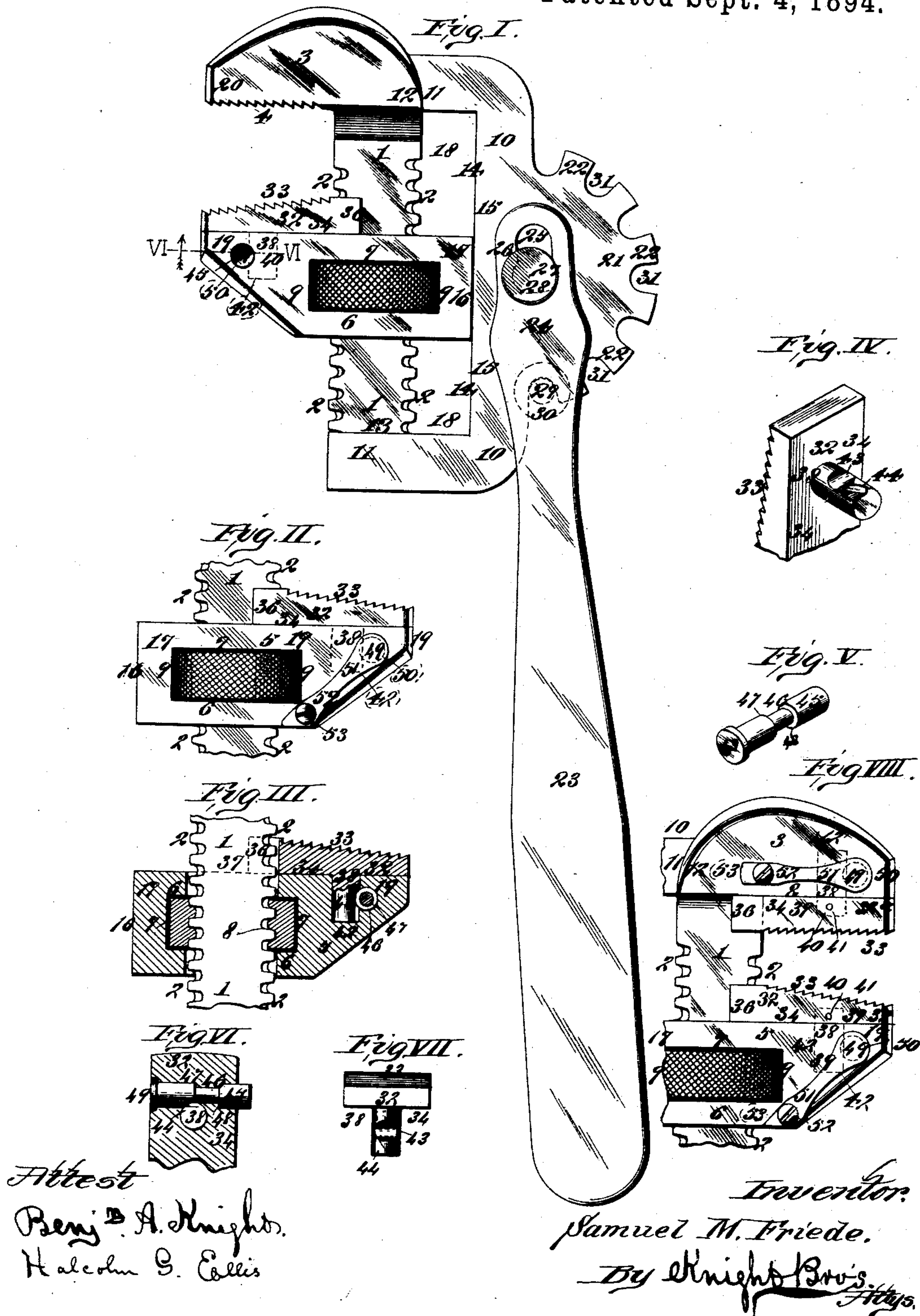


(No Model.)

