws or to expand work between which the two jaws are interposed. In the one case the work will be compressed between the inner fixed jaw plate 18 and the oppositely facing movable jaw plate, designated 27. In the other case work will be expanded between the outer fixed jaw plate 17 and the more remote movable jaw plate 28.

It is necessary to provide driving means for operating the carriage in either direction, and holding means for maintaining it in any adjusted position following movement in either direction for resisting tendency of the work to move it backwards. This is provided by the mechanism which will now be described.

The side of the carriage 22 which is opposite the movable jaw 24 and which may be considered the bottom of the carriage as viewed in Fig. 1 extends in the form of a pair of bosses 31 which are apertured to receive a pin or shaft 32 which journals a pinion 33. This pinion is partly received in a hollow 34 formed in the carriage between the bosses 31 and meshes with the rack 21. Rotation of the pinion thus drives the carriage along the rack and the stock.

To rotate the pinion 33 I provide a more or less long handle 35 which terminates at its inner end in an element made like a clevis, having two spaced parallel endwise extending plates 36 provided with apertures 37 at their extreme ends to serve as bearings for the pin 32 which mounts the pinion 33. Inwardly from these pin bearings the plates 36 are similarly apertured, as shown at 38, to receive a pin 39 on which is pivoted a double ended dog 40 for cooperating with the pinion to rotate it. The relationship of the dog, its pivotal mounting, and the pinion is such that when the dog has its length right-angularly disposed to the length of the handle, both ends of the dog are disengaged from the teeth of the pinion, but when the dog is rocked to either side of such position one of its ends will engage the teeth of the pinion so as to drive the pinion when the handle is swung in one direction about the pivot 32 and slip over the teeth when the handle is swung oppositely. Thus the dog acts as a pawl for the pinion, providing a ratchet drive for it, depending on which of its ends is projected to engage the pinion.

In order to maintain either end of the dog in ratcheting engagement with the pinion, the dog is provided with a stud 41 projecting radially from its side opposite the side which bears the pawl ends. This stud is positioned by a follower block 42 under the influence of a coil compression spring 43 disposed around a shank 44 which extends from the back of the follower block and works in a bore 45 formed in the handle. The face of the follower block is centrally notched at 46 and provided with downwardly inclined slide faces 47 at each opposite side of the notch.

The details of the foregoing construction are best shown in Fig. 4, from which it will be observed that, with the dog disposed as there shown, the handle 35 can be swung to the left to rotate the pinion clockwise and drive the carriage 22 to the left, thereby compressing the work W between the jaw plates 18 and 27. When the handle is swung to the right in Fig. 4 with the dog positioned as there shown, the end of the dog which is engaged with the pinion will slip over the pinion teeth, thus providing ratchet action.

The opposite action takes place when the dog is swung through some 90 degrees so as to bring the stud 41 into engagement with the opposite inclined face 47, as will be obvious.

During the ratchet action the follower block 42 moves downwardly, compressing spring 43, each time the engaged end of the dog slips over a tooth of the pinion. In order to hold the dog disengaged from the pinion, to permit sliding of the carriage 22 along the stock with the pinion freely turning as it moves along the rack, the stud 41 is seated in the notch 46, as shown in Fig. 1.

In order to hold the carriage and its movable jaw at any point along the stock, against the compressive or expansive force of the work tending to move it backwards, I provide holding means generally designated 50. This consists of a cam 51, made in the form of a more or less half circular segment, serrated or toothed on its arcuate surface, and having an eccentric perforation 52. This perforation receives the pin 53, on which it is made fast, by splining or by the use of a dowel 54 (see Fig. 5), and the pin 53 is provided at one end with a crank arm 55 having a crank pin 56. Obviously, swinging the crank pin 56 will rotate the cam 51, and the same will be accomplished by manipulating the handle 57 which extends rearwardly from the segment.

A pair of bosses 60 extend from the side of the carriage 22, approximately 90 degrees displaced from the plane of the rack 21 and handle 35. These bosses are perforated to provide bearings for the pin 53, and an opening is cut in the carriage 22 between the bosses 60 so that the arcuate face of the cam 51 will engage and bite into a path on the smooth surface of the stock 10 whenever the pin 53 is rotated enough to bring one or the other of the side portions of the arcuate face of the cam far enough into the opening in the carriage to engage the stock 10.

