

Oct. 10, 1939.

G. L. McKEE

2,175,478

BANDING TOOL

Filed July 23, 1937

2 Sheets-Sheet 1

Fig. 1.

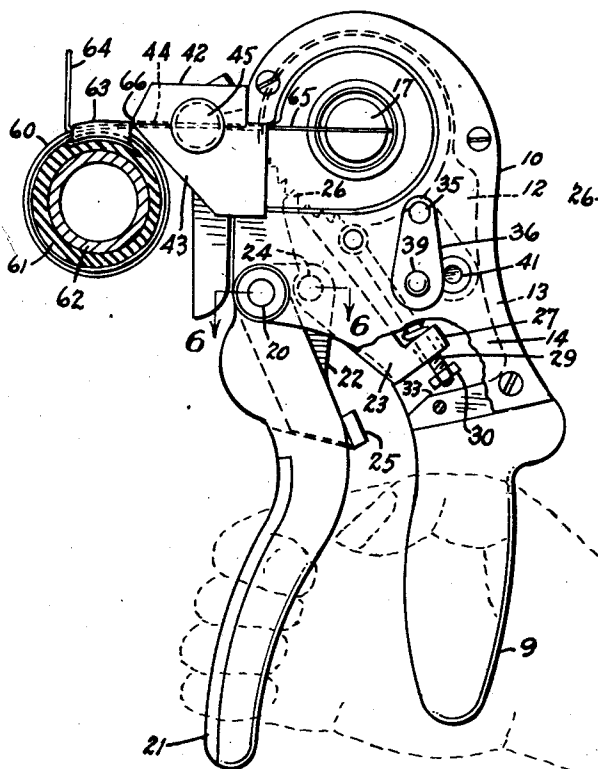


Fig. 2.

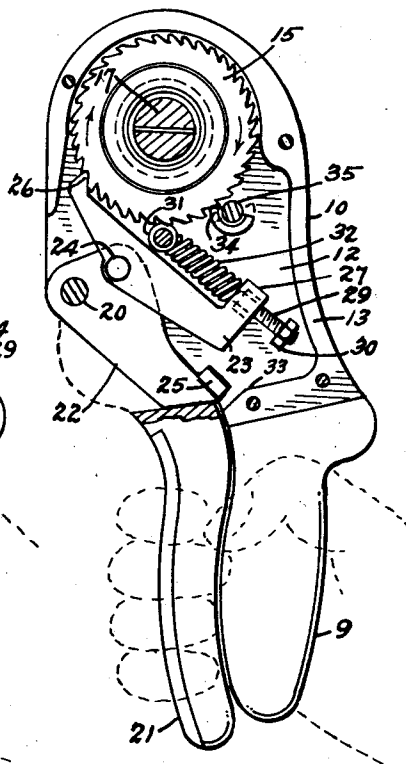
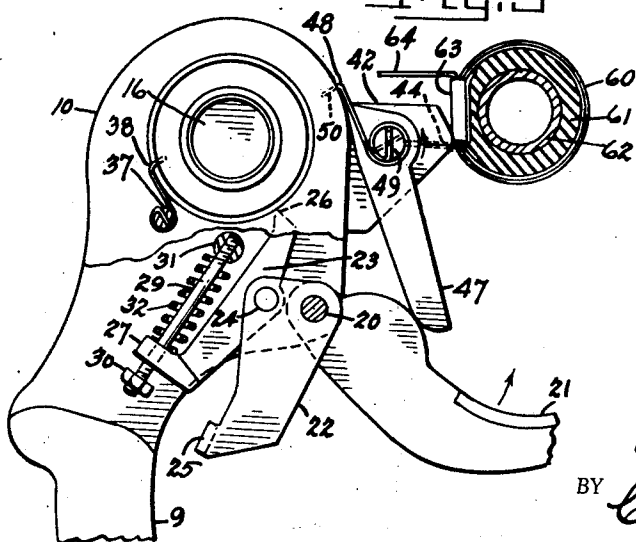


Fig. 3



INVENTOR.
Glenn L. McKee
BY Carlos G. Stratton
ATTORNEY.

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Fig. 4.