S. M. FRIEDE.
COMBINED PIPE, RATCHET, AND MONKEY WRENCH.
No. 525,683.
Patented Sept. 4, 1894.



UNITED STATES PATENT OFFICE.

SAMUEL M. FRIEDE, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-THIRD TO
JOHN W. DONNELL, OF SAME PLACE.

COMBINED PIPE, RATCHET, AND MONKEY WRENCH.

SPECIFICATION forming part of Letters Patent No. 525,683, dated September 4, 1894.

Application filed December 18, 1893. Serial No. 493,941. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL M. FRIEDE, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in a Combined Pipe, Ratchet, and Monkey Wrench, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

10 This invention relates to a combined monkey and ratchet pipe wrench, in which either one or both of the jaws are provided with an automatic spring locked and removable ratchet plate or plates, to enable the use of the tool, as either a ratchet pipe wrench, or
15 as a monkey wrench, and also to facilitate and enable the renewal of the detachable ratchet plate or plates for sharpening or renewal, &c.

20 Figure I is a side view of the wrench with a detachable pipe ratchet plate secured to the tail grip jaw. Fig. II is a detail, side view, and shows the operator wheel and the spring that locks the attachment of the ratchet plate.

25 Fig. III is a detail section. Fig. IV is a perspective, detail view of the detachable ratchet plate, and of its pin holder. Fig. V is a perspective view of the lock bolts that secure the attachment of the detachable ratchet plates.

30 Fig. VI is a detail section taken on the line VI—VI Fig. I through a detail of the grip jaw, with the projecting end of the stem holder lock and the roller lock bolt as shown in full relief. Fig. VII is an end view of the detachable ratchet plate; and Fig. VIII is a detail, side view of a modification, and shows detachable ratchet plates on both the tail and head grip jaws of the wrench.

Referring to the drawings:—1 represents
40 the flattened stem of the monkey wrench proper, and 2—2 are the forward and rear disconnected screw threads in the edges of said stem.

3 is the grip-head jaw, that projects from
45 said stem; and 4 is the ratchet face of the pressure lip of said jaw.

5 is the tail-grip jaw, the holder slot 6 of which travels on said flattened screw-stem, and 7 is an operator wheel, the internal screw
50 thread 8 of which travels on the screw threads 2—2, of said stem, as the impulse is given it

by the action of the thumb of the operator on its milled periphery 9, and as said wheel works within said holder slot 6, as it turns on its screw seat, it carries its tail-grip jaw
55 respectively toward and from the head-grip jaw.

10 represents a bail shaped frame, the attachment arms 11—11 of which are immovably respectively secured to the rear 12 of
60 the grip-head jaw 3 at one end, and to the foot 13 of the flattened screw stem 1 at the other end. The flat forward side 14 of the back extension bar 15 of said bail shaped frame 10, is held sufficiently aloof from the
65 said flattened screw-stem 1 of the monkey and pipe wrench, by said arms 11—11, for the square face 16 of the heel 17 of the tail-grip jaw 5, to travel back and forth, on line and in loose brace touch to said flat forward
70 side 14, within its slot-way adjustment course 18. It will thus be seen that as said tail-grip jaw travels back and forth, the said square face 16 of the tail-grip jaw 5, running on line with the flat forward side 14 of the back ex-
75 tension bar 15 of the bail frame 10, the pressure lip 19 of the aforesaid tail-grip jaw is brace held both in its approach to and in the maintenance of its grip to any object that is held between said lip 19 and the pressure lip
80 20 of the aforesaid grip head jaw 3.

21 represents a semi-circular cog or spur edge geared plate, that extends integrally rearward from said bail shaped frame 10, and round the periphery of the same are a series
85 of cog geared spurs 22.

