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H. B. FOULDER
TIE TWISTING TOOL
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Inventor
Henry B. Foulder
Attorney

1,515,470
To all whom it may concern:

Be it known that I, Henry B. Foulser, a citizen of the United States, residing at Brooklyn, in the county of Kings, city and State of New York, have invented certain new and useful Improvements in Tie-Twisting Tools, of which the following is a specification.

My invention relates to tools for twisting wire ties for use in tying bags, bundles, reinforcing rods, and the like. The principal object of my invention is to provide a construction in which the wire tie, after being twisted, is automatically released from the tool. This may be accomplished in my improved construction by mechanism such that a relative movement of the operating parts in one direction twists the tie at or toward the end of the twisting operation means are set in operation such that a continuity of the operating movement results in the automatic release of the tie. Such result may be brought about by holding the enlarged or offset ends of a wire tie in suitable holding means in a twisting head. The ends of the tie constantly tend, during the twisting operation, to escape from the holding means but are prevented from leaving the holding means therefore by a member which coacts with the twisting head to hold the ends of the tie in position, until, toward the end of the twisting operation, it is withdrawn from such cooperating position.

In the preferred form of my device the twisting head is provided with a slot or slots through which the end portions of the tie are inserted, the slots being sufficiently narrow to prevent the enlarged ends of the tie from pulling therethrough. A sort of valve construction is employed to prevent the enlarged ends of the tie from passing out through the ends of the narrow slot portions, until the valve is opened at the end of the twisting operation, when the tie is to be released from the tool. If a narrow slot or slots are used as the holding means for the tie ends, such slot or slots may have an enlargement or enlargements through which the enlarged ends of the tie tend to pass during the twisting operation, such passage, however, being prevented by means covering or closing the enlarged slot portions. This covering means may be a sleeve which is normally spring-pressed into position to cover the enlarged opening or openings, and which is pushed away from its covering position by the engagement of coacting parts at the end of the twisting operation.

Mechanism of the character briefly referred to may be applied both to hand tools and bench tools for twisting ties. In the present application I will claim the invention broadly and also with specific reference to its embodiment in a hand tool. It will be obvious that a device of the character referred to effects a considerable saving of time when a large number of ties are to be twisted and also that the same will be extremely simple in its method of operation. Various features of my invention will be more fully described and particularly pointed out hereinafter.

In order that a clearer understanding of my invention may be had attention is hereby directed to the accompanying drawings forming part of this application and illustrating certain embodiments of my invention. In the drawings, Fig. 1 represents a longitudinal section taken through a hand tool for twisting wire ties, Fig. 2 is a side elevation of the device partly broken away and shown in section, Fig. 3 is a section taken on line 3—3 of Fig. 2 illustrating the twisting head, Fig. 4 is a view partly in side elevation and partly in section of the twisting head, and the axial sleeve member integral therewith and Fig. 5 is a detail view partly in side elevation and partly in section of a modified form of construction embodying a twisting head and the adjacent parts.

Referring to the drawings, the cylindrical spindle 1 is provided with a spirally grooved portion 2 and with the ungrooved cylindrical portion 3 which extends forwardly from the spirally grooved portion. The cylindrical portion 5 of the spindle is provided at its forward end with a screw-threaded portion 4 of reduced diameter which is adapted to be screwed into the rear end of the sleeve portion 5 of the twisting head, which is provided at its forward end with a flange or flanges 6 arranged in a generally radial direction.

The handle member may comprise a sleeve 7 having a forward portion 7 from which the sleeve 8 extends rearwardly. Sleeve 8 is screw-threaded on its periphery adjacent its rear end and an enlarged sleeve portion 9 is screw-threaded thereon. The hand grip 110
member 10 is mounted on the sleeve 8 between shoulders provided by the rear surface of member 8 and the forward surface of member 9 respectively.

5 Rotation is imparted to the spindle 1, when the handle member and spindle move longitudinally relatively to each other, by any suitable means. I have illustrated a plurality of balls 11 which engage the spiral grooves 2 of the spindle and are held in position by screw plug 12 which are mounted in suitably threaded openings in the casing or handle member 9, as illustrated.

The tool illustrated is provided with means by which the rear end of the spindle may be secured to the belt of the operator. In the construction shown a cylindrical abutment 13 is provided at the rear end of the spirally grooved portion 2, a cylindrical stem portion 14 extending rearwardly from the cylindrical portion 13. A short sleeve is slipped over the stem portion 14, this sleeve having an end portion 15 adapted to abut against the abutment 13 and a screw-threaded portion 16 extending rearwardly therefrom. The stem 14 has a screw-threaded portion 17 of reduced diameter at its rear end, on which a nut 18 is screwed to prevent the spindle 2 from being pulled out from sleeve 15 while permitting relative rotation between the same. A sleeve 19 having internal screw-threads is now screwed up on the threaded portion 16 of the sleeve 15 and held in position by set-screw 20.

