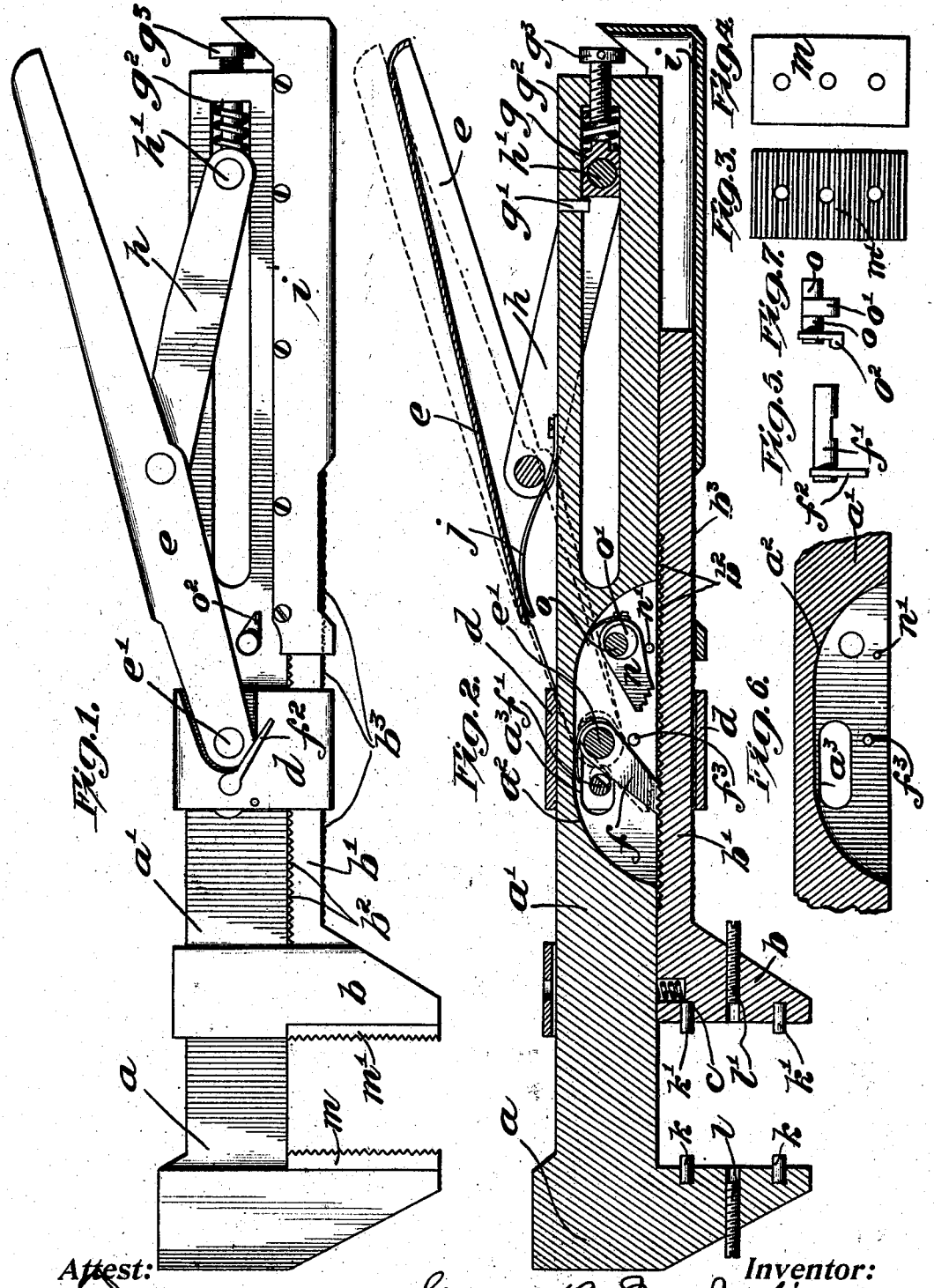
No. 858,357. PATENTED JUNE 25, 1907.

G. A. McINTIRE.

WRENCH.

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Attest:

C. Mitchell

F. G. Wentworth

Inventor:

George A. McIntire

by Charles F. Dalton

his Atty

UNITED STATES PATENT OFFICE.