23 represents the operative lever or handle, that works the wrench, the head 24 of which lever is provided with an elongated, inverted T slot 25, in which works the holder bolt 26.
90 The fast end of said bolt is secured in its perforate seat in said cog gear plate by being there riveted, and its flat projecting head 27, overlaps the flat head 24 of the lever handle 23, and thus holds said handle securely to
95 said cog gear plate, while by means of its inverted T slotted connection, it allows both longitudinal movement of said handle by means of the movement of the bolt in the longitudinal slot and a lateral locking adjust-
100 ment of said holder bolt within the inverted T head 28 of the slot, locks it in its operative

hold, while it allows a free adjusting slide movement within the limits of said inverted T head of the slot.

29 represents a key pin that is firmly screw seated or riveted in and projects laterally from the flat side of the head of said lever 23, at the required distance from the holder bolt 26, for said key pin 29 to work between the cog gear spurs 22, as the elongated slot in said handle works back and forth on the holder bolt 26, and into the inverted T head of said slot, the flat head 30 of said key-pin holds it from lateral divergence from its hold between the cog-spurs 22, that project from the semi-circular edge of the geared plate 21, as the lever works from one to another of the interlock curved spaces 31 between said cog spurs.

32 represents a detachable spring locked pipe-ratchet plate, which has pipe-ratchet teeth 33 on its preferably bevel front grip face, and its straight back 34, rests against the smooth face of said pressure lip 19 of said tail-grip jaw 5 of the wrench.

36 are clutch-lugs, at the rear of said ratchet-plate, which lugs when the intervening space 37 between them is occupied by the forward edge of the flattened screw stem 1, said lugs embrace each side of said stem, and thus hold the rear of the plate from lateral displacement.

38 represents a stem holder lock-bolt, the fast end of which is preferably integral with the pipe ratchet plate 32, but said lock bolt may be as in the modification shown in Fig. VIII, seated in each case in the countersunk socket 39, in the pipe ratchet plate 32 or 32^a, and is there held by the key pin 40, in the key hole 41, that pierces said plate and said stem holder lock bolt 38, which bolt when inserted in its operative position, rests in its socket seat 42, in the aforesaid tail grip-jaw or in the head jaw 3, in the aforesaid modification. 43 is a curved locking recess in said stem holder lock bolt 38, and 44 is a cut-away inclined guide between the end of the bolt and said locking recess to which it leads.

32^a represents a like spring locked detachable ratchet plate to the plate 32 already described, as attachable to the tail-grip-jaw, except that the ratchet grip face 33, of the plate 32^a has preferably a square presentation instead of a bevel face, as has said 32, and it is attachable as a modification to the head jaw 3, and by the same means as is the plate 32 to the tail jaw 5. When, as in said modification, the detachable ratchet plate 32^a is used, as shown in Fig. VIII, the aforesaid ratchet teeth 4 of the pressure lip 20 of said head jaw are dispensed with, and said pressure lip has then a smooth presentation, as has that of the tail jaw for the embedding of its detachable ratchet plate 32^a. In the said modification, 32^a of the ratchet plate secured to the head jaw 3, the subordinate and attachment devices are the same or substantially the same as those already described in

connection with the ratchet plate 32, that is secured to the tail jaw 5, and are therefore alike named and numbered.

45 represents a roller lock bolt, that is provided with a recessed groove 46, around midway of the same, the provision of which recessed groove constitutes the shoulder catches 47 and 48, that work and roll on the incline guide 44 of the stem holder lock bolt 38, and grip each end of the curved locking recess 43 of the bolt, when said bolt enters its seat 42 in the respective jaws and the ratchet plates are respectively snapped into position thereon, at which time the respective heads 49 and stems of said locking roller bolts are seated and work in their countersunk seats 50 in said jaws.

51 represents a spring plate which is secured to its respective tail or head jaw by the screw 52 that passes through its perforate seat in said spring plate, and is secured in its screw socket seat 53 in said jaw.