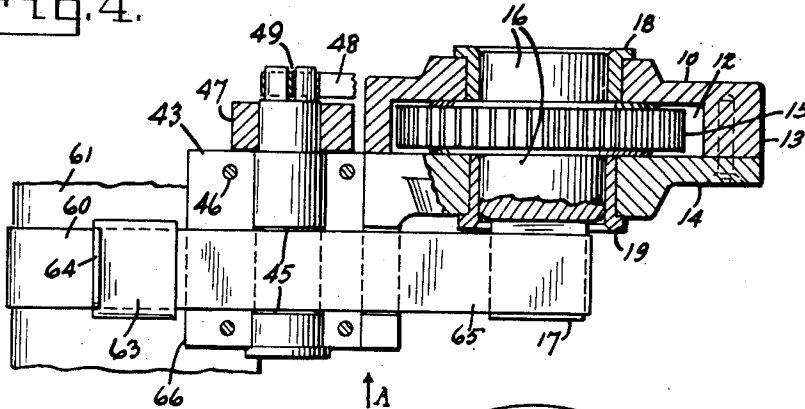


Fig. 5.

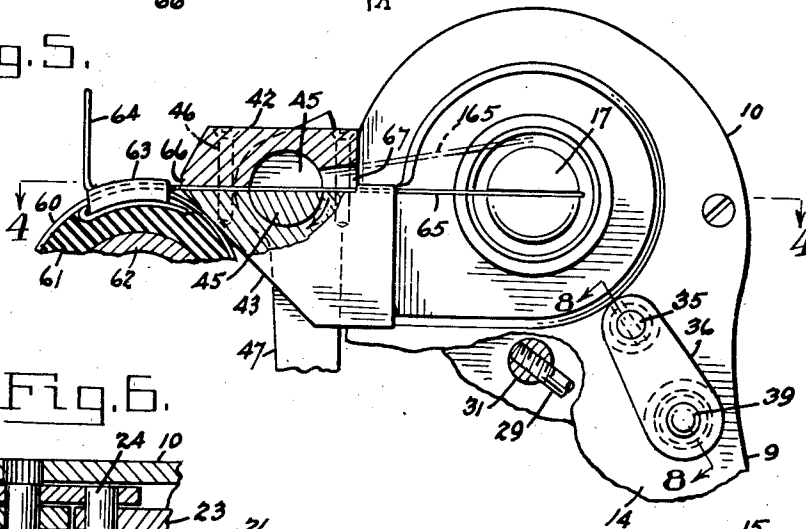


Fig. 6.

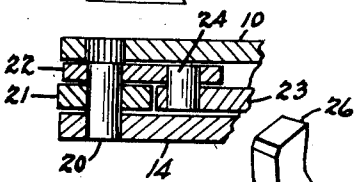
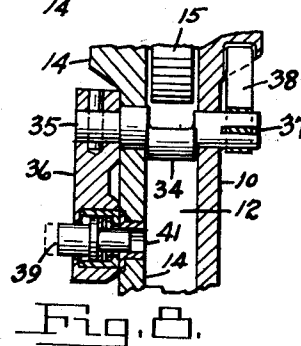
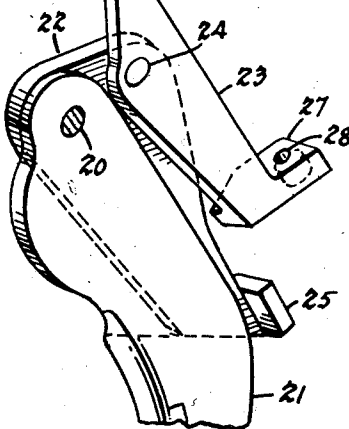


Fig. 7.



INVENTOR.

Glenn L. McKee

BY

Carlos G. Stratton

ATTORNEY.

UNITED STATES PATENT OFFICE

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BANDING TOOL

Glenn L. McKee, Bakersfield, Calif., assignor to
McKee Brothers Corporation, Bakersfield,
Calif.

Application July 23, 1937, Serial No. 155,156

9 Claims. (Cl. 81—9.3)

My invention relates to a banding tool, and more particularly to a tool for tightening a metal band around an article, e. g., a round article such as a hose, a telephone pole, etc., or a rectangular article, such as a box, a railroad tie, etc.