GEORGE ALEXANDER McINTIRE, OF PORT CHESTER, NEW YORK, ASSIGNOR OF ONE-HALF TO CHARLES F. DALTON, OF PORT CHESTER, NEW YORK.

WRENCH.

No. 858,857. Specification of Letters Patent. Patented June 25, 1907.

Application filed April 4, 1906. Serial No. 309,843.

To all whom it may concern:

Be it known that I, GEORGE ALEXANDER McINTIRE, a citizen of the United States, residing at Port Chester, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Wrenches, of which the following is a specification, reference being had therein to the accompanying drawings, which form a part thereof.

My invention relates to wrenches, and more particularly to a class of sliding jaw wrenches wherein the jaws are closed by means of a lever and link mechanism.

The main object of the invention is to provide a wrench wherein the movable jaw may be fed forward through a lever and toggle lever mechanism so as to permit the jaws to be adjusted to a nut, pipe or other work, and held firmly thereon through a clutch mechanism having a movement parallel to that of the jaw and actuated by said toggle levers, thus avoiding any binding of parts and developing the full power of the lever handle.

A further object is to provide a wrench wherein the movable jaw may be fed forward through a lever and link mechanism so as to permit the jaws to be adjusted to a nut, pipe or other object and held firmly thereon through compression of a fixed and a movable part of the handle; and wherein the feeding movement will be such as to cause an automatic limitation thereof when a full feeding movement is prevented through resistance encountered in adjusting the jaws to a part or object without varying the gripping power of the jaws.

A still further object is to provide a wrench of this character wherein the feeding mechanism may be rendered inoperative at will and the sliding jaw permitted to have only such limited movement in both directions as will permit it to be set and reset to any object without readjustment.

A still further object is to provide a wrench of this character wherein the power applied through the lever handle may be so regulated as to control the crushing power of the jaws.

A still further object is to provide a wrench of this character wherein when the feeding mechanism is out of gear or inoperative, a return movement of the sliding jaw is prevented, thus adapting the wrench for use as a lifting jack, a clamp or a vise, or as a general handy tool for miscellaneous work.

A still further object is to provide a wrench which, while resembling an ordinary monkey wrench, will by reason of the various attachments which may be applied thereto, and of its mode of operation, be capable of use as a pipe or monkey wrench, a clamp, a vise, a lifting jack, or a work holder for use with machines, thus embodying in compact form a tool having a range of utility which will permit its substitution for various tools and appliances in a machinist's kit or a shop.

A still further object is to provide a wrench having these characteristics, in which the various parts will be so inclosed as to be protected from dirt or other substances tending to interfere with their operation.

A still further object is to provide a wrench of this character wherein the sliding jaw may be fed toward the fixed jaw by the free continuous movement thereof by hand, or by an intermittent movement through the lever handle.

A still further object is to provide a wrench wherein the feeding mechanism will be so constructed and arranged as to avoid such binding of the movable parts as would tend to jam the jaws or the lever handle.

A still further object is to provide a wrench wherein the jaws may be quickly and firmly set through the lever handle, and conveniently released therethrough.

A still further object is to provide a wrench wherein the jaws may be set and locked upon the work through movement of the lever handle. And a still further object is to provied a simple and compact tool which may be inexpensively produced.

The invention consists primarily in a wrench comprising a fixed jaw having a shank, a sliding jaw mounted relative thereto, a slidable clutch mechanism mounted on said shank and adapted to engage said sliding jaw, a lever handle pivotally connected with said clutch mechanism, and a toggle lever carried by said shank and pivotally connected to said lever handle; and in such other novel features of construction and combination of parts as are hereinafter set forth and described and more particularly pointed out in the claims hereto appended.

Referring to the drawings: Figure 1 is a

side elevation of a wrench embodying my invention; Fig. 2 is a longitudinal section of said wrench with the jaw faces removed; Figs. 3 and 4 are detail views of the detached jaw faces. Fig. 5 is a detail view of the means whereby the feeding pawl is rendered inoperative; Fig. 6 is a detail view of a portion of the shank of the stationary jaw, and Fig. 7 is a detail view of the means setting the holding pawl.

Like letters refer to like parts throughout the several views.

