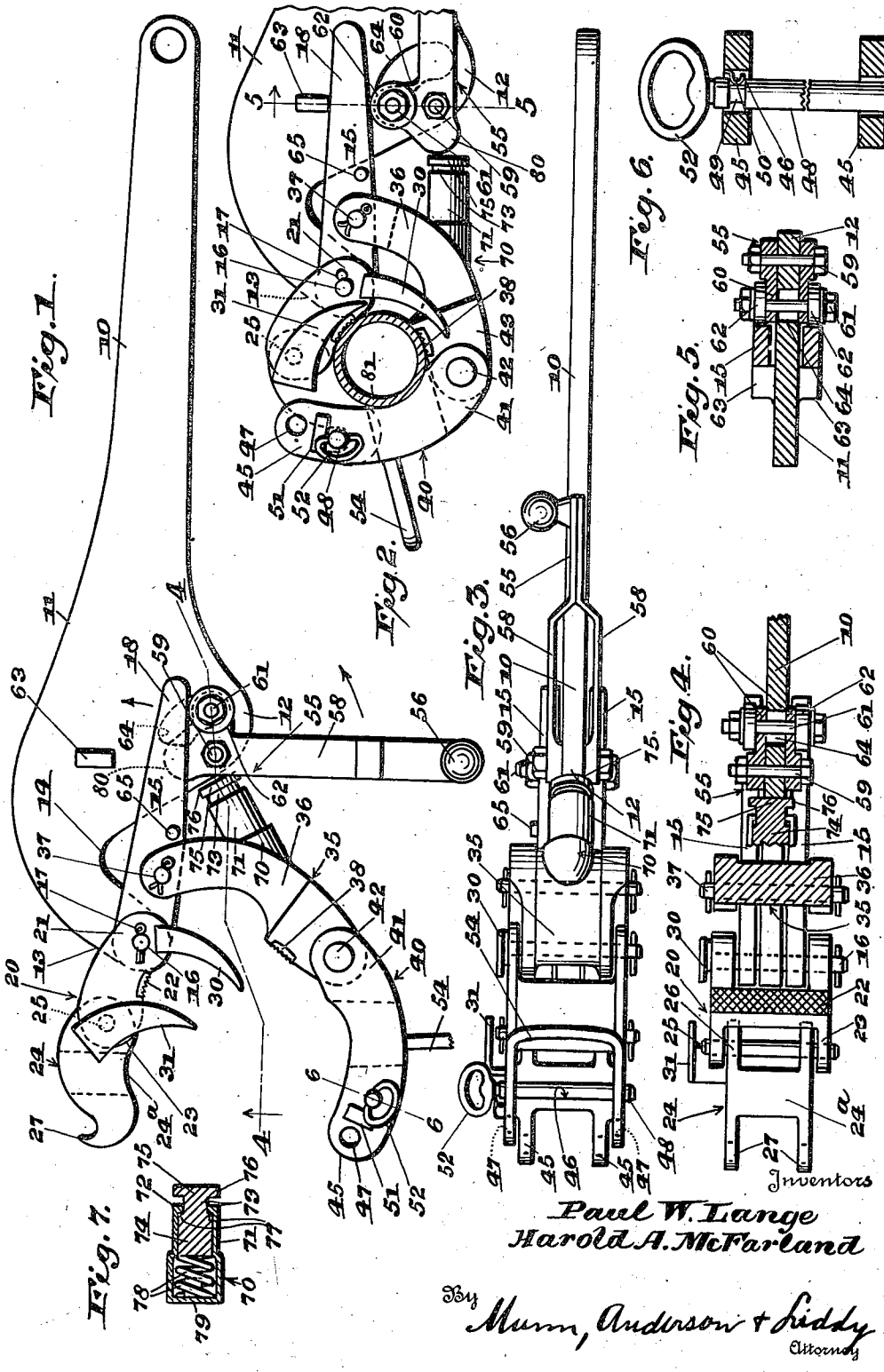
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PIPE TONGS

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PIPE TONGS

Paul W. Lange and Harold A. McFarland,
Casper, Wyo.

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This invention relates to locking pipe tongs.

An object of the invention is the provision of a pair of quick-locking pipe tongs which have a positive gripping action on the pipe after the jaws have encircled and have become automatically locked to the pipe with means for quickly releasing the jaws when desired.

Another object of the invention is the provision of a pair of quick-locking pipe tongs which are automatically set in operative relation with a pipe when the pipe is moved in between pairs of the jaws, the free ends of the jaws having interlocking means for retaining the jaws in position after they have been moved into an encircling relation when the pipe has been inserted between the jaws, the jaws at no time being so wedged on the pipe that they cannot be readily released when desired.