An important object of the present invention is to provide such a tool that may be held in the operator's hand during the banding operation.

Another object is to provide in such a tool means for cutting off surplus from the end of the band, after the band has been applied to and tightened around the article desired to be banded.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description.

In the drawings, like reference characters designate similar parts in the several views.

Figure 1 is a face view of an embodiment of my invention.

Figure 2 is a vertical section with certain parts removed, and showing the handles in a different operative position.

Figure 3 is a broken face view, looking in the opposite direction.

Figure 4 is an enlarged view, partly in cross section, taken on the line 4—4 of Figure 5.

Figure 5 is also an enlarged view, partly in section and partly broken away, looking in the direction of the arrow A of Figure 4.

Figure 6 is an enlarged section taken on the line 6—6 of Figure 1.

Figure 7 is a broken, perspective view of a hand lever comprised in the invention and its associated parts.

Figure 8 is a section taken on the line 8—8 of Figure 5.

Referring more in detail to the drawings, the reference numeral 9 designates a handle for the tool mounted on a head 10 that is provided with a recessed portion 12 by means of a peripheral flange 13. A face plate 14 is bolted on the flange 13, thereby providing a housing for mechanism disposed in the recess 12.

A rotary ratchet wheel 15 is mounted on a spindle 16 and provided with a split end 17. A sleeve bearing 18 rotatably mounts one end of the spindle 16 in the head 10 and a sleeve bearing 19 rotatably mounts the other end of the spindle 16 in the face plate 14.

Pivoted on a pin 20 in the recess 12 of the head 10 is another handle 21. A block 22 is also pivoted on the pin 20 and in turn supports a dog 23 by means of a floating pivot pin 24. The block 22 has a laterally bent lug 25 that is engaged by

the relatively movable handle 21 when moved in one direction (counter-clockwise, as shown in Figure 7).

The dog 23 comprises a tooth 26 for engaging the ratchet wheel 15, and also carries a lug 27, apertured at 28, for receiving a bolt 29 that is provided with threaded ends. An adjusting nut 30 is screwed on one threaded end of the bolt 29, and the other threaded end is screwed into a rotary abutment 31. A helical spring 32 is wound around the bolt 29 and abuts the lug 27 and the abutment 31. Said spring rocks the dog 23 about the pivot pin 24. Pressure of the spring 32 against the lug 27 thereby urges the tooth 26 of the pivoted dog 23 into engagement with opposed teeth of the ratchet wheel. The nut 30 engages a shoulder 33 of the flange 13. The shoulder 33 inclines upwardly (in Figs. 1 and 2) at an angle to a tangent of the arc of movement of the nut 30. Thus, by adjustment of the nut 30, it engages a different point on the incline of said shoulder, which determines the amount that the ratchet wheel is rotated during one cycle of movement of the pivoted handle 21. It is to be understood that when the nut has been screwed up the bolt 29, so that the shoulder 33 is not touched by the nut 30, in the cycle of operation, the longest stroke of the dog 23 is obtained. In this event, the bolt 29 itself engages the shoulder 33, to limit the dog 23. Thus by changing the position of the nut on the bolt 29, the amount of rotation of the ratchet wheel during one cycle of operation of the pivoted handle is varied.

Means to prevent retrograde movement of the ratchet wheel while the dog 23 is being moved to engage other teeth of the ratchet comprises a pawl 34. The pawl is mounted on a pin 35 that is journaled in the head 10 and plate 14, as shown in Figure 8. The pin 35 has its ends projecting beyond said head and plate.

A crank arm 36 is keyed on one projecting end of the pin 35. The other projecting end is slit, as shown at 37, to receive a flat spring 38. This spring tends to move the pawl 34 into engagement with the ratchet wheel. The crank arm 36 has a spring latch 39, which in one position (shown in Figure 8) engages a socket 41 in the plate 14. When the latch 39 is in the socket 41, the ratchet 15 is locked against successive rotation. When the latch 39 is withdrawn manually from the socket 41 and the crank arm 36 is moved to the position shown in Figure 1, the ratchet 15 may be rotated in successive stages, to tighten a band around an article.