In the embodiment of my invention shown in the drawings, *a* indicates the stationary jaw, the shank *a'* of which has a way therein as shown. Mounted on the shank of the jaw *a* is a sliding jaw *b* having a rack bar *b'* parallel to the said shank, the teeth b^2 thereof being presented toward said shank. The jaw *b* has a socket therein in which is seated a friction device, as the spring *c* to hold said jaw against movement when the clutch mechanism hereinafter referred to is released. The outer face of the bar *b'* is roughened at b^3 to afford a suitable holding surface for closing the jaw by hand.

The shank *a'* is channeled out at a^2 and the walls of said channel or pocket have oppositely disposed parallel, elongated slots a^3 therein and suitable bearings for the trunnions of the eccentric setting the holding pawl. The rack bar *b'* closes this pocket. Encircling the said shank *a'* and the rack *b'* is a sliding strap *d* to which is pivoted the lever handle *e*, the ends of which is so forked as to straddle said strap, the sides of the strap preferably being countersunk to bring said handle flush therewith while allowing sufficient play to operate it. The lever handle *e* is attached to the strap *d* by means of a pivot pin *e'* passed through the slots a^3 and having loosely mounted thereon a spring pressed pawl *f* having one or more teeth adapted to engage the teeth b^2 of the rack *b'*. Also passing through the slot a^3 and carried by the strap *d* is a rotatable locking pin *f'* one end of which carries a handle f^2.

To disengage the pawl *f* from the teeth of the rack *b'*, I provide a pin f^3 which engages the pawl when the lever handle *e* reaches the limit of its return movement and raises it above said teeth, the pivot *e'* having a slot therein as shown in Fig. 5 to permit such movement, the balance of said pin being of a diameter which, when the pin is turned by the handle f^2 will prevent such movement and thus lock said pawl in mesh with the teeth b^2. The pawl *f* and pin *f'* move with the strap *d* while the pin f^3 remains fixed relative to the shank *a'*.

Mounted in the way in the shank *a'* is a sliding block *g* seated between a fixed stop *g'* forwardly thereof, and a stiff coiled spring g^2, a boss on said block entering said spring. The end of the shank is closed to form a seat for said spring and an adjustable buffer as the screw g^3 passes through said closed end and into the path of the block *g* thus serving to limit the quantity of movement of said block. Pivotally mounted on the pivot block *g* by means of a pivot pin *h'* are the oppositely disposed toggle levers *h*, the other ends of which are similarly connected to the lever handle *e*.

It will thus be seen that the force applied to the lever handle *e* is applied simultaneously to the strap *d* and the spring g^2, thus causing the feeding movement of the sliding jaw or that portion thereof prior to the engagement of the jaws with a solid body, to be under the tension of said spring only, the final force, however, being a direct one against the buffer screw g^3. It is this construction which permits the jaws to be set under substantially the same conditions at all times, the give of the spring being initiated at the period of contact, whether such be the first or later stages of the depression of the handle *e*.

The axis of the pivot pin *h'* should be parallel with that of the pin *e'* so that when the lever handle *e* is depressed to its fullest extent, the point of connection between the links or toggles *h* and said lever handle will be on a plane with, or slightly below the axis of, said pins, thus setting the lever *e* and the clutch mechanism thereby. The shank *a'* also carries a hollow handle *i* adapted to house in the end of the rack *b'* and to serve for a foot to permit the use of the tool as a lifting jack. The end of the handle is cut away to permit access to the buffer screw g^3, and the full depression of the handle *e*, and its under side is cut away to permit the thumb to be applied to the serrated portion b^3 to move the sliding jaw. A spring *j* carried by the shank *a'* acts to normally force the handle *e* outwardly.

The jaw *a* is provided with means, as the studs *k* and the screw *l* arranged at divergent points, and the jaw *b* with similar studs *k'* and *l'*, to facilitate the attachment of hardened steel jaw faces as *m m'*, or other attachments thereto.