A further object of the invention is the provision of a pair of pipe tongs having jaws which are caused to be automatically moved into operative position when a pipe is inserted between the jaws, the jaws having a large surface for effectively holding the pipe while preventing the pipe from being flattened, a tripping lever being employed for immediately releasing the grip of the jaws on the pipe.

This invention will be best understood from a consideration of the following detailed description, in view of the accompanying drawing forming a part of the specification; nevertheless, it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications as define no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:

Figure 1 is a plan view of a pair of tongs in open position and constructed in accordance with the principles of our invention,

Figure 2 is a fragmentary plan view of the tongs showing the jaws in operative relation on a pipe,

Figure 3 is a longitudinal end view,

Figure 4 is a vertical section taken along the line 4—4 of Figure 1,

Figure 5 is a transverse vertical section taken along the line 5—5 of Figure 1, and

Figure 6 is a transverse vertical section taken along the line 6—6 of Figure 1.

Figure 7 is a transverse section through a cylinder secured to one of the jaws of the tongs.

Referring more particularly to the drawing, 10 designates a handle having a head portion 11 and this head portion is provided with projections 12 and 13. Between the pair of projections is a substantially V-shaped cut-out portion 14.

A pair of levers 15 are located upon opposite sides of the head 11 and are pivotally mounted on a pin 16 carried by the projection 13. This pin may be held in place by means of a cotter pin 17 or by a nut threaded onto the end of the pin. The levers extend rearwardly and have their free ends 18 terminating at points adjacent the projection 12.

A movable jaw 20 is pivotally mounted on the pin 16 and has a pair of legs 21 straddling the levers 15 and the projection 13. These legs are in flat contact with the outer faces of the levers 15, as shown more particularly in Figs. 3 and 2. The inner face of the jaw 20 is provided with a toothed portion 22 which is dove-tailed into the body of the jaw and is adapted to engage the pipe to prevent the jaw from slipping on the pipe. The member 22 is replaceable.

The outer end of the jaw 20 is bifurcated to form a pair of legs 23 which straddle a second jaw 24. A pin 25 pivotally connects the jaw 24 with the outer free end of the jaw 20. It will be noted from Fig. 4 that the jaw 24 is provided with a pair of legs 26 which are located inwardly of the legs 23. The outer free end of the jaw 24 is provided with a pair of curved fingers 27 for a purpose which will be presently explained.

To the inner end of the jaw 20 and at one side thereof is secured a tripping finger 30 which extends laterally inwardly from the jaw. A second tripping finger 31 is secured to one side of the jaw 24 and this finger also extends laterally inwardly from the inner end of the jaw for a purpose which will be presently explained.

A jaw 35 is provided with a pair of legs 36 which are pivotally mounted on a pin 37 carried by the levers 15. The inner faces of the legs 36 are in flat contact with the outer faces of said levers. This jaw is also provided with a toothed plate 38 which is removably dove-tailed in the inner face of the jaw 35 and cooperates with the toothed plate 22 for aiding in holding the pipe against slippage when the tongs are operated.

A second or auxiliary jaw 40 has legs 41 which are pivotally mounted on a pin 42 carried by the outer reduced end 43 of the jaw 35. The legs 41 are in contact with the opposite faces of the reduced portion 43 of the jaw 35.

The outer end of the jaw 40 is also provided with a pair of spaced legs 45 and these legs are provided with openings 46 and 47 to receive a pin 48.

The pin 48, as shown more particularly in Fig. 6, is provided with an annular groove 49 which is adapted to receive a spring 50 located in each of the openings 46 and 47. The spring 50 maintains the pin 48 against displacement during the operation of the tongs.

On one face of the jaw 40 and on the outer face of one of the legs 45 of the said jaw is formed a cam member 51 which is adapted to engage the under surface of a handle 52 connected with the pin 48 so that when the pin is turned by means of the handle the cam member will force the pin outwardly and release it from the spring 50.

The pin 48 is adapted to be engaged by the curved fingers 27 on the jaws 24 when the jaws are in locked position around the pipe. The pin is placed within the openings 46 when the jaws of the tongs are adapted to engage around the pipe and when the jaws are adapted to engage the collar of the pipe said pin is placed in the openings 47.

A handle 52 is secured to the jaw 40 and may be gripped by the hand for pulling the jaw away from the pipe when the pin 48 has been released from the curved finger 27.