Mounted at a side of the head 10 are upper

and lower blocks 42 and 43. A groove 44 is provided between the blocks. The groove 44 is preferably entirely in the upper block 42, although complementary portions of the groove may be in the two blocks.

A shearing bolt 45 is rotatably mounted in complementary halves of a cylindrical opening between the blocks 42 and 43. The bolt 45 is transverse to the groove 44. That portion of the bolt 45 that extends across the groove 44 is half cut away, to-wit, that half that is normally in the upper block 42. Screws 46 fasten the blocks 42 and 43 together.

On what is normally the rear face of the tool, a lever 47 is fastened on the shearing bolt 45. A flat spring 48 is disposed in a split end 49 of the bolt and is hooked into the head 10, as shown at 50. The spring 48 urges the free end of the lever 47 against the side of the head 10. When the lever 47 is against the side of the head 10, the groove 44 between the blocks is unobstructed.

In the use of my tool, a band 60 such as shown and described in my co-pending application for patent, Serial No. 125,650, filed February 13, 1937, is applied to a hose 61. A coupling 62 laps the joint between hose sections. Reference is made to said application and also to my co-pending application Serial No. 79,545, filed May 13, 1936, now issued as Patent No. 2,150,234, dated Mar. 14, 1939, for subject matter shown and described but not claimed herein.

The present tool is a portable hand tool for tightening such a band around the hose or other article, as suggested at the outset of this specification.

A clip 63 embraces wraps of the band 60. One end 64 of the band is bent around an end of the clip 63, to prevent such end from slipping through the clip. The other end 65 of the band is inserted lengthwise of the groove 44, across the flat side of the shearing pin 45 and into the split of the end 17. A nose 66 formed by beveled front faces of the blocks 42 and 43 contacts the clip 63 to restrict its movement. The position of the clip 63 spaced from the nose 66, as shown in Figures 4 and 5, is prior to the tightening of the band 60 around an article.

The ratchet 15 is now rotated in the direction of the arrows shown in Figure 2, by moving the handle 21 toward the handle 9 by successive movements. The handles are gripped as suggested by the broken lines in Figures 1 and 2, illustrating the user's hands.

Said movement of the pivoted handle 21 effects movement of the block 22 by contact with the lug 25. Tooth 26 of the dog 23 successively engages teeth around the ratchet wheel to advance the latter by successive movements of the dog. The spring 32 urges the dog tooth into engagement with the ratchet and the number of teeth that the ratchet wheel is advanced upon each movement of the dog is determined by the position of the nut 30, which thereby can be varied to engage different points on the incline of the shoulder 33, or to permit the bolt 29 to engage the incline.

After the band 60 has been sufficiently tightened around an article, the band is locked upon the clip 63, to maintain the compression or tension upon the article, in the following manner: The banded article is moved from the position shown in Figure 1 to the position shown in Figure 3. This movement bends the end 65 of the band around the end of the clip 63. To permit such movement of the banded article, the tool

permits the gradual withdrawal of the band end 65 as the clip 63 rounds the nose 66 of the tool. During this movement, the spring latch 39 is in the recess 41 and the handle 21 is moving away from the handle 9. Thus the tension or compression is maintained on the article as the band is locked around the clip.

The banded article may then be bent upward, as shown in Figure 3, so as to bend the band end 65 substantially parallel with the end 64, to lock the band in its tightened position around the article.

The band end 65 is then sheared by moving the handle 21 further away from the handle 9, as suggested by the arrow adjacent the handle 21 in Figure 3. The lever 47 thereby rotates the shearing pin 45 in the direction of the arrow adjacent such lever in the same figure and in the direction of the arrow adjacent said pin in Figure 5. This movement causes the pin 45 to shear the band against the edge of the complementary groove in the upper block 42.

The remaining portion of the end 65 is then bent down on the clip 63 and the end 64 is bent down upon the first-mentioned end in the manner shown and described in my said co-pending applications.

It will be noted in Figure 5 that the upper block 42 has a slot 67 that permits play of the band end 65 in the upper block. The broken line 165 suggests an extreme position of the band 65 during the rotation of the ratchet.

Moreover, the opening in the lug 27 is larger than the pin 29, to permit rocking of the one relative to the other.