In order to urge one or another of these cam faces into engagement with the smooth path on the stock, I provide a follower 61 for the crank pin 56. This follower is made in the form of a block having much the same shape as the follower 42 for the stud 41 of the dog 40. It is centrally notched and has a pair of surfaces backwardly inclined from the notch. A pair of slide pins 62 extend from the back of the block 61 and are mounted in holes 63 formed in the post 24 of the movable jaw 23. A leaf spring 64 is riveted or otherwise secured at its upper end to this post and is cut out at its lower, free end to pass the slide pins 62 and bear against the back of the block 61. Thus the block is urged outwardly, so as to tend to swing the crank pin 56 to rotate the cam 51 in either direction, depending on which of the inclined faces of the block is engaged with the crank pin, or to hold the cam 51 in central position, disengaged from

the stock 10, if the pin 56 be seated in the notch of the block.

In using the device the handle 57 is moved to one side or another to hold the carriage in any position to which it may be moved by swinging the operating handle 35. One side or another of the arcuate face of the cam is maintained by action of the spring 64, follower 61 and crank pin 56 in biting engagement with a smooth path along the side of the stock 10, and this effectively holds the carriage at any point to which it may be moved. Obviously, the force of the work tending to move the carriage backwards serves only to tighten the hold of the cam on the stock. I consider this continuous holding at all points along the line of movement of the carriage, as distinguished from step by step holding, an important feature of the invention.

It is believed that it will be evident from the foregoing explanation of the invention embodied in a preferred type of construction that I have provided a combination ratchet clamp and jack which fully achieves the objects set forth hereinabove and provides numerous additional advantages. Modifications are contemplated within the scope and purview of the appended claims.

I claim:

1. A tool comprising an elongated stock having at one end a jaw, a carriage slidably mounted on the stock and having a cooperating jaw, means for moving the carriage along the stock to position said jaws at selected distances apart, and cam means mounted on the carriage and bearing against the stock to hold the carriage and its jaw in adjusted positions on the stock, said cam means comprising a serrated segment eccentrically journaled on the carriage and movable from an intermediate position out of engagement with the stock to opposite terminal positions in which its serrations bear against the stock with increasing force responsive to force tending to move the carriage along the stock, a spring reacting between the carriage and the segment tending, when the segment is displaced from intermediate position, to urge the segment into one or the other of its terminal positions, and means interposed between the spring and cam means for cooperating with the spring to hold the cam means yieldably in intermediate position.

2. In a tool comprising an elongated stock having an abutment fixed at one end portion and a carriage slidably mounted on the stock having a projecting abutment adapted to cooperate with the fixed abutment alternatively to clamp work between the two abutments or to expand the two abutments in the manner of a jack, the combination of means holding the carriage on the stock adjustably fixed against sliding movement thereon alternatively either toward or from the fixed abutment comprising a cam pivoted on the carriage and having an arcuate surface provided with opposite end portions which are frictionally engageable with the stock when the cam is rotated to resist movement of the carriage in either direction on the stock, and means for bringing either of said end portions selectively into engagement with the stock comprising a crank pin mounted on the cam, a follower having two relatively inclined surfaces selectively engageable with the crank pin for urging it to rotate the cam in opposite directions, and spring means urging the follower into engagement with the crank pin.

3. A tool as claimed in claim 2 in which the arcuate surface of the cam is serrated with teeth projecting relatively oppositely from the two end portions of said surface for biting into a smooth portion of the stock.

4. A tool as claimed in claim 2 in which the two relatively inclined surfaces of the cam follower are separated by an intervening notch adapted to engage and hold the crank pin in neutral position so that neither of the end portions of the cam will engage the stock.

OSCAR PETERSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
57,447	Stockmar	Aug. 21, 1866
63,468	Card	Apr. 2, 1867
301,418	Williams	July 1, 1884
442,733	Shampel	Dec. 16, 1890
529,765	Weyhe	Nov. 27, 1894
914,567	Goodknight	Mar. 9, 1909
956,334	Gallon	Apr. 26, 1910
1,072,313	Conte	Sept. 2, 1913
1,187,109	Steuernagel	June 13, 1916
1,216,224	Furgerson et al.	Feb. 13, 1917
1,424,034	Rigert	July 25, 1922
1,430,694	Short	Oct. 31, 1922