A bell-crank 55 is provided with a handle 56 and a pair of legs 58 straddling the projection 12 on the handle 10. These legs are pivotally mounted on a pin 59 carried by the projection 12. A pair of arms 60 project at right angles from the inner ends of the legs 58 and are rigidly connected thereto. Each arm 60 carries a pin 61 upon which is mounted a roller 62 adapted to engage the levers 15 for oscillating the levers so that one of the levers will be moved into engagement with a stop 63 formed on one face of the head 11. After the tongs have been operated and when the lever 55 and the levers 15 move to the positions shown in Fig. 2, the jaws will be held against displacement. It will be noted that the projection 12 is provided with an arcuate slot 64 through which the pin 61 moves.

A pin 65 is connected to one of the levers 15 and is in a position to engage the outer edges of the legs of the jaw 35 to limit the inward movement of the jaw.

A cylinder 70 is secured within a pocket formed in the jaw 35 and is secured to the legs in any approved manner. This cylinder has a reduced portion 71 projecting outwardly from the legs and towards the projection 12 on the head portion 11 of the handle 10. The outer end of the portion 71 of the cylinder 70 is provided with an inturned flange 72 adapted to receive a reduced portion 73 of a piston 74 which is slidably mounted in the reduced portion 71 of the cylinder 70. A head 75 is located on the outer end of the piston 74 and is provided with an annular flange 76 which is adapted to engage the flange 72 on the cylinder 70 to limit the inward movement of the piston. An annular shoulder 77 on the piston 74 engages the flange 72 on the cylinder 70 for limiting the outward movement of the piston. A coil spring 78 is located within the cylinder 70 and has one end engaging the inner end of the piston 74 while the opposite end engages a closed end 79 of the cylinder. The spring tends at all times to force the piston outwardly from the cylinder.

A cam member 80 formed on the end of the bell-crank 55 is adapted to engage the head 75 of the piston or plunger 74 for forcing the jaws 36 and 40 inwardly towards the respective jaws 20 and 24 when the bell crank 55 is oscillated. Oscillation of the bell crank causes the cam member 80 to move over the head 75 of the piston 74, thereby causing the jaw 36 and likewise 40 to be moved towards the jaw 20 as will be presently explained.

The operation of the device is as follows: The jaws of the tongs shown in Fig. 1 are in open position and are ready to receive a pipe 81. As the tongs are moved towards the pipe the placing the tongs in operative position on the pipe the member 31 will be engaged by the pipe whereby the jaw 24 will be moved inwardly towards the jaw 40. Continued movement of the tongs will cause the member 30 to come in contact with the pipe whereby the jaw 20 will be moved inwardly. The jaws 35 and 40 are then moved upwardly towards the pipe and since the jaw 24 has been moved inwardly the fingers 27 will be in a position to be engaged by the pin 48 which is in the openings 46 in the legs at the outer end of the jaw 40.

The bell crank 55 is then rocked in the direction indicated by the arrow in Fig. 1 whereby the rollers 62 will engage the levers 15 at each side of the head 11 and moves the said lever in the direction indicated by the arrow in Fig. 1 and one of the levers engages the stop 63 at one side of the head.

At this time the arm of the bell crank will be in a horizontal position while the horizontal axis of the rollers 62 will be in substantially vertical alignment with the axis of the pivot of the bell crank.

When the pin 48 is in the passages 46 in the spaced legs 45 of the jaw 40 the cam 80 will be in close association with the head 75 of the plunger 74 as shown in Fig. 2 but will not act on said head for retaining the jaws in operative relation with the pipe 81. However, when the pin 48 is located in the passages 47 in the legs 45 of the jaw 40 the cam 80 will engage the head 75 and force the plunger towards the inner end of the cylinder 70 against the tension of the spring 78, so that when the bell crank is in the horizontal position shown in Fig. 2 the cam will exert pressure on the plunger for maintaining the jaws 35 and 40 in a firmer gripping relation with the collar of a drill string. In other words, when the tongs are applied to an article of greater diameter than the pipe 81 the pin 48 is placed in the opening 47 and the plunger 74 in connection with the cam member 80 cooperates for maintaining the jaws in a tighter gripping relation with the collar or other element so that the toothed plate 38 will be urged in contact with the outer surface of the collar and prevent the tongs from falling away from the collar when power has been released from the handle 10.

It will be seen by this construction that pipes or collars of different diameters may be firmly gripped by the same pair of tongs by the adjustment of the pin 48 in either of the openings 46 or 47 at the outer end of the jaw 40. The oscillation of the handle of the bell crank 55 in the direction indicated in Fig. 1 causes rocking of the lever 15 in the direction indicated by the arrow whereby a pull will be exerted on the jaws 35 and 40 until one of the levers 55 engages a stop 63.