This sleeve member 19 is provided at its rear end with a ring 21 by which the tool may be secured to the belt of the operator.

The twisting head in the device illustrated is provided, as stated, with the axial sleeve portion 5 and the flanges 6. One or more slots 22 extend through the flange or flanges 6 and constitute the means for holding the enlarged ends 23 of a wire tie indicated at 24. In the form of device illustrated a pair of slots 22 are provided which extend through the flange or head 6 in a radial direction, in alignment with each other. It should be noted, however, that a greater or less number than two such slots may be provided and that the same may be positioned in any desired manner so long as the tie ends may be readily inserted therein and will slip therefrom when the tie is to be released.

In the construction illustrated the axial sleeve portion 5 of the twisting head is provided with a pair of slots 25 which are of greater width than the slots 22 and which form extensions of the slots 22. Slots 25 are sufficiently wide to permit the passage therethrough of the enlarged ends 23 of the wire tie, when the ends of the tie are free to pass therethrough.

A sleeve member 26 is mounted in position to surround the cylindrical portion 3 of spindle 1 within the handle member. With the forward position of the handle, when the tie is about to be twisted, illustrated in Fig. 1, the enlarged portion 27 at the rear of sleeve 26 may abut against the shoulder 28 formed at the rear of the axially-threaded portion of handle member 9. The enlarged portion 27 of the sleeve is slidably mounted within the sleeve portion 8 of the handle member. Sleeve 26 extends forwardly out of the handle member and at its forward end is preferably given an enlarged thickness, as is shown at 29. This forward portion 29 of the sleeve is adapted, in the form of my device illustrated in Figs. 1 and 2, to cover the enlarged slots 25 so as to prevent the passage therethrough of the ends 23 of the tie 24.

The sleeve portion 5 of the twisting head is provided with a lengthwise slot 30 through which extends a pin 31 which is secured at its ends to the portion 29 of the sleeve 26. A spiral spring 32 is coiled within the interior of the sleeve portion 5 of the twisting head, the ends of the spring bearing respectively against the end of the screw-threaded end portion 4 of the spindle 1 and the pin 31. Accordingly this spring tends to hold the pin 31 at the forward end of sleeve 26, in which position the end portion 29 of sleeve 26 covers the slots 25 and presses against the rear surface of the flanged portion 6 of the twisting head, this position being shown in Fig. 1 of the drawings. The flanged portion 6 of the twisting head is preferably inclined rearwardly and outwardly as shown, so that the slant of the same will tend to hold the enlarged ends 23 of the wire tie against the outer surface of the portion 29 of sleeve 26, when the latter is in the forward position.

A peripheral shoulder 33 is provided on the sleeve 26 at the forward edge of the portion 27 thereof of enlarged diameter. A peripheral shoulder 34 is provided at the forward portion of the handle member, this shoulder 34 being the rear end surface of handle member 7, radially inward from the sleeve portion 8 of the handle member. Shoulder 34 is in alignment with shoulder 33 and accordingly at the end of the twisting operation, shoulder 34 engages against the peripheral abutment 33 with the result of causing sleeve 26 to move rearwardly, compressing spring 32 and causing the forward portion 29 of sleeve 26 to uncover slots 25, this position being shown in Fig. 2.

A modification of my device is shown in Fig. 5. It seems an advantage to have the enlarged ends 23 of the wire tie positioned as closely as possible to the axis of the tool. Before the tie is twisted, for the reason that less power will be required to twist the tie when it is positioned with its ends close together. This is provided for in the con-
struction shown in Fig. 5 in which a short cylindrical member 35 is slidably mounted within the forward end of the bore of the sleeve portion 5 of the twisting head. The pin 31 extends through plug 35 and has its outer ends secured in the enlarged portion 29 of the sleeve 26 so that plug 35 will move back and forth with the sleeve 26. The spring 32 in this case presses against the rear end of plug 35. In the normal position of the parts, and during the twisting of the tie, the plug 35 is in its forward position in which it covers the slots 25 from the inside. That is to say, the forward end of plug 35 fits closely within the axial central opening 36 of the twisting head so that the enlarged ends 29 of the wire tie will be prevented from passing out through the opening by the conical action of the plug 35 and the rear surface of the flanges 6. In this construction the forward end portion 29 of sleeve 26 is shorter than is the forward end portion 29 in the construction shown in Figs. 1 and 2, so that when the ends of the tie are slipped in place they will press against the surface of plug 35 and the rear surface of flanges 6 as is shown in Fig. 5.