When the device is to be used as a jack or a vise, it is necessary to hold all the feeding movement gained with each reciprocation or oscillation of the lever handle. To accomplish this, I provide means adapted to engage the rack bar *b'* and while permitting a forward movement thereof, preventing a return movement. Preferably this means comprises a holding pawl *n* pivoted to the shank *a'* within the pocket a^2 by a pin having trunnions *o* and an eccentric portion *o'* upon which the pawl *n* is mounted. A lever handle o^2 is attached to one trunnion *o* which projects beyond the side of said pocket a^2 so as to be conveniently operated. A pin *n'* is mounted below and slightly forwardly of the

axis of the trunnions o to facilitate the setting and release of said pawl n.

The operation of the herein described wrench is substantially as follows: In adjusting the wrench to a nut, pipe or other similar article, the lever f^2 and lever o^2 are turned as shown in Fig. 1, and the lever handle e is permitted to assume the full extent of its movement under the spring j. When the parts are in this position, the strap d, the pawl f and its pivot e', and the locking pin f' are drawn backward, the pawl being raised out of engagement with the teeth b^2 through contact with the pin f^3. This releases the rack b' and permits it to be moved freely in either direction, the spring c offering only that slight resistance necessary to permit the entire sliding jaw to move independently of any power applied thereto. When the jaws have thus been quickly adjusted to approximately fit the object, they are applied thereto, and the lever handle e is brought down toward the shank a'. The spring g^2 exerts sufficient pressure on the block g and links h to cause the initial depression of the lever handle to exert a forward thrust upon the strap d resulting in a forward movement which forces the pawl f away from the pin f^3 and permits it to drop into mesh with the teeth b^2 under its spring tension, whereupon all subsequent movement thereof imparts a forward feeding movement to the jaw b toward the fixed or stationary jaw a. If a single depression or vibration of the handle e is insufficient to firmly engage the object, said handle may be released, permitting the spring j to restore the various parts to their former positions, the spring of the pawl f permitting such movement of the pawl as will cause it to assume the proper position for another feeding movement, the recess in the locking pin affording a clearance for the pawl when it abuts against the stop pin f^3 or rises in passing over the teeth of the rack bar b'. The former operation is then repeated with the same result. If desired, the jaw b may be closed entirely through the handle e. When the jaw b, however, is brought hard against a solid body, the resistance therefrom checks the forward movement of the clutch mechanism and reacts upon the spring g^2 which gives until the block g abuts against the buffer screw g^3 whereupon the full power of the toggle mechanism is applied to the jaw b. As this occurs only when the lever e is in position to have the greatest power applied thereto, and when such power will exert the greatest force upon the clutch mechanism and impart the least movement thereto, it will be observed that the construction is such as to secure the greatest ease of operation and secure the best results.

If it be desired to remove the wrench from the part, nut or pipe, and take a fresh hold thereon, the lever handle f^2 may be thrown forward bringing the cylindrical part of the pin f' into engagement with the pawl f and locking said pawl relative to the rack b'. Hence the return movement of the strap d will impart a similar movement to the jaw b permitting the removal of the wrench from the object and affording sufficient clearance to compensate for irregularities in the object to which it is applied. It will be observed that the jaw b under such circumstances is reset to its former position, the previous return movement thereof to release the jaws defining this feeding movement. The pressure exerted on the rack b' by the pawl f tends to force the jaw b away from the shank a' and bind it against the strap d which having a similar movement, eliminates all likelihood of these parts becoming jammed. Incidentally the spring c tends to force the jaw b away from said shank also.

If it be desired to use the wrench as a clamp, vise or work holder, the handle e is forced downward until the pivot between it and the links h is on a center line between the pivots e'—h' or below such center, thus preventing action by the spring j, the buffer screw g^3 being withdrawn to permit such excess movement.

To limit the power applied to the jaw b, or to insure the full feeding movement of the said jaw, as when using as a clamp or lifting jack, the screw g^3 is brought into contact with the block g. When an object is stretchable or movable, the full movement and power is preserved, but when the object is rigid, as a pipe, this adjustment merely limits the crushing power of the jaw b.

When it is desired to use the tool as a jack, clamp or vise, to draw parts together or sustain weight, the holding pawl n is thrown into mesh with the teeth of the rack bar b' by turning the lever handle o^2 forwardly. This movement through the eccentric o' advances the axis of the pawl sufficiently to permit it to pass the pin n', which takes up all strains on the pawl and transmits them to the shank a'. This pawl will, therefore, permit the jaw b to be fed forward, but will take up and hold all feeding movement. When used as a jack, the end of the handle i is placed against an object and the handle e worked as heretofore described, raising any object with which the jaw b engages.