When the bell crank lever 55 has been swung from the position shown in Fig. 1 to the position shown in Fig. 2 it will be recognized that the roller 62 will tend to hold the lever 15 against the stop 63. When the handle 10 is moved counter-clockwise and is in the position shown in the drawing the lever 15 will tend to rotate in the same direction as forced by the roller 62 on the

locking lever 55. This tends to exert a pull on the gripping jaw 35 which is connected to the lever 15 by the pin 37. At the time that the lever 55 is moved to its set position the cam member 80 engages the head 79 of the piston 74 and compresses the spring 78. The force thus created tends to urge the gripping jaw 35 in a gripping operation and also pulls this jaw to impart a pull on the lever 15. This will place the entire gripping jaw structure with the latch members under yieldable tension around the pipe. It will be recognized that lack of uniformity in the diameter of the pipe might cause a slight amount of lost motion between the roller 62, the lever 15 and the stop 63 when the structure is latched. This lost motion will be taken up automatically by the action of the cam 80, the piston 74 and the spring 78. This is a point of considerable importance since in cases where the movement of the roller 62 did not tightly bind the gripping members around the pipe before a pull is taken on the handle 10 the tongs would tend to slip down on the pipe, but when the piston 74 and the spring 78 are provided these members will maintain the gripping jaws and the latch members in a tightly wrapped position around the pipe at all times, and will prevent the tongs from slipping down during the period when no pull is being exerted on the handle 10.

Rocking of the handle 10 will cause all of the jaws to bind firmly on the pipe 81 so that the pipe may be turned.

When it is desired to remove the tongs from the pipe it is only necessary to swing the lever outwardly away from the handle 10, whereby the levers 15 will be released and the jaws will likewise be released from rigid contact with the pipe. The curved fingers 27 may then be removed from the pin 48.

When the pin 48 is in the openings 47 of the jaw 40 the cam 80 will be removed from its engagement with the head of the plunger 74 for further releasing the jaws when the bell crank is moved outwardly from the handle 10 and to the position in Fig. 1.

From the foregoing disclosure it will thus be seen that the tongs are simple in their construction, may be latched in position easily, and thereafter quickly set in a gripping position. It will furthermore be recognized that due to the yieldable element interposed in the combination of levers and jaws, the jaws when disposed in an embracing position around a pipe will be held yieldably in this position to maintain the tongs in a desired horizontal plane of operation.

We claim:

1. Pipe tongs comprising a handle, a pair of levers and a main clamping jaw having a common pivotal connection with one end of the handle, a second main jaw having pivotal connections with the levers inwardly of the first pivotal connection, an auxiliary jaw pivotally connected to the free end of the first-mentioned jaw and provided with curved fingers at the free end thereof, a second auxiliary jaw pivoted on the free end of the second main jaw and provided with a pin adapted to be received by the curved fingers, a stop on the handle adapted to be engaged by the free end of the lever, and means on the handle for forcing one of the levers against the stop for causing the jaws to tightly grip the pipe.

2. Pipe tongs comprising a handle, a pair of levers and a main clamping jaw having a common pivotal connection with one end of the handle, a second main jaw having pivotal connections with the levers inwardly of the first pivotal connection, an auxiliary jaw pivotally connected to the free end of the first-mentioned jaw and provided with curved fingers at the free end thereof, a second auxiliary jaw pivoted on the free end of the second main jaw and provided with a pin adapted to be received by the curved fingers, a stop on the handle adapted to be engaged by the free end of the lever, tripping fingers projecting inwardly from a main jaw and from an auxiliary jaw adapted to be engaged successively by a pipe for causing said jaws to be moved into operative relation with said pipe, and means on the handle for forcing one of the levers against the stop for causing the jaws to tightly grip the pipe.

3. Pipe tongs comprising a handle, a pair of levers and a main clamping jaw having a common pivotal connection with one end of the handle, a second main jaw having pivotal connections with the levers inwardly of the first pivotal connection, an auxiliary jaw pivotally connected to the free end of the first mentioned jaw and provided with curved fingers at the free end thereof, a second auxiliary jaw pivoted on the free end of the second main jaw and provided with a pin adapted to be received by the curved fingers, and means for causing oscillation of the levers for drawing the jaws tight around the pipe.

4. Pipe tongs comprising a handle, a pair of levers and a main clamping jaw having a common pivotal connection with one end of the handle, a second main jaw having pivotal connections with the levers inwardly of the first pivotal connection, an auxiliary jaw pivotally connected to the free end of the first-mentioned jaw and provided with curved fingers at the free end thereof, a second auxiliary jaw pivoted on the free end of the second jaw and provided with a pin adapted to be received by the curved fingers, and means for oscillating the levers and locking the levers in an operative position after the jaws have been tightened on the pipe by said levers.