The operation of the various elements of this device has been in some measure indicated in the course of their descriptive introduction, but may be still further elucidated as follows: The tail-grip jaw 5, which is the adjustable movable portion of the wrench, is set by the turn of its operator wheel 7, on the flattened screw stem 1, to bring its pressure lip 19 to the required distance from the pressure lip 20 of the head grip jaw 3. It will be seen that as the square face 16 of the heel of said tail-grip moves, in the adjustment of the grip, it runs parallel with the flat side 14 of the bail holder frame 10, so as to constitute a loose brace hold of the tail-grip jaw, and thus firmly holds its pressure lip in line with its work. It will also be seen that by means of the adjustable swinging handle, and by the compound lock engagement of its commander cog geared plate 21, the command of the operator over the wrench is renewed for a certain number of times, and to a certain extent without the delay and trouble of dislodgment and renewal of the hold of the article on which the wrench is operating. Also by the compound action and reaction in the cog-spur gear locked positions of the handle, the operator both avoids the adverse action, consequent on having to pass the dead center in the turn of the wrench, in cases where great force is required in effecting the turn, and from the same cause and effect, the operator's arm in effecting the turn avoids the usual disadvantageous action of the elbow joint in passing the dead center of its movement. So also where the turn of the wrench is barely within reach, either in elevation or otherwise, the operator can effect the turn of the wrench where a common wrench could not be operated.

When the commander head of the handle is lock geared in its operative position, both the key pin 29 is seated between certain of the cog spurs 22, and also the operative movement of the handle, when either turned from

or toward the operator, in either case locks the holder bolt 26 in either one end or the other of the inverted T head 28 of the slot 25, so that in either right or left hand movement while the handle operates, the commander head self locks itself in its operative position, aided by said key pin 29, working as a journal in the curve slots 31.

The spring locked ratchet plates 32 are instantaneously attachable to the tail-grip jaw, so as to transform the monkey wrench into a pipe ratchet wrench, by the insertion of the projecting bolt 38 of said ratchet plate into its socket seat 42 in the jaw, the roller key bolt 45, that is loosely seated in said jaw running in the inclined cut away guide 44 in the projecting holder bolt 38, until when said holder bolt is fully inserted, the spring plate 51, snaps said roller key bolt into its locked position within the curve slot 43 in said holder bolt 38, and thus locks the ratchet plate to its seat.

Now as it is well known that the wear and strain on the ratchet teeth in a pipe wrench is chiefly on the movable tail grip jaw, (the head jaw generally remaining stationary,) therefore the combination monkey wrench and pipe ratchet wrench may in some cases be supplied with the detachable ratchet plate 32 alone, that is attachable to the tail grip jaw 5, in which case the head grip jaw has a series of ratchet teeth 4 formed in its pressure lip 20. But when it is required to still further complete the transformation, the ratchet teeth 4 in the pressure lip 20 of the head jaw are omitted, as in the modification shown in Fig. VIII, and a substantially similar ratchet plate 32^a to that already described, is secured by identically the same means as is the plate 32, to the head grip jaw, and said parts are alike both in construction and in the numerals by which they are indicated.

In conclusion, it will be seen that by means of the readjustable lock spur lever, my combined pipe and monkey wrench, is adaptable for use in cramped corners, and among multitudinous obstructions where a common wrench could not effect a turn, or pass its own dead center, and that for a lengthened turn without having to renew its hold. Also by the use of the respectively bevel face ratchet plate 32, and square face ratchet plate 32^a, shown in Fig. VIII, and their respective transfer from jaw to jaw, (which transfer is but the work of a few moments,) the wrench can be transferred in its position and from a right to a left hand movement, and vice versa, so as to work the wrench past a dead center, or past an obstructive position, ready for a free turn thereafter. Also by the transfer of said respective bevel and square faced ratchet plates from jaw to jaw, the ratchet wrench is thus adapted for the respective attachment and detachment of screw joints.