The faces of the jaws a—b are made removable to permit the application of jaws of any desired style thereto. Interchangeable jaws being old and well known, however, I lay no claim thereto.

It is not my intention to limit the invention to the precise details of construction shown in the drawings, as such may be varied to impart a better finish to the tool or make its operation more convenient, without departing from the spirit and scope of the invention.

Having described the invention, what I claim as new and desire to have protected by Letters Patent is:

1. A wrench comprising a fixed jaw having a shank, a sliding jaw mounted relative thereto, a sliding clutch mechanism mounted on said shank and adapted to engage said sliding jaw, a lever handle pivotally connected with said clutch mechanism, and a toggle lever carried by said shank and pivotally connected to said lever handle.

2. A wrench comprising a fixed jaw having a shank, a sliding jaw mounted relative thereto, a sliding clutch mechanism mounted on said shank and adapted to engage said sliding jaw, a lever handle pivotally connected with said clutch mechanism, a toggle lever carried by said shank and pivotally connected to said lever handle, and means whereby said clutch mechanism will be set through the movement thereof in one direction and released through such movement in the opposite direction.

3. A wrench comprising a fixed jaw having a shank, a sliding jaw mounted relative thereto, a sliding clutch mechanism mounted on said shank and adapted to engage said sliding jaw, a lever handle pivotally connected with said clutch mechanism, a toggle lever carried by said shank and pivotally connected to said lever handle, means whereby said clutch mechanism will be set through the movement thereof in one direction and released through such movement in the opposite direction, and means whereby when set, said clutch mechanism may be locked to permit only a limited reciprocation of the sliding jaw therethrough.

4. A wrench comprising a fixed jaw having a shank, a sliding jaw mounted relative thereto, a sliding clutch mechanism mounted on said shank and adapted to engage said sliding jaw, a lever handle pivotally connected with said clutch mechanism, a toggle lever carried by said shank and pivotally connected to said lever handle, means whereby the said clutch mechanism will be set through the movement thereof in one direction and released through such movement in the opposite direction, and means whereby said sliding jaw is permitted to feed forwardly, but is held against a return movement.

5. A wrench comprising a fixed jaw having a shank, a sliding jaw mounted relative thereto, a sliding clutch mechanism, mounted on said shank and adapted to engage said sliding jaw, a lever handle pivotally connected with said clutch mechanism, a toggle lever carried by said shank and pivotally connected to said lever handle, means whereby said clutch mechanism will be set through the movement thereof in one direction and released through such movement in the opposite direction, a resilient support carried by said shank for said toggle lever and a rigid buffer whereby the lever handle will automatically adjust itself to the quantity of feeding movement of the sliding jaw.

6. A wrench comprising a fixed jaw having a shank, a sliding jaw mounted relative thereto, a sliding clutch mechanism mounted on said shank and adapted to engage said sliding jaw, a lever handle pivotally connected with said clutch mechanism, a toggle lever carried by said shank and pivotally connected to said lever handle, means whereby said clutch mechanism will be set through the movement thereof in one direction and released through such movement in the opposite direction, a resilient support carried by said shank for said toggle lever, and a rigid, and adjustable buffer whereby the lever handle will automatically adjust itself to the quantity of feeding movement of the sliding jaw, and the power applied therethrough may be regulated.

7. A wrench comprising a fixed jaw having a shank, a sliding jaw mounted relative thereto, a sliding clutch mechanism comprising a toothed bar carried by said sliding jaw, a strap inclosing said shank and said bar, a pawl carried by said strap, a lever handle pivotally connected with said strap, a toggle lever carried by said shank and pivotally connected to said lever handle, and means whereby said pawl will be caused or permitted to engage said rack when said strap is moved in one direction and to disengage said rack, when moved in the opposite direction.