While I have illustrated and described what I now regard as the preferred embodiment of my invention, the construction is, of course, subject to modifications without departing from the spirit of my invention. I, therefore, do not wish to restrict myself to the particular form of construction illustrated and described, but desire to avail myself of all modifications which may fall within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A banding tool comprising relatively movable handles, mechanism on the tool to draw a band tight around an article, a shearing block fastened on the tool, a shearing pin rotatable in the block, means on the pin to turn the pin, one of the handles being arranged for relative movement in opposite directions, said handle being arranged to actuate said means by movement in one direction and being operatively connected with said mechanism upon movement in the opposite direction.

2. A banding tool comprising relatively movable handles, mechanism on the tool to draw a band tight around an article, a shearing block fastened on the tool, a shearing pin rotatable in the block, a lever on the pin, a spring tending to move the lever to a position in which the pin is in a non-shearing position, one of the handles of the tool being arranged for relative movement in opposite directions, said handle being arranged to engage and move the lever against the action of said spring by movement in one direction, to rotate the pin to a shearing position, and said handle being operatively connected with said mechanism upon movement in the opposite direction.

3. A banding tool comprising relatively movable handles, a movable ratchet on one of the handles, a pivoted dog arranged to be actuated

by the other handle to transmit motion to the ratchet by relative movement of the handles, a spring, a pivoted arm arranged to stiffen the spring, the spring being connected to move the dog pivotally into engagement with the ratchet, means limiting the pivotal movement of the arm, and thereby limiting the motion transmitted by the dog to the ratchet, and means connected with the ratchet for winding up a band, by movement of the ratchet, to tighten the band about an article.

4. A banding tool comprising relatively movable handles, a ratchet on one of the handles, a pivoted dog arranged to be actuated by the other handle and to move the ratchet by relative movement of the handles, a bolt on the dog, a nut on the bolt arranged to strike a portion of one of the handles to limit pivotal movement of the dog and thereby limit the motion transmitted by the dog to the ratchet, and means connected with the ratchet for winding up a band by movement of the ratchet, to tighten the band about an article.

5. A banding tool comprising relatively movable handles, a ratchet on one of the handles, a rocker dog arranged when actuated to advance the ratchet, a block pivoted with respect to the handles, the dog being pivoted on the block to actuate the dog by relative movement of the handles, and means connected with the ratchet for winding up a band to tighten same about an article.

6. A banding tool comprising handles relatively movable about a pivot, a ratchet on one of the handles, a rocker dog arranged when actuated to advance the ratchet, a pivoted block providing a floating pivot for the dog and disposed in the path of one of the handles, to actuate the dog by relative movement of the handles, and means connected with the ratchet for winding up a band to tighten same about an article.

7. A banding tool comprising handles relatively movable about a pivot, a rotary ratchet on one

of the handles, a pivoted dog arranged to be actuated by the other handle to transmit rotary movement to the ratchet by relative movement of the handles, means connected with the ratchet for winding up a band to tighten same about an article, the tool having a shearing edge, a shearing pin mounted adjacent the shearing edge to turn on an axis between the axis of the ratchet and the article being banded, the pin having means to turn it, one of said handles being arranged to actuate said means to turn the shearing pin relative to the shearing edge, to effect a shearing action.

8. A banding tool comprising a handle, a ratchet and a block pivoted on the handle, a rocker dog pivoted on the block and arranged when actuated by the block to advance the ratchet, a second handle pivoted on the first-mentioned handle and arranged to contact the block, spring means urging the dog into engagement with the ratchet, means connected with the ratchet for winding up a band to tighten same about an article, and shearing means for the band, the second handle being movable separately from the ratchet, block and dog on the other handle and arranged to engage and actuate the shearing means when so separately moved.

9. A banding tool comprising relatively movable handles, mechanism on the tool to draw a band tight around an article, a shearing block fastened on the tool, the block having a slot therethrough for the band, a rotary shearing pin in the block transversely of the slot, the pin having a portion removed to provide a free passage lengthwise of the slot, in one position of the pin, and to afford a shearing movement of the pin when same is rotated, one of the handles being arranged to actuate the shearing pin, and means connected to the pin to turn same and disposed to be actuated by the latter handle.

GLENN L. MCKEE.