The operation of the device will now be clear. In the form of construction illustrated in Figs. 1 and 2 the ends 29 of a wire tie are slipped into the opposite slots 22 of the twisting head, the ends 29 thereof pressing against the adjacent surfaces of the flanges 6 and the sleeve portion 29. The wire tie may be given one initial turn or not, as desired. An article to be tied such as the mouth of a bag being inserted within the loop of the wire tie, the operator then draws the handle portion of the tool rearwardly with the result that the tie is twisted until shoulder 34 abuts against shoulder 33 when the slots 25 are uncovered and the tie immediately released from the tool. It will be understood that the tension of the tie itself and the inclination of the flanges 6 of the twisting head will cause the ends of the tie to immediately pass through slots 25 when the same are uncovered. The action is the same in the construction shown in Fig. 5 except that the ends of the tie are held in position against plug 35 and the rear surface of flanges 6 during the twisting of the tie, plug 35 being moved to a rearward position in which the ends of the tie are free to pass through the opening when shoulder 34 abuts against shoulder 33.

It will be understood that my invention is broad and general in its character and is not limited to the exact details of construction described.

What I claim is:
1. In a tie-twisting tool, the combination of a shank and a sleeve surrounding the same, means for causing relative axial movement of said members to cause rotation of one of the same, a twisting head secured to the rotatable member, having slot means therein, by which the enlarged ends of a wire tie, extended therethrough, may be held, said slot means having an enlarged portion, through which said enlarged tie ends may pass, means normally preventing said tie-ends from passing through said enlarged portion of the slot means, and means for causing said preventing means to become inoperative at the end of the twisting operation.
2. In a tie-twisting tool, the combination of a twisting head having means comprising a slotted flange for holding the enlarged ends of a wire tie and means comprising an opening communicating with the slot of said flange for permitting the release of said ends, movable means covering said opening, and means for rotating said twisting head.
3. In a tie-twisting tool, the combination of a twisting head having means comprising a slotted flange for holding the enlarged ends of a wire tie and means comprising an opening communicating with the slot of said flange for permitting the release of such ends, comprising an opening and movable means covering said opening, a pair of members, one of which is movable relatively to the other to rotate said head, and means automatically operable at the end of the tie-twisting operation to move said movable means to uncover said opening.
4. In a tie-twisting tool, the combination of a handle member, a spindle extending therein having a twisting head, means for rotating said spindle as the same is progressed through said handle member, said head having means for holding the enlarged ends of a wire tie and means for permitting the release of such ends, comprising an opening and movable means covering said opening, a pair of members, one of which is movable relatively to the other to rotate said head, and means automatically operable at the end of the tie-twisting operation to move said movable means to uncover said opening.
5. In a tie-twisting tool, the combination of a handle member, a spindle extending therein having a twisting head, means for rotating said spindle as the same is progressed through said handle member, said head having means for holding the enlarged ends of a wire tie and an opening through which said ends will pass when said opening is uncovered, a member normally covering said opening, and spring means tending to hold said member in covering position, said handle member having a projection and said covering member a projection engaged thereby at the end of the twisting operation to move said covering member to position in which said opening is uncovered.
6. In a tie-twisting tool, the combination of a handle member, a spindle extending therein having a twisting head, means for rotating said spindle as the same is progressed through said handle member, said
head having an outer portion adapted to hold the enlarged ends of a wire tie and an inner portion having an opening therethrough, through which said ends tend to pass during the twisting of the tie, a longitudinally movable member normally covering said opening, spring means tending to hold said member in covering position, and means actuated by the handle member at the end of the twisting operation for retracting said covering member.

7. In a tie-twisting tool, the combination of a handle member, a spindle extending therein having a twisting head, means for rotating said spindle as the same is progressed through said handle member, said head having an outer slotted flange and an inner axial sleeve portion having an enlarged slot communicating with the slot of said flange, a sleeve extending over said axial sleeve portion and within said handle member, a spring normally holding said sleeve in forward position, and means on said handle member and sleeve for retracting said sleeve toward the end of the operative movement of said spindle through said handle member.

8. In a tie-twisting tool, the combination of a handle member, a spindle extending therein having a twisting head, means for rotating said spindle as the same is progressed through said handle member, said head having an outer slotted flange and an inner axial sleeve portion having an enlarged slot communicating with the slot of said flange, a sleeve extending over said axial sleeve portion and within said handle member, a cylindrical plug slidably mounted within said axial sleeve portion and pinned to said sleeve a spring normally holding said sleeve in forward position in which said plug closes said enlarged slot, and means on said handle member and sleeve for retracting said sleeve and plug to uncover said enlarged slot, toward the end of the operative movement of said spindle through said handle member.

9. In a tie-twisting tool, the combination of a spindle having a shank and a head, a sleeve member surrounding said shank, means for causing rotation of said spindle as said spindle and sleeve member move longitudinally, relatively to each other, a member adjacent said head, movable longitudinally relatively to said spindle, said last named member and head being shaped and positioned to cooperate in retaining the ends of a wire tie during the twisting of the same, means for holding said last named member in position to thus cooperate with said head during the twisting of the tie, and automatic means for moving said last named member out of cooperative position, to release the ends of the tie, at the end of the twisting operation.

This specification signed and witnessed this 5th day of March, 1920.

HENRY B. FOULDER.

Witnesses:

DYER SMITH,
I. McINTOSH.