I claim as my invention—

1. In a combined pipe, ratchet and monkey wrench, the combination of the clamping grip-

jaws of the wrench, the detachable ratchet plate, having the projecting holder bolt 38, provided with the locking recess 43, and the cut-away inclined guide 44, the roller locking bolt 45, and the snapping spring plate 51; substantially as described.

2. In a combined pipe, ratchet and monkey wrench, the combination of the clamping grip jaws, the cog-spur geared plate 21, the operative lever 23, having the commander head 24, provided with the inverted T slot 25, the holder bolt 26 that projects from said gear plate, the key-pin 29, that projects from said lever, and the detachable ratchet plate, attachable to the grip jaw, substantially as described.

3. In a combined pipe, ratchet and monkey wrench, the combination of the flattened screw stem 1, the stationary grip-head jaw 3, the adjustable tail-grip jaw 5, the bail shaped frame 10, having the attachment arms 11, and the flat forward contact side 14, and said tail grip having the projecting heel 17, with the square brace face 16, the spur geared plate 21, the lever 23 provided with the inverted locking T slot, the holder bolt 26, the key pin 29, the attachable and detachable ratchet faced plates, the stem holder lock bolts 38 that project from said plates, said bolts provided with the locking recess 43, and the cut-away inclined guide 44, the roller lock-bolt 45, and the spring 51, that throws said lock-bolt; substantially as described.

4. In a combined pipe, ratchet and monkey wrench, the combination of the flat screw stem 1, the stationary grip-head jaw 3, having the pressure lip 20, the adjustable tail-grip jaw 5, provided with the holder slot 6, the operator wheel 7, having the internal screw thread 8 and the milled periphery 9, the bail shaped frame 10, having the attachment arm 11, and flat, forward side 14, the spur gear plate 21, having the gear cogs 22, the operative lever 23 having the commander head 24, provided with the inverted T locking slot, the pivot locking bolt 26, and the key pin 29, said adjustable tail-grip jaw having the pressure lip 19, and the projecting square heel 17 with the brace contact face 16, the attachable and detachable ratchet face plates, the stem holder lock bolts 38, the roller lock bolts 45, and the spring 51 that throws said lock bolt; substantially as described.

5. In a combined pipe, ratchet and monkey wrench, the combination of the grip-head jaw 3, the adjustable tail-grip jaw 5, having the projecting heel 17 with the square brace face 16, the spur geared attachment frame having the integral semi-circular plate 21, with the cog geared spurs 22, the attachment arms 11, the extension bar 15 having the flat forward side 14, in loose contact with which said brace face 16 of the square heel of the tail grip jaw travels, the laterally projecting holder bolt 26, having the flat retention head 27, the lever 23, having the commander head 24 and provided with the inverted T retention and

locking slot 25, the key pin 29, that projects from said lever and engages with said spurs 22, said key pin having the flat retention head 30, the attachable and detachable ratchet
5 faced plates 32 and 32^a, the stem holder lock bolts 38 that project from said plates, said bolts provided with the locking recess 43 and the cut-away inclined guide 44, the said wrench jaws provided with the countersunk
10 key seats 50, the roller keys that work in said seats, said keys having the recessed groove 46, and shoulder locking catches 47 and 48, and the locking spring 51; substantially as described.

15 6. In a combined pipe, ratchet and monkey wrench, the combination of the clamping grip

jaws, the cog spurred gear plate 21, the cogs 22 provided with the intervening curved journal lock beds 31, the operative lever 23 having the commander head 24, provided with 20 the inverted T slot 25, having the locking spaces 28, the pivot pin 26, the retention head 27, the key pin 29, that journals in said intervening curved beds 31, as said bolt 26 locks, the detachable ratchet plates, the locking 25 bolts 38, the roller lock bolt 45, and the snap spring 51; substantially as described.

SAMUEL M. FRIEDE.

In presence of—

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A. M. EBERSOLE.