8. A wrench comprising a fixed jaw having a shank, a sliding jaw mounted relative thereto, a sliding clutch mechanism comprising a toothed bar carried by said sliding jaw, a strap inclosing said shank and said bar, a pawl carried by said strap, a locking pin carried by said strap above said pawl having a recess therein, means whereby said pin may be turned so as to either permit said pawl to rise out of engagement with said rack bar, or to lock it in engagement therewith, a lever handle pivotally connected with said strap, a toggle lever carried by said shank and pivotally connected to said lever handle, means whereby said pawl will be caused or permitted to engage said rack when said strap is moved in one direction and to disengage said rack when moved in the opposite direction, a pawl carried by said shank, and means whereby said pawl may be thrown into mesh with said rack, or out of mesh therewith.

9. A wrench comprising a fixed jaw having a shank, a sliding jaw mounted relative thereto, a sliding clutch mechanism comprising a toothed bar carried by said sliding jaw, a strap inclosing said shank and said bar, a pawl carried by said strap, a locking pin carried by said strap above said pawl having a recess therein, means whereby said pin may be turned so as to either permit said

pawl to rise out of engagement with said rack bar, or to lock it in engagement therewith, a lever handle pivotally connected with said strap, a toggle lever carried by said shank and pivotally connected to said lever handle and means whereby said pawl will be caused or permitted to engage said rack when said strap is moved in one direction, and to disengage said rack when moved in the other direction.

10. A wrench comprising a fixed jaw having a shank, a sliding jaw mounted relative thereto, a sliding clutch mechanism comprising a toothed bar carried by said sliding jaw, a strap inclosing said shank and said bar, a pawl carried by said strap, a lever handle pivotally connected with said strap, a toggle lever carried by said shank and pivotally connected to said lever handle and means whereby said pawl will be caused or permitted to engage said rack when said strap is moved in one direction and to disengage said rack, when moved in the opposite direction, a pawl carried by said shank and means whereby said pawl may be thrown into or out of mesh with said rack.

11. A wrench comprising a fixed jaw having a shank, a sliding jaw mounted relative thereto, a sliding clutch mechanism comprising a toothed bar carried by said sliding jaw, a strap inclosing said shank and said bar, a pawl carried by said strap, a lever handle pivotally connected with said strap, a toggle lever carried by said shank and pivotally connected to said lever handle, and means whereby said pawl will be caused or permitted to engage said rack when said strap is moved in one direction and to disengage said rack when moved in the opposite direction, a pawl carried by said shank and means whereby said pawl may be thrown into or out of engagement with said rack comprising an eccentric bearing for said last mentioned pawl, a handle whereby it may be turned, and a pin located beneath said bearing whereby with the shifting of the axis of said pawl, it will be caused to ride upon, or drop from said pin.

12. A wrench comprising a fixed jaw having a shank, a sliding jaw mounted relative thereto, a sliding clutch mechanism mounted on said shank and adapted to engage said sliding jaw, a lever handle pivotally connected with said clutch mechanism, a rigid buffer carried by said shank, a reciprocating block mounted in a way in said shank, a spring between said block and said buffer, a toggle lever the opposite ends of which are respectively pivotally connected to said lever handle and said block, and means whereby said clutch mechanism will be set through movement thereof in one direction, and released through movement in the opposite direction.

13. A wrench comprising a fixed jaw having a shank, a sliding jaw having a spring seat therein, mounted relative thereto, a spring in said seat bearing against said shank, a sliding clutch mechanism mounted on said shank and adapted to engage said sliding jaw, a lever handle pivotally connected with said clutch mechanism, a toggle lever carried by said shank and pivotally connected to said lever handle, and means whereby said clutch mechanism will be set through the movement thereof in one direction, and released through such movement in the opposite direction.

14. A wrench comprising a fixed jaw having a shank, a sliding jaw mounted relative thereto, a sliding clutch mechanism comprising a toothed bar carried by said sliding jaw, a strap inclosing said shank and said bar, a pawl carried by said strap, a lever handle pivotally connected with said strap, a toggle lever carried by said shank and pivotally connected to said lever handle and means whereby said pawl will be caused or permitted to engage said rack when said strap is moved in one direction and to disengage said rack when moved in the opposite direction, a pawl carried by said shank, means whereby said pawl may be thrown into or out of mesh with said rack, and a hollow handle casing inclosing the lower end of said rack bar and having a foot projecting over the end of said shank.

GEORGE ALEXANDER McINTIRE.

Witnesses:
WM. B. SMITH,
S. GRACE MEADE.