5. Pipe tongs comprising a handle, a pair of levers and a main clamping jaw having a common pivotal connection with one end of the handle, a second main jaw having pivotal connection with the levers inwardly of the first pivotal connection, an auxiliary jaw pivotally connected to the free end of the first mentioned jaw and provided with curved fingers at the free end thereof, a second auxiliary jaw pivoted on the free end of the second main jaw and provided with a pin adapted to be received by the curved fingers, and a bell crank pivotally mounted on the handle having a short arm provided with rollers engageable with the levers for moving said levers to an operative position to draw the jaws tight around the pipe, and a long arm included in the bell crank for oscillating the bell crank.

6. Pipe tongs comprising a handle, a pair of levers and a main clamping jaw having a common pivotal connection with one end of the handle, a second main jaw having pivotal connections with the levers inwardly of the first pivotal connection, an auxiliary jaw pivotally connected to the free end of the first mentioned jaw and provided with curved fingers at the free end thereof, a second auxiliary jaw pivoted on the free end of the second main jaw and provided with a pin adapted to be received by the curved fingers, a stop on the handle

adapted to be engaged by the free end of the lever, and means on the handle for forcing one of the levers against the stop for causing the jaws to tightly grip the pipe, the second auxiliary jaw having a plurality of passages to receive the pins so that the jaws may be used on pipes of different diameters.

7. Pipe tongs comprising a handle, a pair of levers and a main clamping jaw having a common pivotal connection with one end of the handle, a second main jaw having pivotal connections with the levers inwardly of the first pivotal connection, an auxiliary jaw pivotally connected to the free end of the first mentioned jaw and provided with curved fingers at the free end thereof, a second auxiliary jaw pivoted on the free end of the second main jaw and provided with a pin adapted to be received by the curved fingers, a stop on the handle adapted to be engaged by the free end of the lever, means on the handle for forcing one of the levers against the stop for causing the jaws to tightly grip the pipe, the second auxiliary jaw having a plurality of passages to receive the pins so that the jaws may be used on pipes of different diameters, and means for removably retaining the pin in the passage.

8. Pipe tongs comprising an operating handle, a lever and a main clamping jaw having a common pivotal connection with one end of the handle, a second main jaw having pivotal connection at one end with the lever, an auxiliary jaw connected with the free end of each main jaw, cooperating means on the free ends of the auxiliary jaws for removably connecting the auxiliary jaws together, a manually operable lever pivoted at one end on the handle and provided with a cam, a plunger mounted on the second main jaw, a spring forcing said plunger towards the cam so that when the jaws are engaged around a collar on a pipe and the second lever is rocked to cause the cam to engage the plunger, said cam will exert a pressure on the plunger and maintain the jaws into tight gripping relation with the collar, and means on the second lever for causing rocking of the first lever for aiding in drawing the jaws tight around the collar.

9. Pipe tongs comprising an operating handle, a lever and a clamping jaw having a common pivotal connection with one end of the handle, a second clamping jaw having pivotal connections at one end with the lever, cooperating means on the free ends of the jaws for removably connecting the jaws together around a pipe, a manually operable lever pivoted at one end of the handle and provided with a cam, a plunger mounted on the second jaw, a spring forcing said plunger towards the cam so that when the jaws are engaged around the pipe and the second lever is rocked the cam will exert pressure on the plunger and maintain the jaws in gripping relation with the pipe, and means on the second lever for causing rocking of the first lever for aiding in drawing the jaws tight around the pipe.

10. Pipe tongs comprising an operating handle, a lever and a clamping jaw having a common pivotal connection with one end of the handle, a second clamping jaw having pivotal connections at one end with the lever, cooperating means on the free ends of the jaws for removably connecting the jaws together around a pipe, a manually operable lever pivoted at one end on the handle and provided with a cam, means on the second jaw and acted on by the cam for causing the jaws to be retained in gripping relation on the pipe when the second lever is oscillated, and means on the second lever for causing rocking of the first lever for aiding in drawing the jaws tight around the pipe.

11. Pipe tongs comprising an operating handle, a lever and a main clamping jaw having a common pivotal connection with one end of the handle, a second main jaw having a pivotal connection at one end with the lever, articulate means to wrap around an article to be gripped and connecting the free ends of the clamping jaws, manually operable means acting against the lever to move it while drawing the jaws and their articulate connections around the object to be gripped and thus holding them, and yieldable means disposed between said manually operable means and one of said jaws whereby the jaws and their articulate connections may be maintained under gripping tension.

PAUL W. LANGE.
HAROLD A. McFARLAND.